(No Model.)

W. KOCH.

ADDING MACHINE.

No. 346,925. Patented Aug. 10, 1886.

Fig. 1.

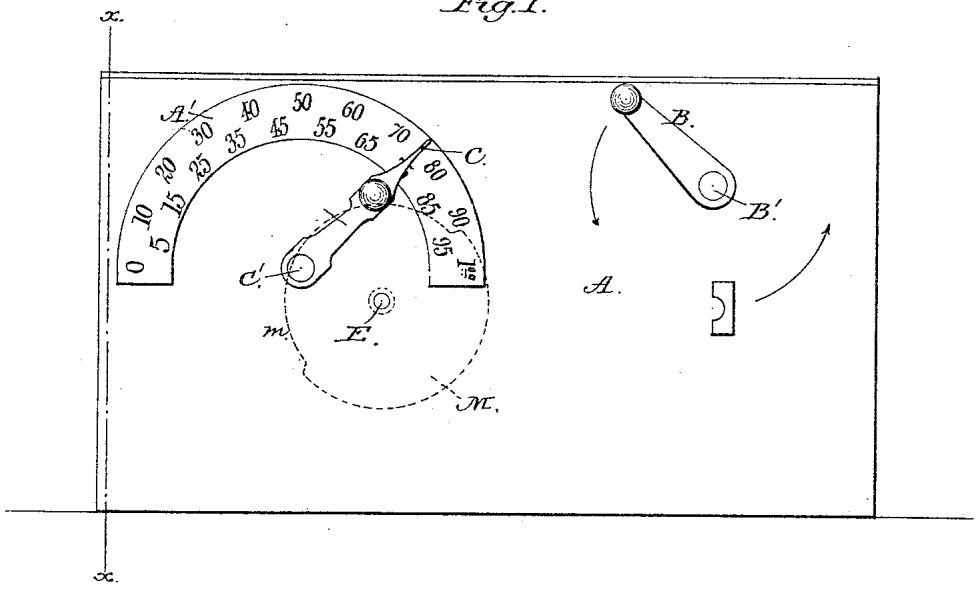


Fig. 2.

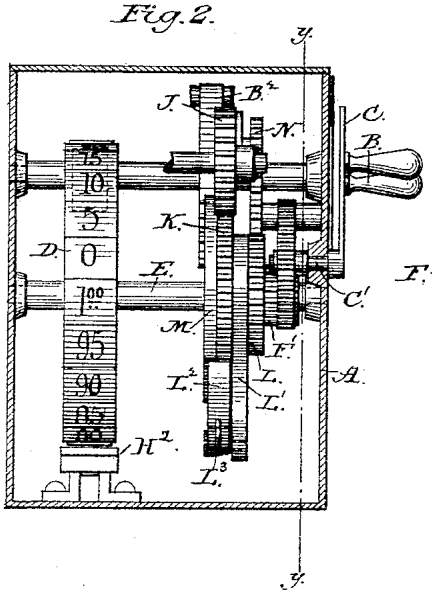


Fig. 3.

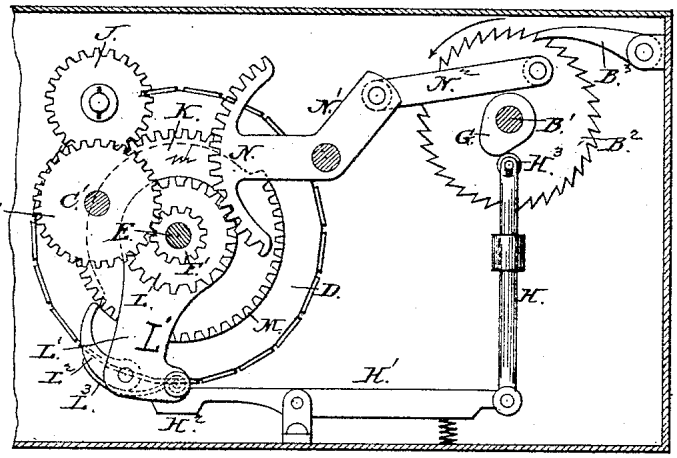
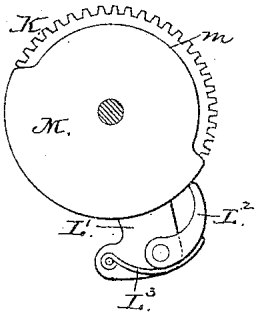


Fig. 4.



Attest:
John A. Ellis
A. B. Moore.

Inventor:
William Koch
By David A. Burr
Atty.

UNITED STATES PATENT OFFICE.

WILLIAM KOCH, OF NEW YORK, N. Y., ASSIGNOR TO THE KRUSE CHECK AND ADDING MACHINE COMPANY, OF SAME PLACE.

ADDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 346,925, dated August 10, 1886.

Application filed November 10, 1885. Serial No. 182,359. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM KOCH, of the city, county, and State of New York, have invented a new and useful Improvement in Adding-Machines; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification.

My invention relates to that class of adding-machines which are designed for adding up the sum of the several figures upon an index-plate to which an indicator-hand upon a rotating shaft may be successively turned, and which are more especially used in connection with check-printing machines.

It consists in the combination in manner, as hereinafter fully described, with a swinging pawl engaging a toothed wheel geared to the adding mechanism to actuate the same, of a semicircular disk or plate (or a wheel having a semicircular cam) whose radius is equal to that of said toothed wheel, and which is mounted and secured in close proximity to its face upon an axial shaft, upon which both the wheel and its pawl are mounted and left free to turn, so that the end of the pawl shall overlap the periphery of both the toothed wheel and segmental disk or cam and be thereby prevented, when resting on the latter, from engaging the teeth of the former, the object of my invention being to prevent during more or less of the stroke of the pawl, as determined by the position of the indicator-hand governing the position of the segmental disk or cam, its engagement with the toothed wheel, and consequently its action upon the adding mechanism geared to said wheel.

In the accompanying drawings, Figure 1 is an elevation of the front of a check-printing machine fitted with my invention; Fig. 2, a transverse section in line *x x* of Fig. 1; Fig. 3, a vertical section in line *y y* of Fig. 2; Fig. 4, a side elevation of the ratchet-wheel, its swinging pawl, and the segmental disk detached.

A represents the front face of a check printing and adding machine in simplest form; B, the crank, and B′ the shaft actuating the printing mechanism; C, the indicator arm or pointer; and C′, the shaft actuated thereby, which operates to set the type-wheel D for printing the checks.

A′ is a semicircular index-plate, over which the indicator-arm C sweeps, and which is marked with a scale of numbers corresponding to those upon the type-wheel. The type-wheel D is secured upon an independent shaft, E, mounted parallel with the shafts B′ and C′, and which is geared to the indicator-shaft C′ by means of a toothed wheel, F, on said shaft C′, meshing into a pinion, F′, on the shaft E. The pinion F′ is one-half the diameter and is cut with half the number of teeth of the wheel F, so that a semi-rotation of the indicator-shaft will produce a complete revolution of the shaft E and its type-wheel D. The printing-shaft B′ carries a cam, G, which, in its revolution, is brought to bear upon the upper end of a vertical rod, H, pivoted at its lower end to one arm of a horizontal pivoted lever, H′, whose opposite arm carries a platen, H², which, by the pressure of the cam upon the rod H, is brought to bear against the periphery of the type-wheel D, or upon an interposed strip of paper. The upper end of the rod H is fitted with a friction-roller, H³, mounted upon springs, and the cam G engages this roller. A reverse movement of the shaft B′ is prevented by means of a ratchet-wheel, B², and pawl B³.

J represents the unit-wheel of an adding-machine of the ordinary form, constructed with a train of decimal-wheels. This unit-wheel J is placed in position to gear with a toothed wheel, K, having twice the number of cogs, and which is mounted to turn loosely either upon the shaft C′ of the indicator or upon the shaft E of the type-wheel, as illustrated in the drawings.

Upon the same shaft, E or C′, upon which the toothed wheel K revolves and in proximity thereto, a smaller toothed wheel or pinion, L, is mounted to turn thereon loosely, and to the side of this pinion L next to the wheel K an arm, L′, is secured, to project radially therefrom beyond the periphery of said wheel K. A pawl, L², is pivoted to the outer end of said arm L′ in position to engage the teeth of the wheel K, its engagement being automatically secured by means of a spring, L³, as shown in

Figs. 2 and 3. A circular plate or disk, M, is also mounted upon the shaft E in close proximity to the toothed wheel K upon the side thereof opposite to the pawl-arm L′. This plate is made fast to the shaft, so as to rotate with it. One-half of its circumference is of a diameter equal to the extreme diameter of the adjacent toothed wheel K, so that the periphery of this portion of the plate shall be flush with the end of the teeth in the wheel. The remainder of the circumference of the plate is cut away (see at *m*, Figs. 1 and 4) to a much smaller diameter, and, in fact, a segmental semicircular plate of a radius corresponding to the extreme radius of the toothed wheel may be substituted for the circular plate M, cut away as described and illustrated. The end of the pawl L^2 is made wide enough to cover the rim of the toothed wheel and to overlap the rim of the circular or segmental plate M, so that when the segment or enlarged diameter of this plate is turned under the pawl the latter will be upheld, and prevented thereby from dropping into an engagement with the teeth of the wheel K. The pawl is made to sweep over an arc of one hundred and eighty degrees, or a half-circle, at each complete rotation of the printing-crank and shaft by means of a segmental rack, N, meshing into the teeth of the pinion L, to which the pawl-arm L′ is secured, said rack being fitted or formed upon the end of one arm of a centrally-pivoted oscillating bent lever, N′, whose opposite arm is coupled by a rod, N^2, with a wrist-pin on the outer side of the ratchet-wheel secured to the shaft B′. A back-and-forth movement or oscillation of the bent lever N′ and of the segmental rack N is thus obtained at each revolution of the shaft. The rack N and pinion L are so proportioned as that a complete movement of the rack in either direction will produce a corresponding semi-revolution of the pinion L, and cause the pawl to swing over a half circle, and this complete sweep of the pawl over an arc of one hundred and eighty degrees is thus obtained at each complete rotation of the printing-shaft B, and, consequently, at each imprint of the type-wheel upon a check or strip. The segmental plate or disk M, whose length is made to equal, as above described, the length of the full stroke or reciprocating movement of the pawl, is made fast to the shaft E in such position relatively to the arc over which the pawl reciprocates as that when the indicator arm or pointer C, whose movement causes a rotation of said shaft E points to 100 upon the index plate or scale, the forward end of the cam surface or segment, including the widest diameter of the plate M, shall be brought to the point at which the forward movement of the pawl begins after it has swept back freely over the uncovered teeth of the toothed wheel K, while, when the indicator-arm C is turned to the 0-point upon the scale the forward end of the cam surface or segment of the plate M shall be brought to the point at which the backward movement of the pawl begins, and the whole of the cam surface or segment be thus brought within the sweep of the pawl, so as to prevent its engagement of the wheel during any portion of its movement. If, then, the indicator-arm be placed at one extreme of the scale—viz., at 0—the rotation of the printing-crank will produce no movement of the adding mechanism. If it be placed at the opposite extreme—viz., at 100—the crank will produce a complete rotation of the unit-wheel and cause it to move the adding mechanism forward 100; and if it be placed at any intermediate point the pawl will be permitted to engage the toothed wheel at a point in its movement which shall bear the same proportion to its entire movement as the figure to which the indicator-points on the scale bears to the full number 100.

In the operation of my machine, when it is desired to print a check, the indicator-arm C is first turned to the figure indicating the denomination required on the check—as for example, "75 cents." (See Fig. 1.) This movement of the indicator will, by means of the gear-wheels F F′, cause the shaft E to rotate so as to bring the corresponding number, 75, on the type-wheel into position over the platen H^2. The rotation of the shaft E and its type-wheel will cause the disk M, secured to the shaft, to turn also, so that its segmental face shall cover so much of the path of the oscillating pawl L as is proportional to the difference between the figure indicated and the number 100. Hence, if the figure be, as shown in Fig. 1, 75, the segmental cam on the disk or plate M will be carried over one-fourth of the path of the pawl, and for that distance prevent its engagement with the toothed wheel L. The type-wheel D and the segmental disk M being set, as above described, in position by the movement of the indicator C, and a slip of paper interposed between the platen H^2 and type-wheel D, if now the crank B be turned, its revolution, operating through the wrist-pin on the wheel B^2 upon the bent lever N′, will cause the pawl-arm L′ to move first, backward to the end of its stroke, during which movement the pawl L^2 will slide back freely over the teeth of the wheel L and over the segmental disk M, then, as the wrist-pin passes the center, forward again; but as the pawl now rests upon the segmental rim of the disk M it may not engage the toothed wheel L until it has made one-fourth of its stroke, whereupon, dropping into engagement with said wheel, it will turn it forward during the remaining three-fourths of its stroke, and produce thereby a three-fourths revolution of the adding-wheel J, so that the sum which it has previously registered will now be increased by seventy-five units. In the meantime the action of the cam G upon the rod H and lever H′ will cause the platen H^2 to bear the strip of paper against the type-wheel D, so that it shall be imprinted with the figure 75.

I claim as my invention—

1. The combination, with an axial shaft, an indicating device operating the same, a toothed wheel actuating the movements of an adding-machine and mounted to revolve loosely upon said shaft, and a pawl pivoted loosely upon the shaft and adapted to engage the cogs of the toothed wheel, of a disk or plate provided with a segmental rim whose radius is equal to that of the toothed wheel and whose length is equal to the length of the stroke or reciprocating movement of the pawl, and which is secured to said shaft in close proximity to the side of the toothed wheel, so that the pawl may overlap both the segmental rim and the teeth of the wheel, all substantially in the manner and for the purpose herein set forth.

2. The combination, with an axial shaft, C′, an indicating device operating the same, a toothed wheel actuating the movements of an adding machine and mounted to revolve loosely upon said shaft C′, a pawl pivoted loosely upon the shaft and adapted to engage the cogs of the toothed wheel, a disk or plate provided with a segmental rim whose radius is equal to that of the toothed wheel and whose length is equal to the length of the stroke or reciprocating movement of the pawl, and which is secured to said shaft in close proximity to the side of the toothed wheel, so that the pawl may overlap both the segmental rim and the teeth of the wheel, of a type-wheel rotated by the rotation of said axial shaft C′, a second shaft, B′, mounted to rotate parallel with the axial shaft, a crank-wheel upon said second shaft, a platen moving to and from the type-wheel, mechanism, substantially as described, to connect the platen with the shaft B′, whereby the platen is carried against the type-wheel at each rotation of said shaft, a pinion revolving loosely upon the axial shaft C′, and to which the pawl-arm is fitted or secured, a pivoted bent lever interposed between the crank-wheel and pinion, a segmental rack upon one arm of said lever geared to said pinion, and a rod coupling the opposite arm of the lever to the wrist-pin of the crank-wheel, all substantially in the manner and for the purpose herein set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM KOCH.

Witnesses:
A. B. MOORE,
JOHN A. ELLIS.