

(No Model.)

6 Sheets—Sheet 1.

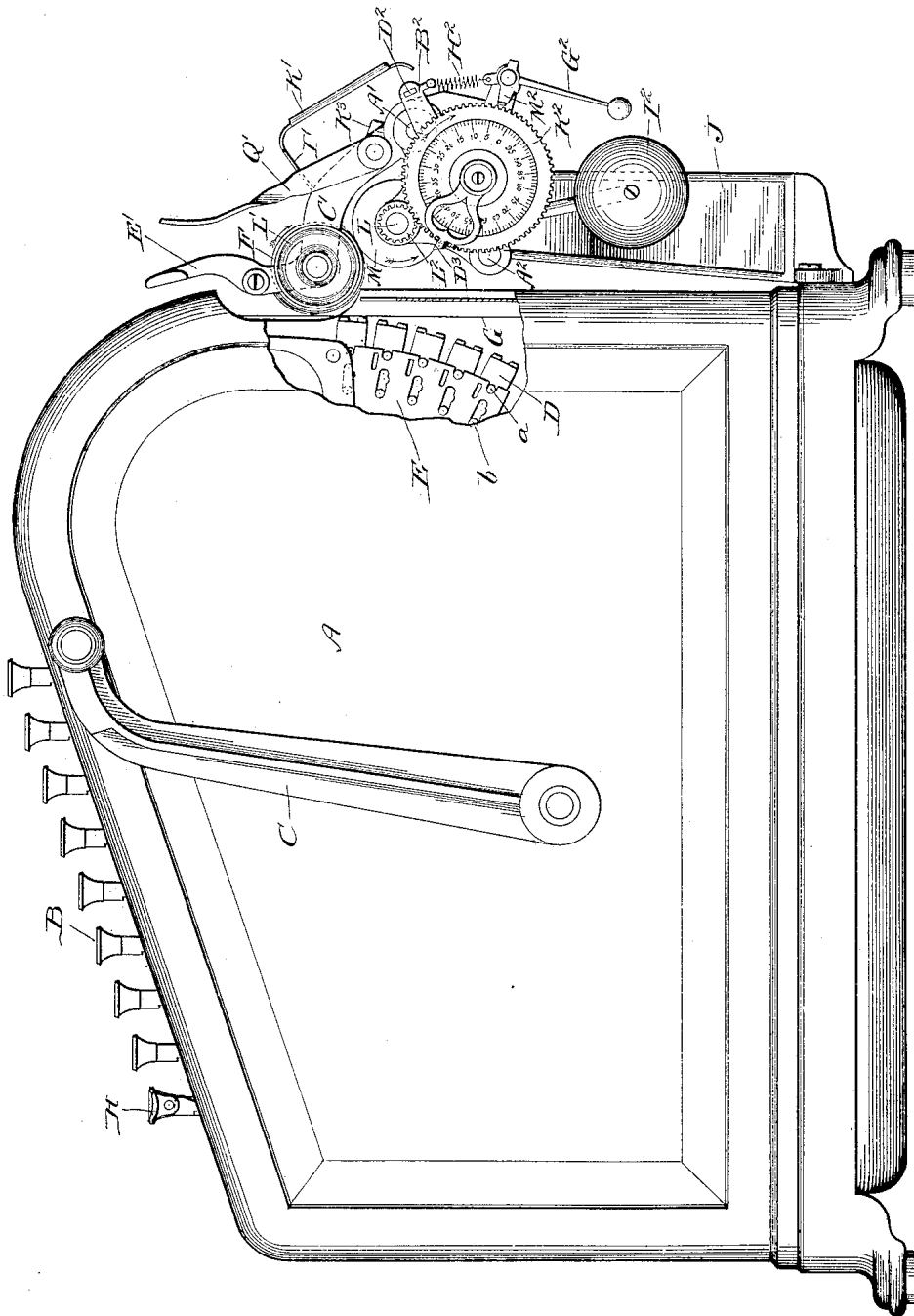
W. H. PIKE, Jr.

PRINTING ATTACHMENT FOR CALCULATING MACHINES.

No. 595,864.

Patented Dec. 21, 1897.

Fig. 1.



Witnesses
Edmund Fox Langhorne
John Taylor Langhorne

Inventor
William Henry Pike Jr.

(No Model.)

6 Sheets—Sheet 2.

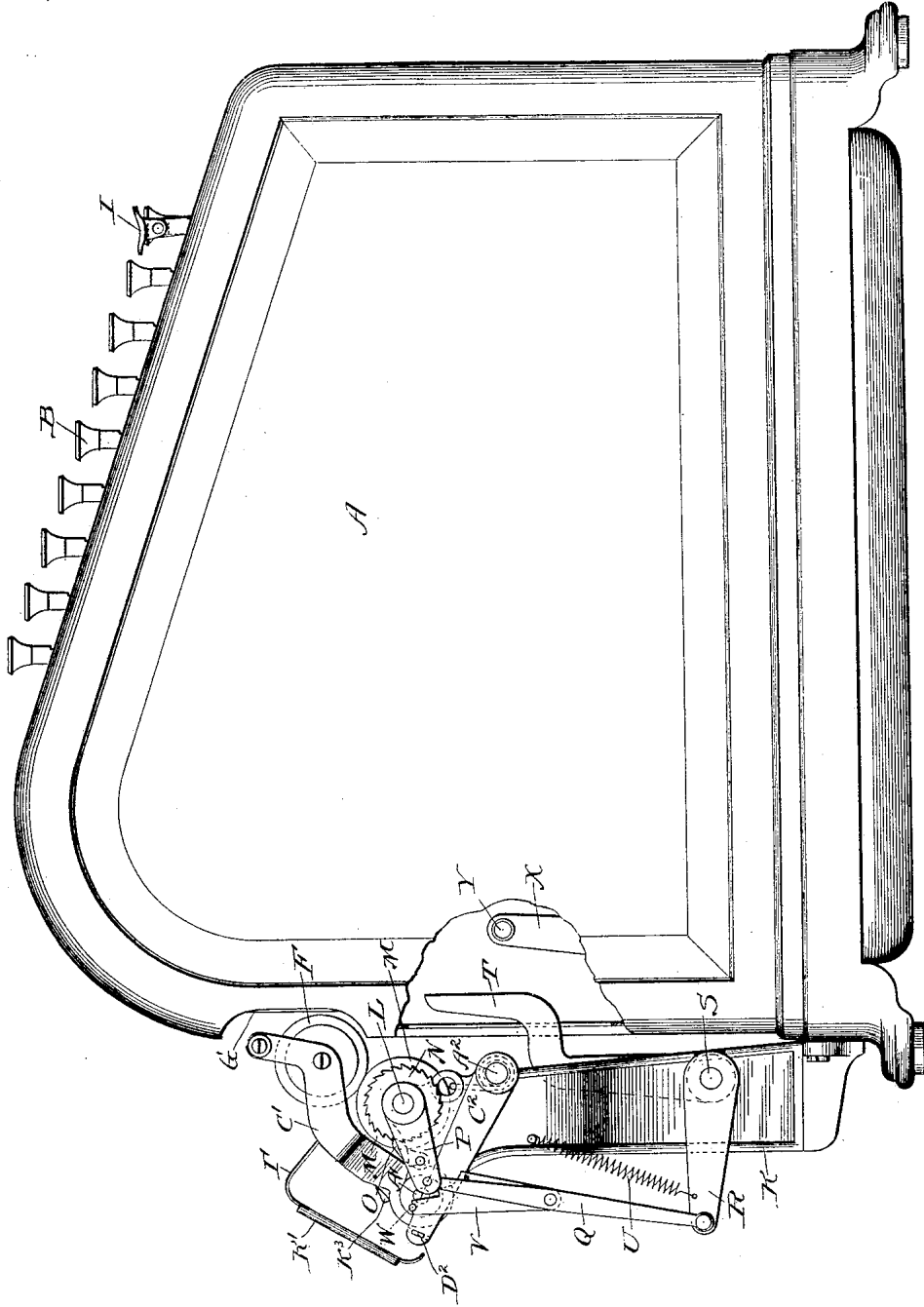
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Fig. 2.



Witnesses
Edmund Gay Langhorne
John Taylor Langhorne

Inventor
William Henry Pike Jr.

(No Model.)

6 Sheets—Sheet 3.

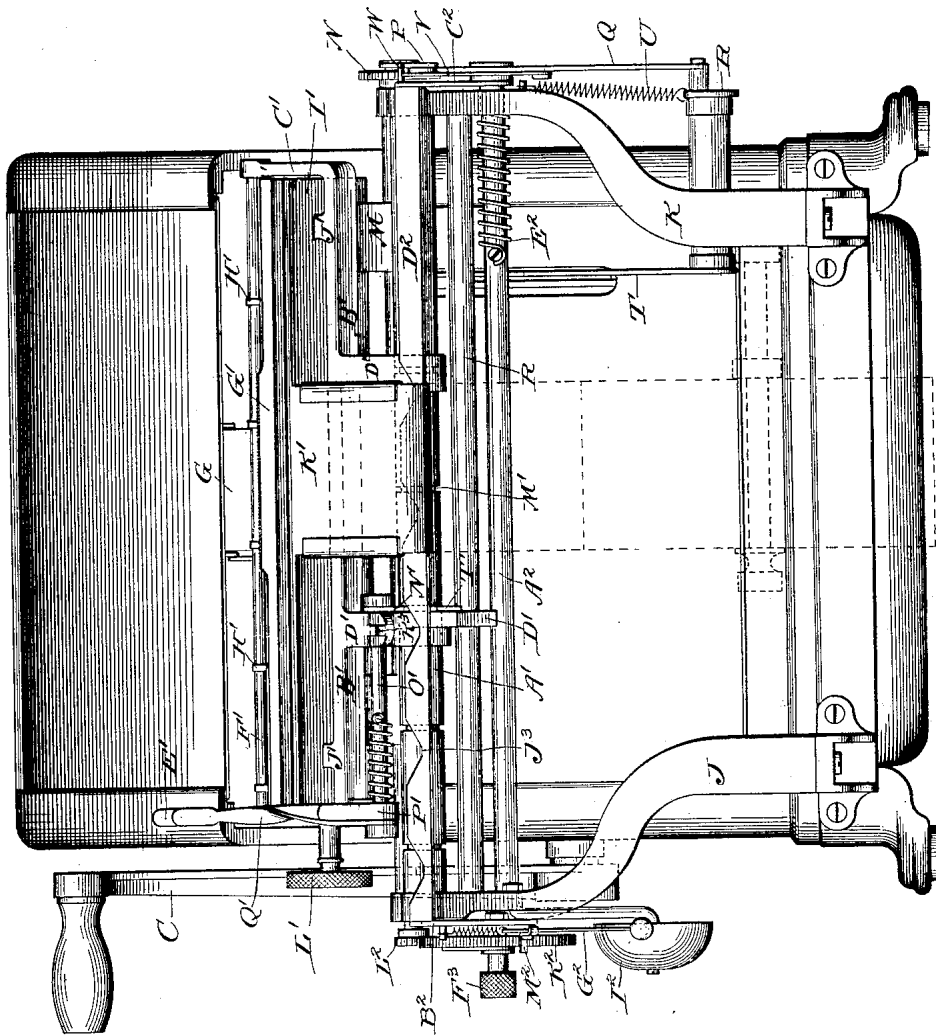
W. H. PIKE, Jr.

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Fig. 3.



Witnesses
 Edmund S. Gay Langhorne
 John Taylor Langhorne

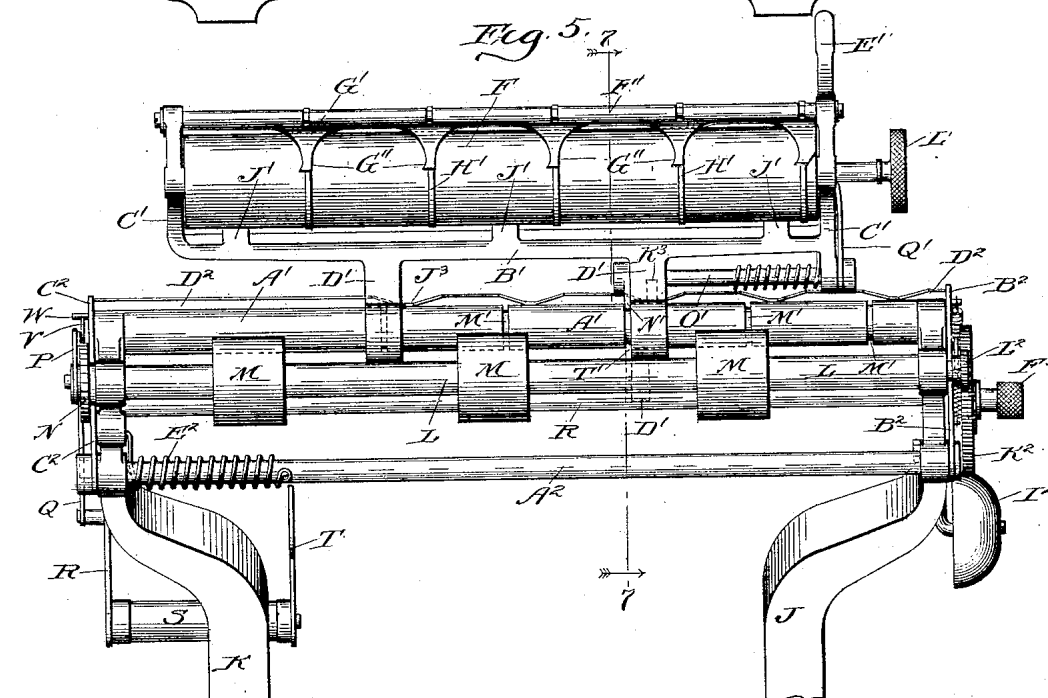
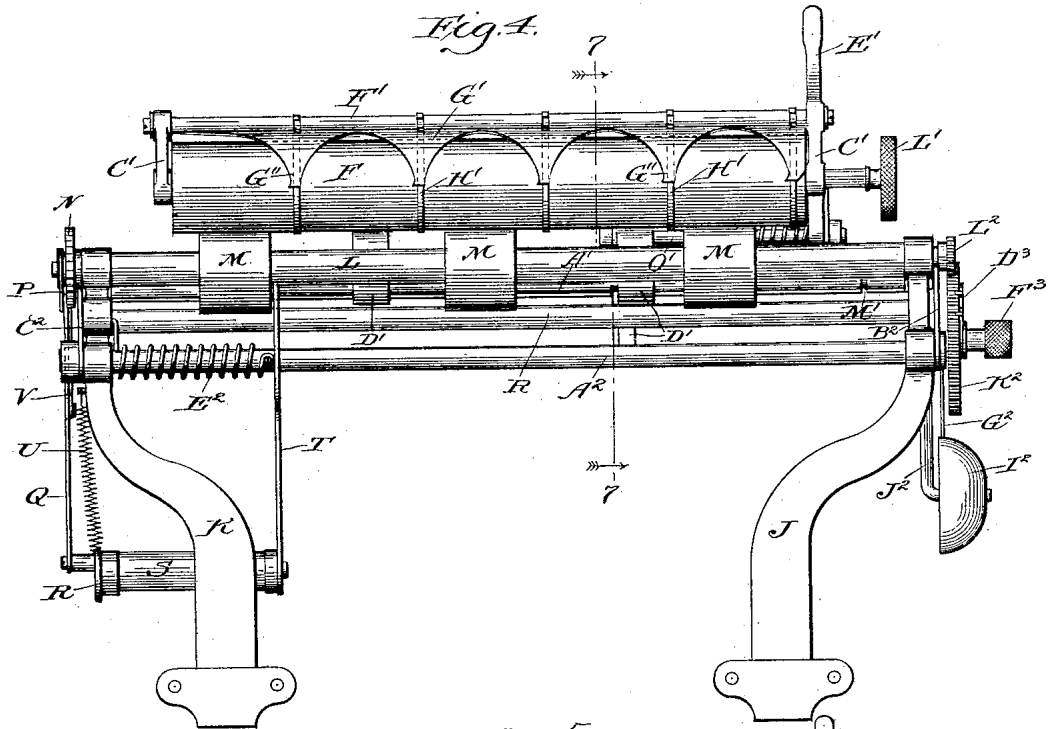
Inventor
 William Henry Pike Jr

W. H. PIKE, Jr.

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 Edmund Gay Langhorne
 John Taylor Langhorne

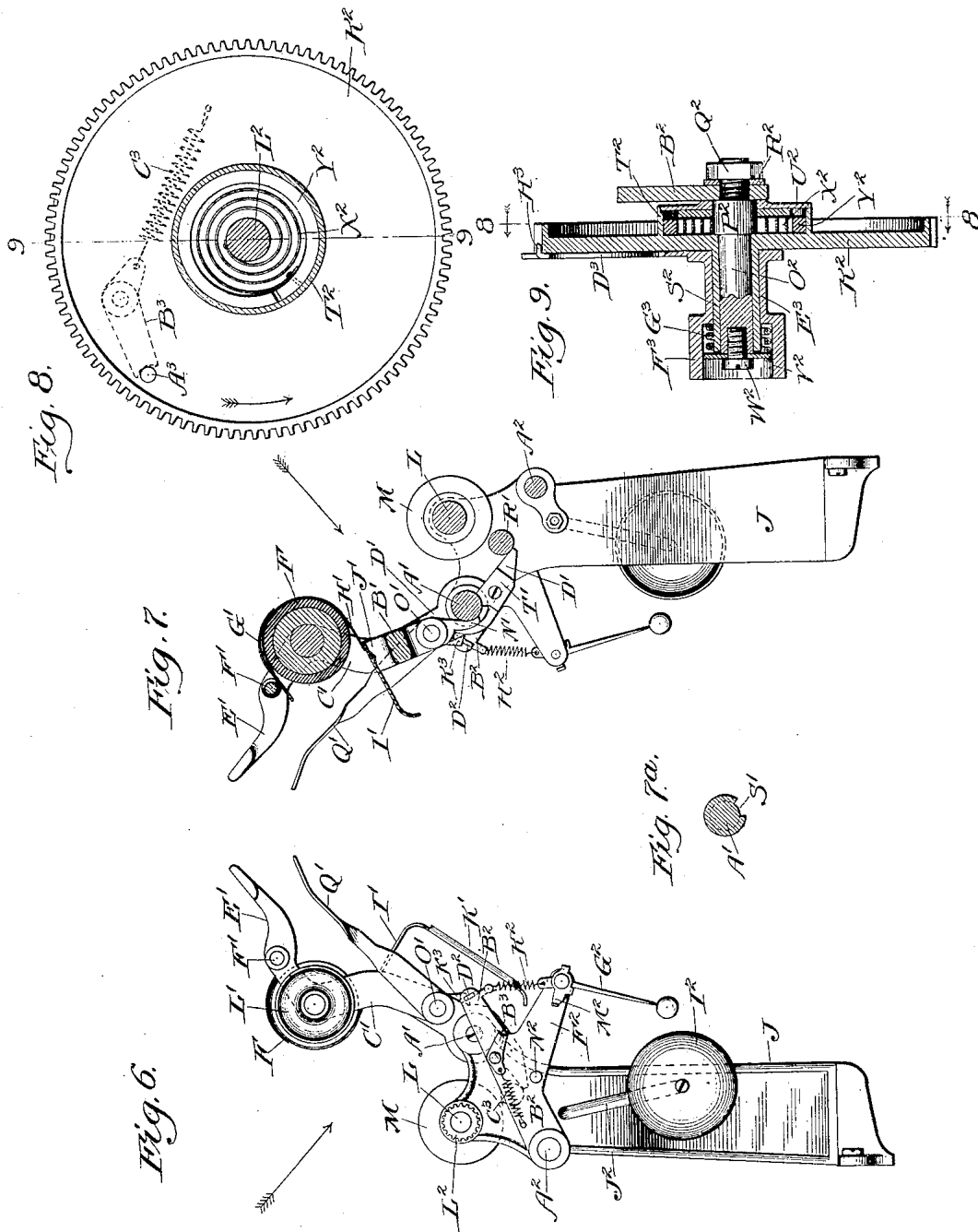
Inventor
 William Henry Pike Jr.

W. H. PIKE, Jr.

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 Edmund Gay Langhorne
 John Taylor Langhorne.

Inventor
 William Henry Pike Jr.

W. H. PIKE, Jr.

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Fig. 12.

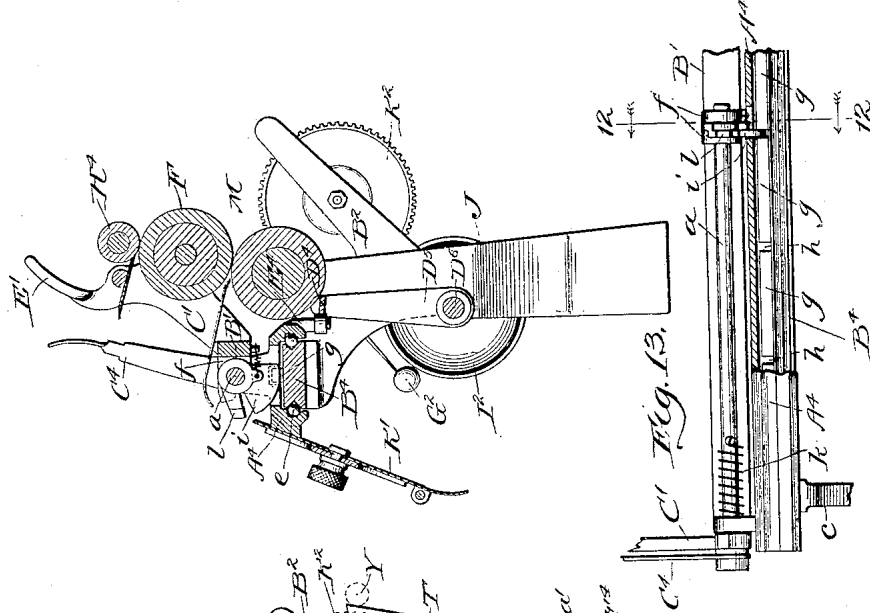


Fig. 11.

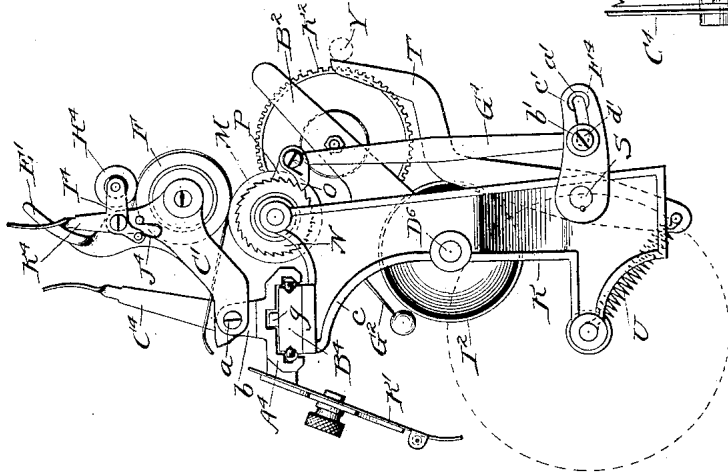
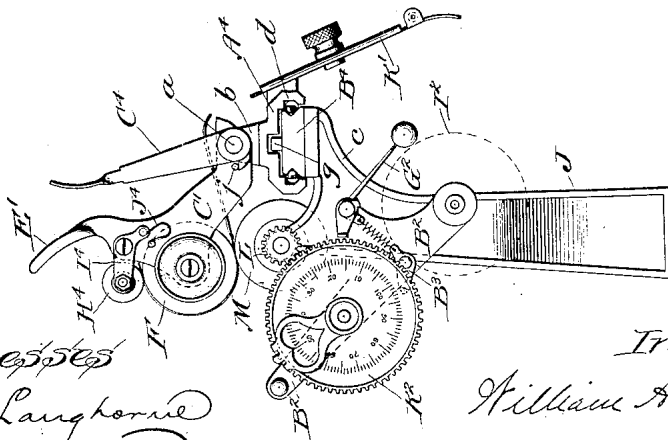


Fig. 10.



Witnesses
 C. Gay Langhorne
 J. T. Langhorne

Inventor
 William Henry Pike, Jr.

UNITED STATES PATENT OFFICE.

WILLIAM HENRY PIKE, JR., OF ST. LOUIS, MISSOURI, ASSIGNOR TO THE
AMERICAN ARITHMOMETER COMPANY, OF SAME PLACE.

PRINTING ATTACHMENT FOR CALCULATING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 595,864, dated December 21, 1897.

Application filed July 9, 1897. Serial No. 644,028. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM HENRY PIKE, Jr., a citizen of the United States, residing at St. Louis, in the State of Missouri, have invented a certain new and useful Improvement in Printing Attachments for Calculating-Machines, of which the following is a description, reference being had to the accompanying drawings, forming part of this specification.

My invention, although capable of use in various different relations, is shown as an attachment for the well-known form of calculating-machine now upon the market known as the "Burroughs' Registering Accountant," which is manufactured under and in accordance with a series of patents granted to William S. Burroughs, of St. Louis, Missouri, the earliest of which are Nos. 388,116, 388,117, 388,118, and 388,119, dated August 21, 1888, and later ones of which are No. 420,618, dated February 4, 1890, and Nos. 504,963 and 505,078, dated September 12, 1893. Reference may be had to these patents for a detailed explanation of the operating mechanism of the machine, it being sufficient for the purpose of the present application to illustrate and describe in detail the novel printing attachment constituting my present invention.

The machine illustrating the application of my improvement is primarily an adding-machine and is extensively used in banks and counting-houses for listing the amounts of checks or other items and totalizing the same. As this and other machines have been heretofore constructed and used the several amounts of the checks or other items to be listed were printed in a single column upon a paper strip carried in a supply-roll upon the machine and led thence through the printing attachment. It frequently happens in the ordinary use of these machines that a very large number of items are consecutively listed—as in banks, where a single machine may be used each day to list many thousands of checks—and the result has been that in such instances, owing to the necessity for printing the amounts in a single column, the completed list was apt to consist of an excessively-long column of figures upon a single narrow strip of paper, thus presenting the list in a somewhat inconven-

ient form for either examination or handling and preservation.

It is the object of my present invention to provide a device adapted to receive comparatively wide sheets of paper of any desired length upon which the items to be listed may be printed in successive parallel longitudinal columns side by side and any desired length, the length of the columns being regulated as desired within the limits of the length of the sheet of paper employed.

To this end my invention consists in a novel printing attachment adapted to accommodate wide sheets of paper for the purpose described and by means of which the printing can be readily examined by the operator at any time desired and by which a series of columns of uniform length may be readily and conveniently printed side by side upon the sheet of paper. The amounts may be totalized at the bottom of each column and carried forward to the top of the succeeding column, if desired, or they may be totalized only at the bottom of the last column in the series.

Having thus premised a general statement of the nature and object of my invention, I will proceed to a more detailed explanation of it by reference to the accompanying drawings, in which—

Figure 1 is a side elevation of the right side of a machine such as described and embodying my present invention, with a portion of the casing of the machine broken away to expose the printing devices within; Fig. 2, a corresponding view of the left side of the machine; Fig. 3, a rear elevation of the machine with the parts in the position shown in Fig. 1; Fig. 4, a front elevation of the printing attachment removed from the machine; Fig. 5, a front view of it, looking at it in approximately the direction of the arrows in Figs. 6 and 7, with the paper-carriage thrown back as in those views; Fig. 6, an elevation of the right side of the printing attachment with the swinging frame carrying the platen-roller thrown backward and with the gear-wheel and cooperating parts of the bell-ringing device shown in Fig. 1 removed; Fig. 7, a vertical section through the printing attachment approximately on the line 7 7 of

100

Figs. 4 and 5; Fig. 7^a, a sectional detail of the grooved shaft; Fig. 8, an enlarged detail of the gear-wheel of the bell-ringing device with its spring-casing in section; Fig. 9, a vertical section of Fig. 8 and associated parts; Fig. 10, an elevation of the right side of the printing attachment, showing a modified construction and arrangement of the parts; Fig. 11, a corresponding view of the left side of the printing attachment; Fig. 12, a vertical section of the same on the line 12 12 of Fig. 13, and Fig. 13 a detail view partly in rear elevation and partly in section.

The same letters of reference are used to indicate corresponding parts in the several views.

A is the casing of the machine, containing the operating mechanism, which it is unnecessary to illustrate or describe in detail.

B are the numbered keys of the machine arranged in a series of parallel rows in the top of the casing, there being nine keys in each row, as shown in Figs. 1 and 2, and there usually being nine rows of the keys in the machines now in use. The keys in each row are numbered consecutively from front to rear (from left to right in Fig. 1) with the nine digits, and the several rows of keys represent different denominations, that upon the right (shown in Fig. 1) representing units of cents, the next to the left tens of cents, the next units of dollars, the next tens of dollars, and so on to the ninth or left-hand row, (shown in Fig. 2,) in which the keys represent millions of dollars. On such a keyboard any amount from one cent to nine million nine hundred and ninety-nine thousand dollars and ninety-nine cents may be indicated, as will be readily understood without further explanation.

C is the operating-lever of the machine, by means of which, after the proper keys B to represent the amount to be added and printed have been slightly depressed or set, the addition and printing are effected by pulling the lever C forward to its limit of stroke and then releasing it and permitting it to return to normal position, such return being effected by a suitable spring within the machine.

So much of the printing mechanism as is necessary to an understanding of my present invention is exposed to view by the broken-away portion of the casing in Fig. 1, where the series of types cooperating with the right-hand row of keys is shown. There are nine of such series or rows of types arranged side by side and close together, one row corresponding to and cooperating with each of the rows of keys B. The types in each row are arranged in five pairs, as shown, each pair being carried by an independent type-bar or plunger D, the five plungers D in each row being mounted upon and carried by a sector-plate E, which is hung at its extreme forward end upon a transverse rod extending across the upper central part of the machine. (Not here shown.) Each plunger D is provided with two pins *a b*, the former of which is nor-

mally seated in a notch in the edge of the sector-plate E and the latter of which projects through a slot in said plate and serves to hold the plunger in position and guide it in its movement independently of the plate E. The uppermost type in each row is a cipher, and those below it represent the nine digits in regular order from "1" to "9." A roller F, hereinafter referred to, constitutes the platen with which the types cooperate, and an inking-ribbon G passes vertically between said roller and the types.

The foregoing explanation will be sufficient for a general understanding of the operation of the machine independently of my present invention, which operation is as follows: When any key B in a given row is depressed and the lever C then drawn forward to its limit of movement, the sector-plate E corresponding to such row of keys will be first swung upward until its type corresponding to the operated key is brought approximately to the printing-point in front of the center of the platen-roller F, and then, after being brought to such position, the plunger D carrying such type is thrown rearward and presses the inking-ribbon G against the roller F to print the amount represented by such type upon the strip or sheet of paper which may be passed between the roller F and the inking-ribbon G, after which, upon the release of the lever C, the parts all return to their normal position.

Before proceeding to a detailed description of my novel printing device I may explain that in Fig. 1 the lowermost or left-hand key B is partially hidden by a special key H, which stands in front of such key B in said view. This key H is the repeating-key of the machine, by depressing which and engaging it in its depressed position any of the keys B which have been previously depressed will be retained in depressed or set position until the key H is released. By means of the key H, therefore, whenever any given amount is to be successively printed several times the proper keys B may be depressed and then maintained in depressed position by means of the key H while the lever C is operated as many times as it is desired to print the amount represented by such keys. In Fig. 2, also, the lowermost or right-hand key B is partially hidden by a special key I, which is the totalizing-key. In addition to the means above described for printing at each operation of the machine an amount corresponding to the particular keys B which are operated or set at such operation the machine is provided with means for adding together the amounts printed at successive operations and preserving a total of them, and whenever it is desired to print such total amounts, as at the foot of a column of listed items, the special key I is depressed and the lever C operated, whereupon such total amount will be printed upon the strip or sheet of paper at the foot of the column. The key I is also

employed as a releasing or resetting key, by means of which if an error be made in depressing the keys B and it be desired to restore the depressed keys to normal position it may be accomplished by depressing the key I before the lever C is operated. The key I is also employed to restore the keys B to normal position after they have been depressed and held in depressed position by means of the key H during successive operations of the lever C, as above described. These special keys H and I form no part of my present invention and are employed in the machines of this character now in general use, so that no description of the particular means by which or manner in which they accomplish the results above mentioned need be given here.

Having now explained so much of the old machine as is necessary to an understanding of my present invention, I will proceed to an explanation of the latter.

With the type of any character and their suitable operating appliances I combine a platen or support for a sheet of paper, means for supporting the said platen so that it can be set in different positions opposite the type, and means for moving the platen or the paper a step as required to print the lines successively one under the other in each position of the platen to print columns of any desired length side by side.

The platen may be of any desired construction and may be curved to a greater or less degree of a size to support the entire sheet swinging about the center of the curve, or, as shown, it may be cylindrical.

In such case, as shown in Figs. 1 to 5, there are secured to the rear side of the casing A of the machine, near its lower edge, two upwardly-projecting and outwardly-curved brackets or side frames J K, which serve to support all of the devices to be now described as part of the novel mechanism constituting my invention. Journalled at its opposite ends in bearings in the upper ends of the respective side frames J K is a shaft L, upon which is secured a rubber-faced feed-roller M, in this instance divided into three sections, as shown in Figs. 4 and 5. At its right-hand end, Figs. 2 and 3, the shaft L has fast upon it a ratchet N, with which coöperates a pawl O, Fig. 2, carried by an arm P, loosely hung at its forward end upon the shaft L beside the ratchet N and having connected to its rear end the upper end of a link Q, whose lower end is connected to the rear end of an arm R, which is secured at its forward end upon a rock-shaft S, journalled in the side frame K, and having rigidly secured upon its end opposite the arm R an upwardly-projecting and forwardly-bent lever T, the lever T, rock-shaft S, and arm R constituting a bell-crank lever having the shaft S as its fulcrum. A coiled spring U, connected at its upper end to the side frame K and at its lower end to the arm R, serves to pull the latter upward and yieldingly hold the bell-crank lever and connected parts in normal position. The

movement of such parts under the stress of the spring U is limited by means of a thin arm or plate V, carried by the link Q and contacting at its upper end with a fixed stop-pin W.

Located within the machine is a lever X, whose upper end is shown in Fig. 2, which lever is so connected with the main operating-lever C of the machine, by means unnecessary to illustrate or describe here, that whenever the lever C is pulled forward to its limit of movement the upper end of the lever X will be thrown rearward and a stud Y, which it carries, be caused to contact with the lever T of the bell-crank and press the upper end of said lever slightly rearward, thereby rocking the bell-crank against the stress of the spring U and lowering the rear end of the pawl-carrying arm P, and thus permit the pawl O to slip over and engage the next lower tooth upon the ratchet N of the feed-roller M, with the result that when the operating-lever C is released and the parts return to normal position the pawl O will advance the ratchet N the space of one tooth and turn the feed-roller M a corresponding distance.

The platen is shown in the form of a roller F, which is also, preferably, a rubber-faced roller and bears upon the roller M when the parts are in operative position, as in Figs. 1, 2, and 3, and the strip or sheet of paper is passed between them, so that when the roller M is actuated at each operation of the machine in the manner and by the means just described the paper will be slightly advanced to bring a fresh surface to the printing-line. The roller F is mounted in the frame, which is supported by and adapted to be swung forwardly and backwardly upon and slid longitudinally of a rod A', which is fixed at opposite ends in rearwardly-projecting ears upon the upper ends of the fixed side frames J K, this rocking and longitudinally-moving frame constituting the paper-carriage of the machine. The rod A' is best shown in Figs. 3, 4, and 5, being also shown in section in Fig. 7, and the opposite ends of it, where it is fixed in the frames J K, in Figs. 1, 2, and 6. The rocking frame or paper-carriage in which the roller F is supported is best shown in Figs. 3, 4, and 5, but also in Figs. 1, 2, 6, and 7. It consists of a cross-bar B', provided at its opposite ends with upturned arms C', in which the opposite ends of the spindle of the roller F are journalled, and provided upon opposite sides of its middle with downwardly-extending supporting-arms D', whose lower ends surround and fit the rod A', so as to freely turn and slide longitudinally upon the latter. The paper-carriage is thus free to be swung forward and backward so as to bring the roller F into contact with the roller M, as in Fig. 1, or to carry it upward and backward and away from said roller, as in Figs. 5, 6, and 7, and is also free to be slid longitudinally of the rod A', for the purpose hereinafter explained. The right-hand side arm C' of this paper-car-

riage is prolonged a considerable distance beyond the roller F to form a handle E', by means of which the frame may be rocked forward and backward and moving along the rod A', as hereinafter described.

Firmly secured at its opposite ends in the upper ends of the side arms C', above the journals of the spindle of the roller F, is a rod F', to the under side of which is rigidly secured a curved paper-guide G', extending forward over and fitting against the upper surface of the roller F, the forward edge of this guide being cut out, as shown in Fig. 4, to form forwardly-extending fingers G'' with wide spaces between them. To further guide the sheet of paper around the roller F, there are provided curved springs H', Fig. 4, which are hooked at their upper rear ends over the rod F' (in grooves therein) and extend thence through holes in the curved guide-plate G', and thence forward beneath the fingers G'' of the latter plate and around the forward side of the roller F, and thence rearward beneath the same, and are secured at their lower rear ends to the lower paper-guide I', Figs. 4, 5, and 7, the latter consisting of a sheet-metal strip extending from side to side of the paper-carriage and secured at its forward edge upon lugs J' upon the upper surface of the cross-bar B' of said carriage, as shown in Figs. 3, 4, and 7. The rear edge of this plate I' is curved downwardly, as shown, and near its middle is provided with a depending guide-way K' for a narrow strip of paper, Figs. 3 and 6, for a purpose hereinafter explained.

At its right-hand end the spindle of the roller F projects through the side arm C' of the paper-carriage and has secured upon it a milled thumb-piece L', (best shown in Figs. 3, 4, and 5,) by means of which the roller may be readily turned in either direction when thrown backward away from the roller M, as in Figs. 6 and 7. In such position the sheet of paper upon which the printing is to be done is inserted by placing its upper forward edge upon the lower guide-plate I', Fig. 7, and pressing it forward until it catches between the under surface of the roller F and the spring-guides H'. Upon then turning the roller F forward by means of the thumb-piece L' at its right-hand end the sheet of paper will be drawn forward and upward and carried thence rearward beneath the upper guide G' and pass thence outward beneath the rear edge of said guide as it is advanced. When the sheet of paper has been thus inserted in proper position, the paper-carriage will be thrown forward and the roller F allowed to rest upon the roller M, as in Figs. 1, 2, 3, and 4, whereupon the movement of the roller M at each operation of the machine, as heretofore explained, will cause the roller F to turn with it and advance the sheet of paper. The several sections of the roller M contact with the roller F in the spaces intermediate the spring-guides H', passing around the roller F, as will appear from Figs. 4 and 5.

From the foregoing description it will be understood that upon inserting a sheet of paper in the manner described and sliding the paper-carriage to extreme right-hand position the left-hand end of the roller F and left-hand edge of the paper will be brought opposite the printing-point and that with the parts in such position a column of figures at the left-hand side of the sheet of paper may be printed thereon by consecutive operations of the machine. It will be further understood that after such a column has been printed the paper-carriage may be thrown backward to carry the roller F away from the roller M and the roller F be then turned backward by means of the thumb-piece L' at its right-hand end until the head of the printed column is brought back to the printing-line, and that upon then sliding the paper-carriage to the left the proper distance and throwing it forward again and permitting the roller F to rest upon the roller M the parts will be in a position to print a second column of figures upon the sheet of paper immediately at the right of the first column, and that by repeating this manipulation a series of columns of figures may in this manner be printed side by side upon the sheet of paper.

The lower ends of the fingers G'' of the upper paper-guide G', Figs. 4 and 5, are in about the horizontal printing-line along the roller F and they serve to indicate when the roller has been turned backward far enough to bring the sheet of paper to proper position to cause the first amount in the second and succeeding columns to be printed in the same horizontal line as the first amount in the first column, so that the heads of the several columns may all stand in horizontal line.

For the purpose of enabling the paper-carriage to be readily adjusted laterally to proper position for printing the respective columns and for locking it in its different adjusted positions while the columns are being printed and while the carriage is swung backward and forward the following means are provided: As indicated by the spaces separated from each other by the spring-guides H' in Figs. 4 and 5, the arrangement of parts shown in the drawings is intended to permit the printing of five columns side by side upon the sheet of paper, and the rod A', as shown in those views and also in Fig. 3, is provided with five circumferential grooves M', which are adapted to cooperate with a catch upon the sliding paper-carriage. As shown in Figs. 3, 6, and 7, the catch which cooperates with these grooves consists of a short arm N', which is fastened upon the left-hand end of a rock-shaft O', which is journaled at one end in one of the supporting-arms D' of the paper-carriage and at its opposite end in a rearward extension P' of one of the side arms C' of said carriage and has fastened upon it at its latter end an upwardly-extending lever Q', having its upper end shaped to form a finger-piece in convenient relation to the upper end of the handle

E' for the two to be grasped between the thumb and forefinger of the operator. A coiled spring surrounding the rock-shaft O' and secured at one end to said shaft and at its opposite end to the bearing P' of the shaft presses the latter in a direction to engage the catch N' with the grooves M' in the rod A'. The catch may be disengaged from the grooves in the rod by pressing the upper end of the lever Q' toward the handle E', which is conveniently done by grasping the two between the thumb and forefinger and simply squeezing them together. The operator will grasp the handle E' of the paper-carriage and the upper end of the lever Q' and swing the paper-carriage backward to the position shown in Figs. 6 and 7. He will then press the lever Q' toward the handle E' far enough to disengage the catch N' from the extreme right-hand groove M' in the rod A' (the left-hand groove in Fig. 3) and then slide the paper-carriage toward the left, releasing the lever Q' and continuing the movement of the carriage toward the left until the catch N' springs into the next groove M' in the rod A'. This will arrest the paper-carriage and lock it in proper position for the printing of the second column. The operator will then turn the roller F backward (by means of the thumb-piece L') until the sheet of paper is brought into proper position to begin printing at the head of the second column and will then swing the paper-carriage forward to normal position and resume the operation of the machine. In this manner and by these means the printing of the several columns side by side and at equal distances from each other may be readily effected without the exercise of any great care or skill on the part of the operator in adjusting the parts for such purpose.

To further guard against and positively prevent the printing of the columns upon the paper sheet except in proper relation to each other, the following locking device is provided, which prevents the paper-carriage being slid laterally except when swung backward to the positions shown in Figs. 6 and 7 and which prevents its being swung forward again to normal position except when its lateral adjustment is such that it is in proper position for the printing of a column of figures upon the sheet of paper. The left-hand one of the two supporting-arms D' of the paper-carriage in Fig. 3 is extended downwardly below the rod A', and when the paper-carriage is swung backward to the position shown in Fig. 7 this extension of the arm D' contacts with a fixed rod R' and limits the backward movement of the parts. The under side of the rod A' is cut away or grooved longitudinally, as at S' in Fig. 7^a, and the extension of the arm D' above mentioned has secured to it a plate T', Figs. 3 and 7, whose upper end fits in said groove S' when the paper-carriage is in rearward position and travels in said groove as the carriage is moved laterally. When the carriage is thrown forward to nor-

mal position, the upper end of this plate T' passes out of the groove in the shaft A' and enters one of the circumferential grooves in said rod. When the paper-carriage is in forward position, therefore, the engagement of this plate T' with the circumferential groove M' in the rod A' will prevent lateral movement of the carriage, and it will be necessary to swing the carriage rearward and carry the plate T' out of the circumferential groove and into line with the longitudinal groove before the carriage can be moved laterally. Likewise, when the carriage is moved laterally after being thus swung rearward the plate T' must be brought into line with another one of the circumferential grooves in the rod A' before the carriage can be thrown forward again to normal position. The cooperation of this plate T' with the circumferential and longitudinal grooves in the rod A' thus prevents the paper-carriage being moved laterally while in forward position, and when swung rearward it prevents its being swung forward again unless it is in proper position for the printing of a column of figures.

The remaining feature of my invention relates to the provision of an automatic alarm or signaling device to indicate the approach of the printed column to the lower end of the sheet of paper, so that the operator may not inadvertently continue the operation of the machine beyond the proper point for the lower end of the column, and by means of which, also, uniformity in the lengths of the several columns may be attained without careful watching on the part of the operator and consequent interference with his rapid operation of the machine, this signaling device serving a similar purpose in respect to the lengths of the columns of figures that the signaling device upon the ordinary type-writer serves in respect to the lengths of the lines. Journaled at its opposite ends in the side frames J K, below and in front of the shaft L of the feed-roller M, is a shaft A², Figs. 1 to 7.

Rigidly secured to the extreme right-hand end of the shaft A² at the outer side of the frame J is an upwardly and rearwardly projecting arm B², Figs. 1, 3, 4, 5, and 6, while rigidly secured to the extreme left-hand end of the shaft A² outside the frame K is a corresponding upwardly and rearwardly projecting arm C², Figs. 2, 3, 4, and 5. The upper rear ends of these two arms B² C² are rigidly connected by a transverse bar D², Fig. 3, so that the two side arms and the connecting-bar D² constitute a pivoted or swinging frame having the rock-shaft A² for its fulcrum or pivot. A coiled spring E², surrounding the shaft A² at its left-hand end and connected at one end to said shaft and at its opposite end to the side frame K, presses the swinging frame upward and yieldingly holds it in the position shown in Figs. 1, 2 and 3. As indicated in Fig. 1 and clearly shown in Fig. 6, the right-hand side arm B² of this swinging frame is forked to form a second

arm F^2 , which has pivoted to its rear end a striker-lever G^2 , yieldingly held in normal position by a coiled spring H^2 and adapted to be actuated by means hereinafter described to sound a gong or signal-bell I^2 , which is carried by the lower end of an arm or rod J^2 , fixed at its upper end in the side frame J . Loosely mounted upon a stud projecting from the arm B^2 (and hereinafter more fully described) is a gear-wheel K^2 , Fig. 1, which meshes with a pinion L^2 , fast upon the end of the feed-roller shaft L when the swinging frame is in its upper normal position, and which becomes disengaged from said pinion when said frame is depressed in the manner hereinafter described. The normal engagement of the gear K^2 with the pinion L^2 on the feed-roller shaft causes the gear K^2 to be turned slightly at each operation of the machine. Now the gear K^2 carries a trip device adapted to cooperate with the forwardly-projecting arm M^2 of the gong-striker G^2 to retract said striker and release it and permit its spring H^2 to throw it against the gong and sound the latter. As hereinafter described, this trip for the gong-striker is adjustable around the gear K^2 and the gear is provided with an indicator or dial, as seen in Fig. 1. In the present instance the gear has one hundred teeth and the indicator or dial one hundred divisions, and at each operation of the machine the gear-wheel is advanced the space of one tooth. By adjusting the trip around the gear-wheel to different points on the dial it may be caused to engage the gong-striker at different predetermined points in the forward movement of the gear-wheel from initial position, with the result that the trip may be adjusted to sound the gong at the end of any predetermined number of operations of the machine, after which, by depressing the swinging frame which carries the gear-wheel, the latter may be disengaged from the pinion L^2 of the feed-roller shaft and turned backward to initial position. To illustrate, if it be desired to print columns of figures having fifty amounts in each column the trip will be set at such a point upon the gear-wheel that it will require fifty forward movements of the latter from initial position to sound the gong. The operator will therefore continue his operation of the machine until the gong is sounded, which will occur at the end of the fiftieth operation of the machine, and will then shift the paper-carriage and paper to position for the next column in the manner heretofore described and reset the gear-wheel to initial position. He will then resume his operation of the machine and continue it until the gong is again sounded, which will occur at the end of the hundredth (or second fiftieth) operation of the machine, and so on until the sheet of paper is filled with columns of equal length, each containing fifty amounts.

Having now explained in a general way the purpose and operation of the signaling de-

vice, I will proceed to a more detailed description of its construction and mode of operation.

The arm B^2 is provided with a hole N^2 , Fig. 6, in which fits one end of a stud or small stub-shaft O^2 , as clearly shown in the enlarged detail view in Fig. 9. The shaft O^2 is provided with an enlargement or collar P^2 , fitting against the outer side of the arm B^2 of the swinging frame, and the reduced portion of the shaft which passes through the hole in said arm is threaded and has screwed upon its end a nut Q^2 , by means of which the shaft O^2 is rigidly secured in the arm B^2 , a washer R^2 being interposed between the nut Q^2 and arm B^2 . The gear-wheel K^2 is loosely mounted upon the shaft O^2 and is provided upon its outer side with an extended hub or sleeve S^2 , surrounding the shaft O^2 , and upon its opposite side it is provided with a cylindrical casing T^2 , whose end is closed by a cap or disk U^2 . The gear-wheel is held in position upon the shaft O^2 by a disk V^2 , secured to the front end of the shaft O^2 by means of a screw W^2 , said disk cooperating for that purpose with the front end of the hub or sleeve S^2 of the gear-wheel. Located within the casing T^2 , upon the opposite side of the gear-wheel, is a coiled spring X^2 , whose inner end is secured to the shaft O^2 and whose outer end is secured to a split friction-ring Y^2 , tightly fitted within the casing T^2 , as shown in Figs. 8 and 9. As the gear-wheel K^2 is turned forward upon the shaft O^2 by the operation of the machine, in the direction of the arrow in Fig. 8, it will wind up the spring X^2 and put it under tension, so that when the gear-wheel is released and left free to turn backward said spring will serve to turn it in that direction. The operation of the parts in this respect would be the same if the outer end of the spring were secured directly to the gear or its casing T^2 , the purpose of connecting it with said casing by means of the split friction-ring Y^2 being to furnish a connection with the gear-wheel, which will yield when the gear-wheel is turned beyond a certain limit and prevent breaking of the spring.

The gear-wheel K^2 is provided upon its inner face with a projecting stud A^2 , Fig. 8, which is adapted to cooperate with a stop B^3 , located upon the side arm B^2 of the swinging frame, as shown in Fig. 6, and in dotted lines in Fig. 8. When the gear-wheel is in initial or zero position, its stud A^2 is in contact with the rear end of the stop B^3 , and the latter serves to limit the backward movement of the gear-wheel under the stress of its spring X^2 . As the machine is operated and the gear-wheel turned forward from initial position its stud A^2 is carried away from the stop B^3 . When the gong is sounded at the end of a column and the swinging frame is depressed and the gear-wheel K^2 thereby disengaged from the pinion L^2 on the feed-roller shaft, as heretofore explained, the spring X^2

will turn the gear-wheel backward until its stud A^3 contacts with the stop B^3 , thereby arresting the gear-wheel in initial position.

The stop B^3 upon the side arm of the swinging frame might be simply a rigid projection on such side arm, but in the present instance it consists of a short lever pivoted upon said arm and yieldingly held in normal position by a spring C^3 , Figs. 6 and 8. This construction and arrangement permit the stop to yield and allow the stud A^3 to pass it in a forward direction in event the gear-wheel should be turned forward more than a complete revolution, as might be the case in the printing of long columns upon a long sheet of paper. For the purpose of printing columns of anything less than one hundred numbers, however, a rigid projection upon the side arm of the swinging frame would serve the same purpose as the yielding stop, although the latter is convenient in assembling the parts in that it enables the spring within the casing of the gear-wheel to be readily put under tension by initially turning forward the gear-wheel a revolution or two.

The adjustable trip carried by the gear-wheel consists of a pointer D^3 , Figs. 1 and 9, whose extreme outer end projects beyond the periphery of the gear-wheel and cooperates with the arm M^2 of the striker-lever. At its inner end the pointer D^3 is secured to or formed integral with a sleeve E^3 , surrounding the gear-wheel hub or sleeve S^2 and enlarged at its forward end at F^3 to form a housing, within which is confined a coiled spring G^3 , said spring bearing at its outer end against the disk V^2 , secured to the front end of the shaft O^2 , and at its inner end against the internal annular shoulder of the housing F^3 . The spring G^3 presses the sleeve E^3 inwardly and holds the pointer D^3 against the face of the gear K^2 , in which position one or more short inwardly-bent fingers H^3 upon the outer end of the pointer D^3 fit between the teeth of the gear-wheel and thereby lock the pointer to the wheel. The length of these fingers is less than the width of the gear K^2 , and consequently when they are inserted between the teeth thereof they only extend partially across the same from the outer face of the gear, so as not to interfere with the intermeshing of the gear and pinion L^2 , which pinion is narrower than the said gear and engages it only at its inner edge. The pointer may be disengaged from the wheel by pulling the sleeve E^3 outwardly against the resistance of the spring G^3 , for which purpose the outer surface of the housing F^3 of the sleeve is roughened or milled, as shown in Figs. 3, 4, and 5. The pointer can then be turned around the gear-wheel and reengaged therewith at any point desired. In Fig. 1 the gear-wheel is shown in the initial or normal position which it occupies at the beginning of the printing of a column of figures, and the pointer or trip is set to such position that it will cause the striker to sound the gong at

the end of fifty operations of the machine. This would be the adjustment of the parts for printing columns having fifty amounts. If columns of twenty-five numbers were to be printed, the pointer would be turned to the number "25" upon the dial of the gear-wheel, while for columns of seventy-five numbers it would be turned in the opposite direction to the number "75" upon the dial. In this manner by first setting the pointer at any desired number upon the dial the gong will be sounded at the end of that number of operations of the machine.

For the purpose of facilitating the release and resetting of the gear-wheel and its pointer or trip at the shifting of the paper-carriage at the end of the printing of one column of figures and preparatory to the printing of the next column the following means are provided for automatically disengaging the gear-wheel from the pinion of the feed-roller shaft by the act of shifting the paper-carriage laterally from the position of one column to another. As seen in Fig. 3, the cross-bar D^2 of the swinging frame, which carries the gear-wheel K^2 , is provided in its upper edge with a plurality of equidistant notches or depressions J^3 , five being shown in the present instance, and the left-hand supporting-arm D' of the paper-carriage in Fig. 3 is provided upon its rear side with a lug K^3 , adapted to cooperate with the bar D^2 . (See also Figs. 6 and 7.) When the paper-carriage is in any one of its proper adjusted positions, this lug K^3 upon the arm D' will stand in line with one of the notches J^3 in the bar D^2 . In Fig. 3 it is opposite the third notch from the left in that view. If the paper-carriage be now swung backward to the position shown in Figs. 6 or 7, the lug K^3 will simply enter the notch in the bar D^2 and not move the latter; but when, after being swung back, the paper-carriage is slid laterally toward position for the printing of the next column the lug K^3 , riding over the inclined side of the notch J^3 , in which it has been resting, will depress the bar D^2 and thereby swing downward the frame, of which said bar forms a part and which carries the gear-wheel K^2 . This depression of the swinging frame will disengage the gear K^2 from the pinion L^2 of the feed-roller shaft, whereupon the gear-wheel will be immediately turned backward to normal position by its spring X^2 , as heretofore explained.

In the manner and by the means above described, therefore, the gear-wheel and trip for the gong-striker are automatically released and reset to normal position at each shifting of the paper-carriage from one printing position to another, so that having first set the trip at any given number upon the dial of the gear-wheel the operator need pay no further attention to the adjustment of the signaling device so long as he desires to continue printing columns containing that number of amounts in each column. When he reaches

the end of the first column, the gong will be sounded and he will swing the paper-carriage backward, shift it laterally to position for the next column, turn the sheet of paper backward to bring the head of the column to printing position, and then swing the paper-carriage forward to normal position and proceed with the operation of the machine until a second sounding of the gong notifies him that the end of the second column has been reached, whereupon he will repeat the above-described manipulation until the sheet of paper has been filled with columns of uniform length.

The employment of my new printing attachment for printing parallel columns upon wide sheets of paper does not prevent the use of the machine for printing single columns upon long and narrow strips of paper, as heretofore. In Fig. 3 there is shown in dotted lines a roll of paper strip supported in the framework and the strip led thence upward through the paper-guide *K'*, heretofore referred to, whence it would pass forward over the paper-guide *I'*, Figs. 6 and 7, and thence upward around the platen-roller *F*, as will be readily understood.

While my invention has been described in connection with a machine for printing columns of figures, it will be understood that it is also applicable to machines for printing columns of other items or characters. It will also be understood from the description which has been given that my invention in its broader scope is not restricted to the details of construction and arrangement of parts which have been illustrated and described, but consists in the new combinations and modes of operation which have been set forth, and that while preserving the essential features of my invention in this respect the details of construction and arrangement may be widely varied. To illustrate, in Figs. 10 to 13 I have shown a modified construction and arrangement of the parts devised by me and put into practical use in which the swinging frame of the paper-carriage, which carries the platen-roller *F*, instead of being mounted to swing upon and slide longitudinally of the round rod *A'*, heretofore described, has the lower rear ends of its side arms *C'*, pivoted at *a* to ears *b*, projecting upward from the opposite ends of a sliding frame *A⁴* which frame is mounted upon a fixed cross-bar *B⁴*, rigidly secured to arms or brackets *c*, projecting rearwardly from the upper ends of the side frames *J K*, this fixed cross-bar occupying substantially the same position in the modified construction as does the rod *A'* in the construction first described. The frame *A⁴* is free to be slid longitudinally upon the bar *B⁴*, and to relieve the friction between the parts ball-bearings are interposed between them, as shown at *e*, the cross-bar being provided upon its front and rear sides with longitudinal grooves and the sliding frame *A⁴* being provided with coincident grooves to accommodate the balls.

The sliding frame *A⁴* constitutes part of the paper-carriage and accommodates the lateral adjustments of the latter for the printing of different columns, while the backward and forward movements of the carriage, to carry the roller *F* into and out of contact with the roller *M*, are permitted by the pivoting or hinging of the side arms *C'* of the swinging frame to the ears *b* of the sliding frame *A⁴* at *a*, as before explained. So far as the mere hinging of this swinging frame is concerned its pivots *a* might be simply studs or screws projecting from the ears *b*, but in the present instance its right-hand pivot *a*, Fig. 10, is a rock-shaft, which, as shown in Fig. 13, extends through the right-hand side arm *C'* and through the adjacent ear *b* upon the sliding frame *A⁴*, and thence onward to a point adjacent the middle of the machine, where its left-hand end is journaled in a bearing *f* upon the rear side of the cross-bar *B'* of the swinging frame, Figs. 12 and 13.

The fixed cross-bar *B⁴* has secured to or formed integral with its upper side a longitudinal rib *g*, which rib, as shown in Fig. 13, is provided at intervals with transverse notches *h*, these notches corresponding in purpose and function to the circumferential grooves *M'* of the rod *A'* in the main construction, Figs. 3 and 5, and occupying a similar position relatively to the other parts. As shown in Figs. 12 and 13, the cross-bar *B'* of the swinging frame has rigidly secured to it adjacent the left-hand end of the rock-shaft *a* (right-hand end in Fig. 13) a sector-plate *i*, which is adapted to travel back and forth in the respective notches *h* in the rib *g* when brought into line therewith and the frame then swung backward and forward upon its pivotal supports *a*. As shown in Fig. 12, this plate *i* is of such size and so located that when the swinging frame is in forward position the plate will rest in one of the notches *h* in the rib *g* and prevent the paper-carriage being slid longitudinally of the bar *B⁴*. When the swinging frame is swung backward to its limit of movement, however, this locking-plate *i* will be carried forward and out of the notch *h* in which it has been resting, so that the paper-carriage is then free, so far as the co-operation of this plate with the notches *h* in the rib is concerned, to be slid along the bar *B⁴*, but cannot be swung forward to normal position again except when the locking-plate *i* is brought into line with one of the notches *h* in the rib. The paper-carriage is, however, provided with an additional latch or locking device controlling its lateral adjustments, of which the rock-shaft *a*, Fig. 13, heretofore referred to, forms a part. As shown in Figs. 10 and 13, this rock-shaft has secured upon its extreme right-hand end (left-hand end in Fig. 13) an upwardly-extending arm or handle *C⁴*, corresponding to the arm or handle *Q'* in the main construction. The hub of this arm is provided with a projecting shoulder, Fig. 10, which coöperates with a stop *j* upon

the side arm C' of the swinging frame, to limit the backward movement of the arm and rock-shaft *a* under the stress of the coiled spring *h*, surrounding the rock-shaft, as shown in Fig. 13. As shown in Figs. 12 and 13, the rock-shaft has secured upon its opposite end an arm *l*, whose outer end is of substantially the same thickness and stands in line with the locking-plate *i*, heretofore described.

When the handle C⁴ and connected parts are in normal position and the swinging frame is swung backward to its limit of movement, the outer end of the arm *l* will enter the rear side of the notch *h* in the rib *g* before the rear edge of the locking-plate *i* is carried entirely out of such notch, with the result that the sliding paper-carriage is not released from the notch by merely swinging the frame backward to its limit of movement, being locked by the arm *l* before it is entirely released by the plate *i*. To then release the paper-carriage and permit it to be slid longitudinally of the bar B⁴, it is necessary to press the upper end of the handle C⁴ upward or forward toward the finger-piece E' of the side arm C' of the swinging frame, as in the case of the arm Q' and its latch in the main construction. When the arm C⁴ is thus pressed toward the arm C', the shaft *a* will be rocked and its arm *l* thrown rearward out of the notch *h* in the rib *g*, and thereby release the paper-carriage and permit it to be slid along the bar B⁴ to the position for printing the next column. In adjusting the paper-carriage in the ordinary operation of the machine the frame carrying the platen-roller will be first swung backward to its limit of movement and the finger-piece of the arm C⁴ pressed toward the finger-piece E' of the side arm of the swinging frame, and then as soon as the paper-carriage has been slid laterally far enough to prevent reengagement of the locking-arm *l* with the notch in the rib *g* the arm C⁴ will be released and the spring surrounding the rock-shaft *a* permitted to press the parts back toward normal position. The action of the spring will press the arm *l* against the rear side of the rib *g*, and it will slide along the latter as the paper-carriage is moved until it comes opposite the next notch *h* in the rib *g*, whereupon it will spring into such notch and thereby arrest the paper-carriage in position for printing the next column, and the frame carrying the platen-roller will then be swung forward to normal position and the operation of the machine be resumed. The arm C⁴ and the latch controlled by it therefore serve as a means for readily determining the positions of the paper-carriage.

The operation of the signaling device and its cooperation with the paper-carriage, whereby the trip is automatically reset to normal position at the shifting of the paper-carriage from one printing position to another, are substantially the same as in the construction heretofore described, the only differences being in the positions of the parts, the swinging frame, which carries the gear-wheel K²,

extending forward from its pivotal support instead of rearward, and the stop B³, which arrests the gear-wheel in initial position when it has been released by its disengagement from the pinion L² of the feed-roller, being located at the under side instead of at the upper side of the wheel, as shown in Fig. 10. The notched cross-bar of the swinging frame carrying this gear-wheel, which corresponds to the bar D² of the main construction, Fig. 3, is shown at D⁴ in Fig. 12, where it will be seen that it cooperates with an arm E⁴, secured to and depending from the forward side of the sliding frame A⁴ and engaging the rear edge of the bar D⁴. This bar D⁴ is secured at its opposite ends to the upper ends of two arms D⁵, fastened at their lower ends to a rock-shaft D⁶, to whose extreme right-hand end the arm B², carrying the gear-wheel K², is secured. When the sliding frame A⁴ is moved longitudinally of the bar D⁴ in adjusting the paper-carriage from one printing position to another, the lower end of the arm E⁴, engaging the rear edge of the bar D⁴, will press the latter forward and thereby rock the shaft D⁶ and throw the arm B² forward and downward and disengage the gear-wheel K² from the pinion L², as will be readily understood.

At the left-hand side of the machine, Fig. 11, the arrangement of the parts for actuating the feed-roller M is slightly but not materially different from that shown in the main construction and heretofore described. The rock-shaft S, which is actuated by the contact of the stud Y (on the lever X, Fig. 2,) has secured upon its extreme left-hand end a forwardly-extending arm F⁴, to which is pivoted the lower end of a link G⁴, whose upper end is pivoted to the pawl-carrier P, carrying the pawl O, cooperating with the ratchet N on the shaft of the feed-roller M. The arm F⁴ is provided with two holes *a' b'*, connected by a slot *c'*, and the lower end of the link G⁴ carries a stud D', which fits in and cooperates with the holes *a' b'* and may be shifted from one to the other. When engaged with the hole *b'*, which is nearer the fulcrum of the arm or lever F⁴, a less throw will be given the link G⁴ and the pawl-carrier and pawl than when the lower end of the link is swung forward and its stud engaged with the hole *a'*. The adjustment of the parts is such that when engaged with the hole *b'*, as in Fig. 11, the pawl O will slip backward over one tooth of the ratchet N and advance the latter the space of one tooth at each operation of the machine, while when the lower end of the link is swung forward and its stud engaged with the hole *a'* the pawl will be given twice as much throw at each operation of the machine and the feed-roller and paper therefore advanced twice as far as under the first-mentioned adjustment. By this means the machine may be adjusted to print the items close together in each column or farther apart, as may be desired.

In addition to the paper-guides about the

platen-roller F, I have provided in the modified construction a pressure-roller H⁴, bearing upon the upper side of the platen-roller F. The spindle of this roller is mounted at its opposite ends in the front ends of levers I⁴, pivoted to the side arms C' of the swinging frame and engaged at their rear ends by springs J⁴, Figs. 10 and 11, which serve to press the roller H⁴ into contact with the roller F. The lever I⁴ at the left-hand side of the machine, Fig. 11, is provided with three arms, the upper vertically-extending one of which, K⁴, forms a handle by which the roller H⁴ may be lifted out of contact with the roller F. The roller H⁴ is composed of sections which bear upon the roller F between the spring-guides passing around the latter, as will be readily understood without illustration.

While I have shown carriages of certain forms for supporting the platen, it will be evident that the construction may be changed; especially if a different character of platen is employed, and the carriage or the platen thereof of course may be mounted to swing or slide back and forth to and from the type in any suitable manner.

If desired, instead of a long roller M, as shown, the platen may be turned by contact with a single disk or pulley at the center of the shaft L or any other suitable gear or means from said shaft or other operating part of the machine.

Having thus fully described my invention, I claim—

1. The combination of two or more type arranged to print side by side, a support for a sheet of paper to be printed adapted to be set in different positions opposite the printing-type, and means for moving the paper longitudinally on its support whereby parallel longitudinal columns may be printed upon the paper, substantially as described.

2. The combination of two or more series of type, means for bringing any one type of a series into position to print side by side with those of other series, a rotary platen adapted to support a sheet of paper and to be moved longitudinally and set in different positions opposite the type, and means for intermittently rotating the platen in any position in which it is set whereby parallel longitudinal columns may be printed upon the paper, substantially as described.

3. The combination of two or more series of type, means for bringing any one type of a series into position to print side by side with those of other series, a platen adapted to support a sheet of paper and to be moved longitudinally and set in different positions opposite the type, devices for locking the platen in any position in which it is set, and means for intermittently moving the platen to feed the paper longitudinally whereby parallel columns may be printed upon the paper, substantially as described.

4. The combination of two or more series

of type, means for actuating any one type of each series to print side by side with those of other series, a rotary platen adapted to support a sheet of paper, a driving-roller for rotating the platen, and means for intermittently rotating the driving-roller whereby successive transverse series of impressions are made upon the paper one directly beneath the other, substantially as described.

5. The combination with a series of type and their operating devices, of a platen adapted to support a sheet of paper, a driving-roller adapted to frictionally rotate the platen, and means actuated through the type-operating devices for positively rotating the driving-roller after each printing action, substantially as described.

6. The combination with a series of type and their operating devices, of a platen adapted to support a sheet of paper, a sectional driving-roller adapted to frictionally rotate the platen, and means actuated through the type-operating devices for positively rotating the driving-roller after each printing action, substantially as described.

7. A series of printing-type and operating devices therefor in combination with supports for a sheet of paper, means for adjusting the same to different lateral positions in respect to the type, devices for locking the supports in such positions, and devices for automatically feeding the paper in each position longitudinally to print parallel columns, substantially as described.

8. In a machine of the character described, the combination with the printing-types and operating mechanism therefor, of a feed-roller mounted in fixed bearings and advanced at each operation thereof, and a laterally-adjustable paper-carriage carrying a platen-roller cooperating with said feed-roller and with the types, substantially as described.

9. In a machine of the character described, the combination with the printing-types and operating mechanism therefor, of a feed-roller adapted to be advanced at each operation of the type, and a laterally-adjustable and backwardly and forwardly movable paper-carriage carrying a platen-roller adapted to be moved into and out of contact with the feed-roller, substantially as described.

10. In a machine of the character described, the combination with the printing-types and operating mechanism therefor, of a paper-carriage mounted to swing backwardly and forwardly and move laterally upon supports, and carrying a platen-roller cooperating with the types and adapted to have a sheet of paper passed over it and adjusted laterally of the printing-line, to effect the printing in parallel vertical columns, and means for advancing the sheet of paper automatically, substantially as described.

11. The combination with the feed-roller and means for turning the same, of the platen-roller mounted to move longitudinally independently of the feed-roller and to be swung

into and out of contact therewith, for the purpose described.

12. The combination with the feed-roller and means for turning the same, of the platen-roller mounted to move longitudinally of the feed-roller and to be swung into and out of contact therewith, and means for preventing movement of the platen-roller longitudinally of the feed-roller while in contact therewith.

13. The combination with the feed-roller and means for turning the same, of the platen-roller adapted to be moved longitudinally of the feed-roller and to be swung into and out of contact therewith, and means for preventing movement of the platen-roller toward and from the feed-roller except in certain positions longitudinally of the feed-roller.

14. The combination with the feed-roller and means for turning the same, of the platen-roller adjustable longitudinally of the feed-roller and adapted to be swung into and out of contact therewith, means for preventing movement of the platen-roller longitudinally of the feed-roller while in contact therewith, and means for preventing the said platen-roller from being swung toward and from the feed-roller except when in certain positions longitudinally of the latter.

15. In a machine of the character described, the combination with the printing-types and operating mechanism therefor, of a feed-roller mounted in a fixed frame and means for automatically turning the feed-roller at each operation of the machine, and a platen-roller mounted to be moved longitudinally of the feed-roller, and to be swung into and out of contact therewith, for the purpose described.

16. In a machine of the character described, the combination with the printing-types and operating mechanism therefor, of a feed-roller mounted in a fixed frame, and means whereby it is automatically advanced at each operation of the machine, a platen-roller movable longitudinally of the feed-roller and adapted to be swung into and out of contact therewith, and means for preventing movement of the platen-roller longitudinally of the feed-roller while in contact with the latter.

17. In a machine of the character described, the combination with the printing-types and operating mechanism therefor, of a feed-roller mounted in a fixed frame and automatically turned at each operation of the machine, a platen-roller movable longitudinally of the feed-roller and adapted to be swung into and out of contact therewith, means for preventing movement of the platen-roller longitudinally of the feed-roller while in contact with the latter, and means for preventing the platen-roller from being moved toward or from the feed-roller except when in predetermined positions longitudinally of the latter.

18. In a machine of the character described, the combination with the printing-types and operating mechanism therefor, of a feed-roller mounted in a fixed frame and means whereby it is automatically advanced at each opera-

tion of the machine, a paper-carriage mounted to swing upon and slide longitudinally of a support in said fixed frame and carrying a platen-roller adapted to be swung into and out of contact with the feed-roller, and paper-guides for directing a sheet of paper between the feed-roller and platen-roller and for supporting it about the latter, for the purpose described.

19. In a machine of the character described, the combination, with the printing-types and operating mechanism therefor, of a feed-roller mounted in a fixed frame, a paper-carriage mounted to move longitudinally of said feed-roller and carrying a platen-roller adapted to be swung into and out of contact with the feed-roller and to cooperate therewith and with the types, and means for holding the paper-carriage in its different adjusted positions longitudinally of the feed-roller.

20. In a machine of the character described, the combination with the printing-types and operating mechanism therefor, of a feed-roller mounted in a fixed frame, a paper-carriage mounted to move longitudinally of said feed-roller and carrying a platen-roller adapted to be swung into and out of contact with the feed-roller and to cooperate therewith and with the types, means for holding the paper-carriage in its different adjusted positions longitudinally of the feed-roller, and means for preventing movement of the platen-roller toward and from the feed-roller except when in certain positions longitudinally of the latter.

21. The combination with the printing-types and operating mechanism therefor, of the fixed frames J, K, the feed-roller M, means whereby it is automatically advanced at each operation of the machine, the paper-carriage and a support therefor, said carriage being mounted to swing backwardly and forwardly upon and be moved longitudinally of said support, the platen-roller F mounted in said paper-carriage and adapted to be swung into and out of contact with the feed-roller M, and the paper-guides for directing a sheet of paper between the feed-roller M and platen-roller F and supporting it about the latter.

22. The combination with the printing-type and operating mechanism therefor, of the feed-roller journaled in a fixed frame, a paper-carriage, a support for the carriage mounted in the frame provided with grooves or notches, said carriage being adapted to swing back and forth upon and to be moved longitudinally of its support, a platen-roller journaled in the paper-carriage and adapted to be swung into and out of contact with the feed-roller and a latch mounted upon the paper-carriage and cooperating with the grooves of the carriage-support, substantially as described.

23. The combination with the feed-roller M and means for advancing the same, of the fixed support A' provided with the longitudinal groove S' and transverse grooves or notches

M', the paper-carriage mounted to swing upon and move longitudinally of the support A', the locking-plate T' carried by the paper-carriage and cooperating with the grooves M' and S' in the support A', and the platen-roller F journaled in the paper-carriage and cooperating with the feed-roller M.

24. The combination with the feed-roller M and means for advancing the same, of the fixed support A' provided with the grooves M', the paper-carriage mounted to swing upon and move longitudinally of the support A', the rock-shaft O' journaled in said paper-carriage and provided at one end with the latch-arm N' cooperating with the grooves M' in the support A' and at its opposite end with the operating-handle Q', the spring surrounding the shaft O' and pressing the latch-arm N' toward the support A', and the platen-roller F journaled in the paper-carriage and cooperating with the feed-roller M.

25. The combination with the feed-roller M and means for advancing the same, of the platen-roller F adapted to be swung into and out of contact with the roller M, and the paper-guide G projecting over the platen-roller and provided at points intermediate its length with the fingers G'', for the purpose described.

26. The combination with the feed-roller M and means for advancing the same, of the platen-roller F adapted to be swung into and out of contact with the roller M, the paper-guides G' and I' above and below the roller F, and the spring-guides H' passing around the forward side of said roller from the upper guide G' to the lower guide I'.

27. In a machine for printing columns of figures, the combination of a feed-roller, and means whereby it is automatically actuated to advance the paper, a platen-roller mounted to swing toward and from the feed-roller and be moved to different positions longitudinally thereof and adapted to be automatically turned by the feed-roller when in contact therewith and to be turned backward by hand when swung out of contact therewith, and means for supporting a sheet of paper about the platen-roller, whereby a column of figures may be printed upon such sheet of paper while the platen-roller is in contact with the feed-roller, and the platen-roller be then swung out of contact with the feed-roller and turned backward to reset the sheet of paper for the printing of another column of figures, and be shifted laterally into position therefor and swung back into contact with the feed-roller.

28. The combination with a series of type and their actuating devices, of a rotary platen adapted to support a sheet of paper opposite the type, means for automatically rotating the platen step by step, and adjustable alarm or signaling devices cooperating with the platen adapted to be set to indicate when the platen has been moved any predetermined number of steps, substantially as described.

29. In a machine for printing columns of

figures, the combination with a feed-roller, and means whereby it is automatically actuated at each operation of the machine to advance the paper at the printing-point, of a gong and a striker therefor, a revoluble trip for the striker adapted to be thrown into and out of gear with the feed-roller, and means for resetting the trip to initial position after it has been turned forward by the movement of the feed-roller to trip the striker and sound the gong.

30. In a machine for printing columns of figures, the combination with a feed-roller, and means whereby it is automatically actuated at each operation of the machine to advance the paper at the printing-point, of a gong and a striker therefor, a revoluble trip for the striker adapted to be thrown into and out of gear with the feed-roller, a resetting-spring for the trip put under tension by its forward movement under the action of the feed-roller, and means for throwing the trip out of gear with the feed-roller and permitting the spring to reset it to initial position.

31. In a machine for printing columns of figures, the combination with a feed-roller, of a gong and a striker therefor, a wheel adapted to be geared to and ungeared from the feed-roller, an adjustable trip carried by said wheel and cooperating with the gong-striker to sound the gong at the end of a predetermined number of movements of the feed-roller, and means for ungearing the wheel from the feed-roller and returning it to initial position after the trip has sounded the gong.

32. In a machine for printing columns of figures, the combination with a feed-roller, of a gong and a striker therefor, a wheel adapted to be geared to and ungeared from the feed-roller, an adjustable trip carried by said wheel and cooperating with the gong-striker to sound the gong at the end of a predetermined number of movements of the feed-roller, a resetting-spring for the wheel and trip put under tension by their forward movement, and means for ungearing the wheel from the feed-roller after the gong has been sounded and permitting the spring to reset it to initial position.

33. In a machine for printing columns of figures, the combination with a feed-roller, of a gong and a striker therefor, a wheel adapted to be geared to and ungeared from the feed-roller, and provided with an index or dial, an adjustable trip turning with said wheel and adapted to be adjusted about the dial thereof at different distances from the gong-striker to cause it to cooperate with the latter at different predetermined numbers of movements of the feed-roller, as desired, and means for ungearing the wheel from the feed-roller after the gong has been sounded by the trip and resetting the wheel and trip to initial position.

34. In a machine for printing columns of figures the combination with a feed-roller, a gong and a striker therefor, a wheel adapted

to be geared to and ungeared from the feed-roller, and provided with an index or dial, an adjustable trip turning with said wheel and adapted to be adjusted about the dial thereof
 5 at different distances from the gong-striker, to cause it to cooperate with the latter at different predetermined numbers of movements of the feed-roller, as desired, a resetting-spring for the wheel and trip put under tension by their forward movement, and means
 10 for ungearing the wheel from the feed-roller after the gong has been sounded by the trip and permitting the spring to reset it to initial position.

15 35. The combination with the feed-roller M, of the gong I² and the striker G² therefor, the wheel K² mounted upon a movable support adapting it to be moved into and out of gear with the feed-roller M, the pointer D³ spring-pressed against the face of the wheel K² and provided with fingers H³ cooperating with the toothed periphery of said wheel, and projecting at its outer end beyond the periphery of said wheel to constitute a trip for the gong-striker, and the spring X² for resetting the wheel K² when ungeared from the feed-roller M.

36. The combination with the feed-roller M provided with the pinion L², of the gong I² and
 30 striker G² therefor, the gear-wheel K² mounted upon the shaft O² fixed in a movable support B² adapting the wheel K² to be thrown into and out of mesh with the pinion L², and said wheel being provided upon its outer side with the extended hub or sleeve S² surrounding the shaft O², and upon its opposite side with the spring-casing T², the coiled spring X² confined in the casing T² and connected at its inner end to the shaft O² and at its outer end to the wheel K²,
 40 the sleeve E³ surrounding the sleeve S² and provided with the enlargement or housing F³ containing the spring G³ confined by the disk V² secured to the end of the shaft O², and the pointer D³ carried by the sleeve E³ and projecting at its outer end beyond the periphery of the wheel K² and provided with fingers H³ fitting between the teeth of the wheel K² for the purpose described.

37. The combination of the shaft O², the
 50 gear-wheel K² mounted thereon and provided with the spring-casing T², the friction-ring Y² fitting within said casing, and the spring X² located within the ring Y² and connected at its outer end to said ring and at its inner end to the shaft O², for the purpose described.

38. In a machine for printing columns of figures, the combination of means for supporting and automatically advancing a sheet
 60 of paper at the printing-point, and shifting it transversely from the position of one column to another, an alarm or signaling device, and means whereby it is automatically sounded at the end of a predetermined number of operations of the machine, and means for automatically resetting the signaling device at the shifting of the sheet of paper from one column-printing position to another.

39. In a machine for printing columns of figures, the combination of means for supporting and automatically advancing a sheet
 70 of paper at the printing-point, and shifting it transversely from the position of one column to another, an alarm or signaling device, and means whereby it is automatically sounded at the end of a predetermined number of operations
 75 of the machine, means for varying at will such predetermined number of operations of the machine necessary to the sounding of the signal, and means for automatically resetting the signaling device at the shifting of the sheet
 80 of paper from one column-printing position to another.

40. In a machine for printing columns of figures, the combination of a feed-roller automatically actuated at each operation of the
 85 machine, a platen-roller movable longitudinally of the feed-roller and provided with means for supporting a sheet of paper about it and causing it to be automatically advanced at each operation of the machine by the action
 90 of the feed-roller, a signaling device automatically sounded at the end of a predetermined number of movements of the feed-roller, and means for automatically resetting the signaling device when the platen-roller is moved
 95 longitudinally of the feed-roller to shift the sheet of paper from one printing column to another.

41. In a machine for printing columns of figures, the combination of a feed-roller, a
 100 platen-roller movable longitudinally of the feed-roller and provided with means for supporting a sheet of paper about it and causing it to be automatically advanced at each operation of the machine by the action of the feed-
 105 roller, a signaling device, and means whereby it is automatically sounded at the end of a predetermined number of movements of the feed-roller, means for adjusting the signaling device to vary at will such predetermined
 110 number of movements of the feed-roller necessary to the sounding of the signal, and means for automatically resetting the signaling device when the platen-roller is moved longitudinally of the roller to shift the sheet
 115 of paper from one printing column to another.

42. In a machine for printing columns of figures, the combination of a feed-roller, a laterally-adjustable and backwardly and forwardly movable paper-carriage carrying a
 120 platen-roller adapted to be moved into and out of contact with the feed-roller, means for supporting a sheet of paper in the paper-carriage and directing it around the platen-roller in position to be automatically advanced by
 125 the action of the feed-roller when the paper-carriage is in position for the platen-roller and feed-roller to cooperate with each other, a gong and a striker therefor, a revoluble trip for the striker adapted to be geared to and
 130 ungeared from the feed-roller, a resetting-spring for the trip, and means automatically operated at the shifting of the paper-carriage laterally from one printing column to another.

to ungear the trip from the feed-roller and permit its spring to reset it to initial position.

43. In a machine for printing columns of figures, the combination of a feed-roller, a laterally-adjustable and backwardly and forwardly movable paper-carriage carrying a platen-roller adapted to be moved into and out of contact with the feed-roller, means for supporting a sheet of paper in the paper-carriage and directing it around the platen-roller in position to be automatically advanced by the action of the feed-roller, a gong and a striker therefor, a revoluble trip for the striker adapted to be geared to and ungeared from the feed-roller and adjusted in relation to the gong-striker to cause it to cooperate therewith at different predetermined points in its forward movement, a resetting-spring for the trip, and means automatically operated at the shifting of the paper-carriage laterally from one column to another to ungear the trip from the feed-roller and permit its spring to reset it to initial position.

44. In a machine for printing columns of figures, the combination of a feed-roller, a paper-carriage mounted to be moved longitudinally of a support parallel with the feed-roller and carrying a platen-roller adapted to be swung into and out of contact with the feed-roller, means for supporting a sheet of paper in the paper-carriage and directing it around the platen-roller in position to be automatically advanced by the action of the feed-roller when the two rollers are in contact, a gong and a striker therefor, a wheel mounted upon a movable support adapting it to be thrown into and out of gear with the feed-roller and carrying a trip cooperating with the gong-striker to sound the gong, a resetting-spring for the wheel, and means intermediate the paper-carriage and movable support for the wheel for causing the latter to be thrown out of gear with the feed-roller when the paper-carriage is moved longitudinally of its support from one printing column to another, to thereby release the wheel and permit its spring to reset it to initial position.

45. In a machine for printing columns of figures, the combination of a feed-roller, a paper-carriage mounted to be moved longitudinally of a support parallel with the feed-roller, and carrying a platen-roller adapted to be swung into and out of contact with the feed-roller, means for supporting a sheet of paper in the paper-carriage and directing it around the platen-roller in position to be automatically advanced by the action of the feed-roller when the two rollers are in contact, a gong and a striker therefor, a wheel mounted on a movable support adapting it to be thrown into and out of gear with the feed-roller, a trip carried by said wheel and adjustable around the wheel to different positions relatively to the gong-striker, and adapted to cooperate with the striker to sound the gong, a resetting-spring for the wheel put under tension

by its forward movement under the action of the feed-roller, and means intermediate the paper-carriage and the movable support for the wheel for causing the latter to be thrown out of gear with the feed-roller when the paper-carriage is moved longitudinally of its support, to release the wheel and permit its spring to reset it to initial position.

46. In a machine for printing columns of figures, the combination of a feed-roller, a paper-carriage mounted to move longitudinally upon a support parallel with the feed-roller and carrying a platen-roller adapted to be swung into and out of contact with the feed-roller, means for supporting a sheet of paper in the paper-carriage and directing it around the platen-roller in position to be automatically advanced by the action of the feed-roller when the two rollers are in contact, a gong and a striker therefor, a movable frame extending longitudinally of the paper-carriage and its support, a wheel mounted upon said frame and adapted to gear with and be ungeared from the feed-roller, and provided with an index or dial, a trip for the gong-striker carried by said wheel and adjustable around its index or dial to different positions relatively to the gong-striker, a resetting-spring for the wheel, and means intermediate the paper-carriage and movable frame for moving the latter and throwing the wheel out of gear with the feed-roller when the paper-carriage is moved longitudinally upon its support, for the purpose described.

47. In a machine such as described, the combination of a feed-roller mounted in a fixed frame, a paper-carriage mounted to slide longitudinally of a support in said fixed frame and carrying a platen-roller adapted to be swung into and out of contact with the feed-roller, paper-guides for directing a sheet of paper between the feed-roller and platen-roller and supporting it about the latter, a swinging frame hung upon an axis parallel with the feed-roller and paper-carriage support and provided with a bar extending longitudinally of the latter, a gong and striker therefor, a gear-wheel mounted upon said movable frame and adapted to be moved into and out of gear with a pinion on the feed-roller, a spring yieldingly holding the movable frame in position for the gear-wheel to mesh with the pinion, a trip for the gong-striker carried by the gear-wheel and adjustable about an index on said wheel to different positions relatively to the gong-striker, a resetting-spring for the gear-wheel put under tension by its forward movement imparted by the feed-roller, and means intermediate the paper-carriage and longitudinal bar of the movable frame for causing the latter to be moved by the paper-carriage when the platen-roller is swung backward away from the feed-roller and the paper-carriage slid longitudinally of its support, to ungear the wheel from the pinion on the feed-roller and permit the

spring to rest the wheel and trip to initial position.

48. The combination of the feed-roller M and means for advancing the same, the paper-carriage mounted to swing backward and forward and slide longitudinally upon the support A' parallel to the feed-roller, and carrying the platen-roller F adapted to be swung into and out of contact with the feed-roller, the paper-guides for directing and supporting a sheet of paper about the roller F, the spring-pressed swinging frame having the bar D² extending longitudinally of the support A', the gear-wheel K² mounted upon one end of said frame and adapted to be carried into and out of mesh with the platen L² on the feed-roller shaft when said frame is moved to different positions, the gong and gong-striker, the pointer D³ movable over the index upon the wheel K² and engageable with said wheel in its different adjusted positions, and operating as a trip for the gong-striker, the resetting-spring X² for the gear-wheel, and a projection upon the movable frame, such as the lug K³, adapted to contact with and move the swinging frame when the paper-carriage is swung backward from the feed-roller and moved longitudinally of its support, to disengage the wheel K² from the pinion L² and permit

the spring to reset the wheel and pointer D³ to initial position.

49. The combination with the feed-roller and the paper-carriage and platen-roller, of the spring-pressed swinging frame having the bar D² extending longitudinally of the paper-carriage and provided with the notches J³ the gear-wheel of the signaling device mounted upon said frame and cooperating with the pinion on the feed-roller, and the projection on the paper-carriage adapted to enter one of the notches J³ in the bar D² when the paper-carriage is swung backward, and to move said bar when the paper-carriage is then moved longitudinally thereof, for the purpose described.

50. The combination with a series of printing-type and their operating devices, of a driving-roller, means actuated through the type-operating devices for rotating the same after each printing action, and means whereby the platen-roller may be moved into and out of driving contact with the driving-roller, substantially as described.

WILLIAM HENRY PIKE, JR.

Witnesses:

EDMUND GAY LANGHORNE,
WILLIAM H. MASON.