(No Model.) 2 Sheets—Sheet 1.

W. KOCH & C. KRUSE.

CHECK PRINTING AND ADDING MACHINE.

No. 348,496. Patented Aug. 31, 1886.

Fig. 1.

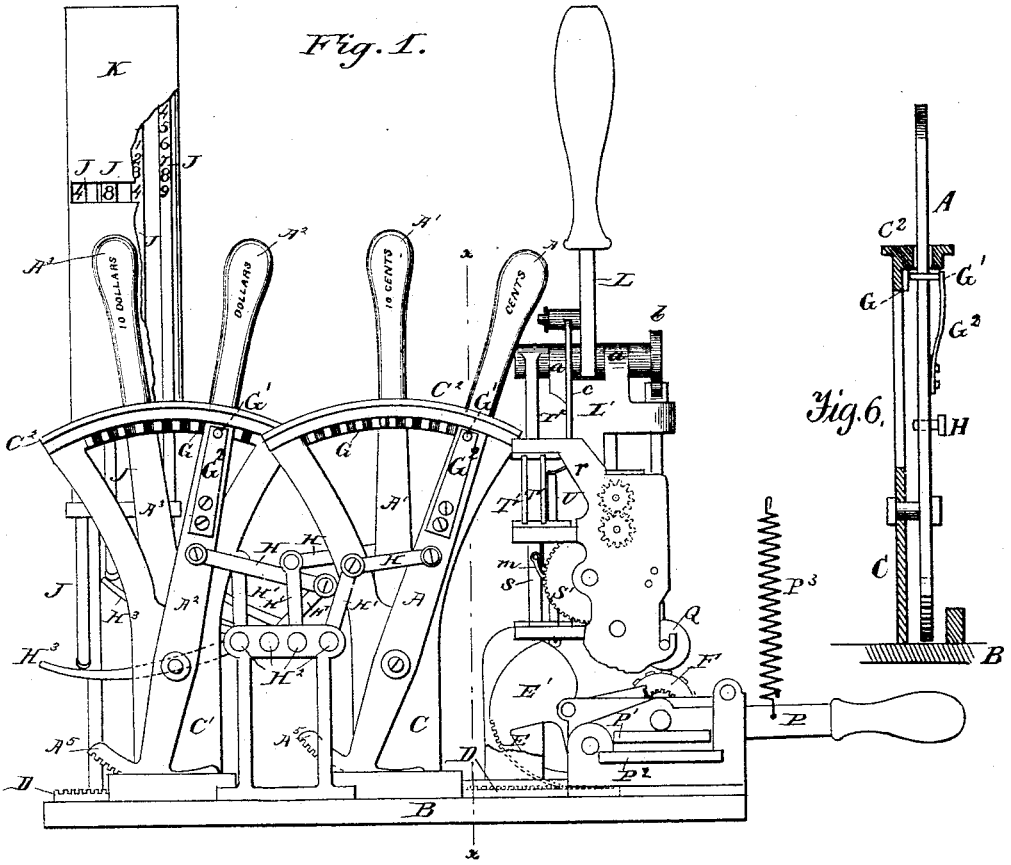

Fig. 6.

Fig. 2.

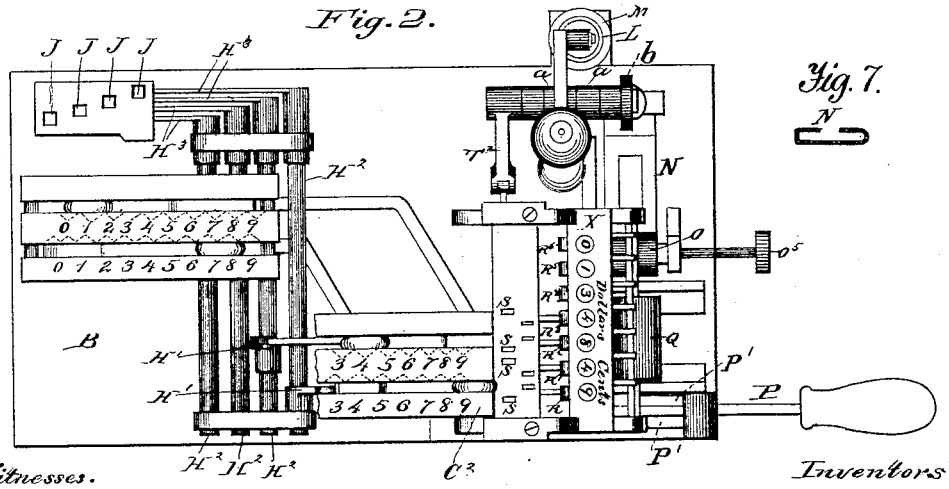

Fig. 7.

Witnesses.

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

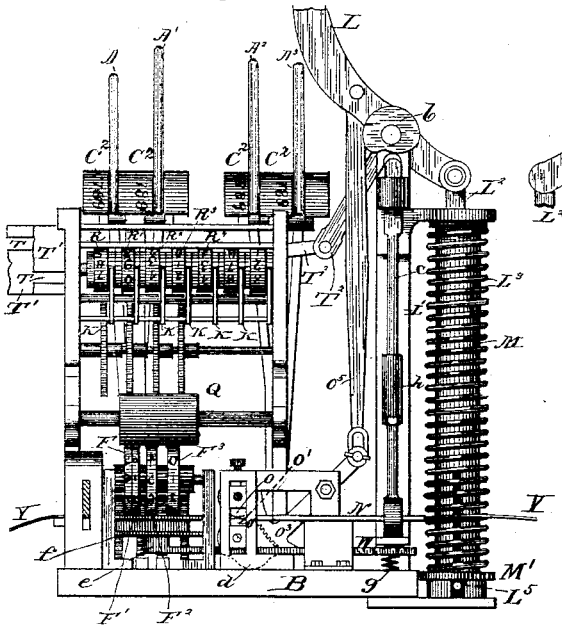


Fig. 4.

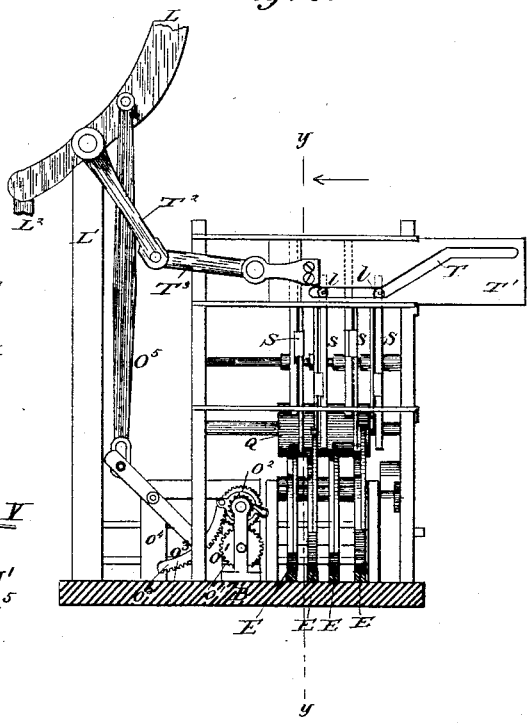
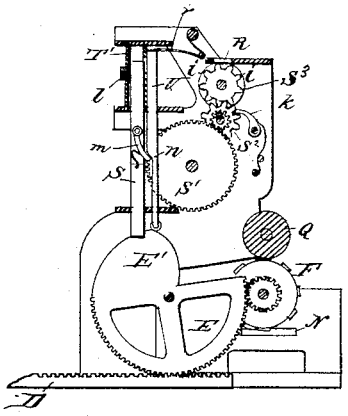


Fig. 5.



Witnesses.

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UNITED STATES PATENT OFFICE.

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

CHECK PRINTING AND ADDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 348,496, dated August 31, 1886.

Application filed March 12, 1884. Serial No. 123,857. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM KOCH and CHARLES KRUSE, both of the city, county, and State of New York, have invented new and useful Improvements in Check Printing and Adding Machines; and we 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.

Our invention relates to machines for printing and issuing checks of any required denomination, indicating the value of each as issued, adding the same, and finally indicating the sum thereof.

It has for its object a more perfect and convenient mode of operating the machine and of registering the sum of the checks.

In the accompanying drawings, Figure 1 is a side elevation of the machine removed from its casing, illustrating the levers for setting the type-wheels; Fig. 2, a top view thereof; Fig. 3, an end view of the machine, illustrating the type-wheels and adding-wheels; Fig. 4, a transverse section in line *x x* of Fig. 1, looking toward the adding mechanism, and illustrating the devices for adding the same; Fig. 5, a section in line *y y* of Fig. 4, giving an end view of the printing and adding mechanism; Fig. 6, a partially detached view, in vertical section, of one of the standards and indicating-plates with one of the levers oscillating in front of the same, illustrating the engagement of the spring-actuated stop-pin on the lever with the serrated face of the indicating-plate; and Fig. 7, a transverse section of the guideway for the paper detached.

The machine, as illustrated, is represented as having a separate lever and type-wheel for cents, tens of cents, dollars, and tens of dollars, so that it may be used for producing checks of all denominations from one up to ninety-nine hundred.

A A′ A^2 A^3, Fig. 1, are oscillating levers pivoted on opposite sides of two standards, C C′, erected upon the bed-plate B, and which carry at their upper ends curved indicating-plates C^2 C^3, along the edges of which the upper longer ends of the levers play in their vibration. The lower shorter end of each lever terminates in a toothed segment, A^5, which engages one end of a sliding rack-bar, D, moving longitudinally on the bed-plate under the lever and in line with the plane in which it vibrates. The opposite end of each rack-bar D engages a toothed semicircular segment, E, (see Fig. 5,) pivoted to oscillate between suitable supports above the bed-plate B, and which carries a segmental cam, E′, formed upon its upper edge. Each of the toothed segments E engages a pinion upon the axis of one of a series of type-wheels, F F′ F^2 F^3, mounted to revolve independently of each other upon a common axis at right angles to the rack-bars. The type representing the numerals 0 to 9 are mounted radially on each wheel at equal intervals, and the reciprocating movement of the lever A or A′, &c., pertaining to the particular type-wheel F or F′, &c., operates by means of the intermediate gearing to rotate said wheel back and forth, and thereby bring either of the numerals in a vertical position under the axis in readiness to produce an impression, the proper position of the lever required to bring any one of the types into this position being indicated by a corresponding number upon the indicating-plate C^3 at the side of the lever, (see Figs. 2 and 3;) hence by bringing either of the levers A A′ A^2 A^3 into position opposite either of the numbers on its indicating-plate the corresponding number on the type-wheel actuated thereby is brought into line for print.

To facilitate bringing each lever A A′, &c., into line with any desired number on the indicating-plate and there detaining it, a serrated or corrugated strip, G, is secured under the indicating-plate in a plane parallel with the line of movement of the lever, and a pin, G′, (see dotted lines, Fig. 1, and see also Fig. 6,) is fitted to play transversely through the lever and bear against the strip, its contact and engagement with the strip being maintained by means of a flat spring, G^2, on the outer face of the lever. The upper arm of each lever is coupled by a link, H, with an arm, H′, projecting from a rod or shaft, H^2, mounted to rock in bearings parallel with the base-plate, and whose outer end is armed with

a wiper, H^3, adapted to engage a friction-wheel upon the lower end of a vertical rod or bar, J, mounted to rest thereon and play longitudinally in suitable bearings at the rear of the machine. (See Figs. 1 and 2.) The face of each rod J is numbered to correspond with the numbers on the plate C^2 to which the levers A A′, &c., are set, and the rods are covered by a casing, K, Fig. 1, having a transverse slot therein through which one of the numerals on each bar may be seen, and which is so arranged with reference to said numerals as that when the lever actuating the bar is set opposite any given number on its indicating-plate C^2 the corresponding numeral on each bar will appear at the opening.

The printing and adding mechanism is actuated by a lever, L, pivoted upon the upper end of a standard, L′, (see Figs. 3 and 5,) and whose shorter arm is pivoted to a vertical rod, L^2, which passes down through the center of a tubular standard, M, and is made to engage a spiral spring, L^3, encircling the standard, by means of a lateral pin, L^5, which projects through a longitudinal slot in the standard, and is secured to a ring, M′, upon which the lower end of the spring rests. The upper end of the spring bears against an offset or shoulder upon the upper end of the standard M. The pivotal journals of the lever L are made to project out beyond the bearings *a a*, (see Figs. 1 and 2,) in which they are mounted. The outer journal is fitted with a cam, *b*, (see Figs. 1 and 3,) adapted to bear down, as the lever L is thrown forward, upon a vertical rod, *c*, mounted in suitable guides at the side of the standard L′, and whose lower end rests upon a horizontal lever, W, which is enlarged or bent centrally at *d*, (see dotted lines, Fig. 3,) to provide a pivotal support therefor upon the bed-plate B of the machine. The outer end of the lever is bent upward or fitted with a projection, *e*, to bear against a movable platen, *f*, so mounted under the type-wheels F F′ F^2, &c., as to play up against the same. A spring, *g*, is placed under the inner end of the lever W, and the lever is so adjusted with reference to the rod *c*, supported thereby, as that when the rod is forced down the platen *f* upon the opposite end of the lever is forced up against the type-wheels with a pressure which is made elastic by the resistance of the spring *g*. This pressure of the platen against the type admits of adjustment by means of a right-and-left nut, *h*, interposed in the length of the rod *c*, which is divided to permit of an expansion or contraction in its length by the operation of said nut. A strip of paper, Y, suitable for the checks is led from a suitable reel out between the platen *f* and the type-wheels, to which it is conducted along a guideway, N, Fig. 3, formed of a strip of sheet metal, whose edges are folded over to embrace and confine the edges of the paper strip. The paper is fed forward, each time the platen drops back from the types, by means of feed-rollers O O′, (see Fig. 3,) interposed in the guideway N. One of said feed-rollers, O, is serrated to engage the paper, and is rotated intermittently by means of a loose pinion, O^2, on its shaft, (see Fig. 4,) governed by a ratchet and pawl adapted to prevent its reverse movement, and which is made to rotate reciprocally by means of a vibrating toothed segment, O^3, geared thereto. This segment O^3 is secured upon one end of an oscillating lever pivoted to a standard, O^4, the outer end of the lever being coupled by a link, O^5, to the outer arm of the main operating-lever L, near to its pivotal fulcrum, as illustrated in Figs. 3 and 4. As the lever L descends, and the platen *f* is thereby made to carry the paper against the type-wheels, the toothed segment O^3 causes the pinion O^2 to revolve loosely upon the shaft of the feed-roller O; but as the lever L is thrown up again the reverse movement of the segment and pinion operates, by means of the engagement of pawl upon the pinion with the rack upon the shaft of the feed-wheel O, to produce a rotation of said wheel adapted to feed the underlying strip of paper forward under the type-wheel. The feed-roller O admits of being rotated by hand by means of a thumb-wheel, O^5, secured upon an extension of its axis. (See Fig. 2.) The printed end of the strip of paper Y, passed out from under the type-wheel as the lever L is lifted, is severed from the strip in the customary manner by means of a knife fitted to a lever, P, which, pivoted at one end to the frame of the machine outside of the type-wheels, extends across the strip of paper at right angles thereto, (see Figs. 1 and 2,) and is held up by a suitable spring, P^3. Embossing-dies or perforating-punches (indicated by the letters P′ P′ in the plan view, Fig. 2) are fitted on each side of the knife, to be actuated or carried by it in the customary manner against counterpart dies P^2 (see Fig. 1) on the bed of the machine, so as that when the printed check is severed from the blank strip the contiguous edges on each side of the line of severance are perforated or otherwise marked with a suitable device, so that each complete check shall be thus marked at each end. The types are inked at each revolution of the type-wheels by means of an inking-roller, Q, mounted to revolve in suitable bearings over the same. (See Fig. 3.)

The adding mechanism consists of a series of indicating-wheels, R R′ R^2, &c., mounted side by side, to rotate, each independent of the other, upon a common axial shaft, S, and each of which bears upon its periphery the index-numerals from 0 to 9, and is fitted on each side with cogs *i i*. Pawls *k k* (see Figs. 3 and 5) are fitted upon a rod, *k′*, to engage the cogs on each adding-wheel and prevent its retrograde movement. Each wheel is actuated through an interposed train of gearing by the movement of a separate vertical reciprocating bar, S, mounted in a suitable frame at the rear of the wheel. (See Fig. 5.) The bar is carried up or down by means

of a friction-roller, *l*, pivoted upon its face, (see Fig. 5,) and which engages an inclined slot, T, cut in a plate, T′, Fig. 4, fitted to slide back and forth in suitable ways at right angles to the bar, the reciprocating movement of the plate being produced by means of an arm, T^2, projecting from the inner journal of the lever L, which actuates the printing mechanism, the slide-plate and arm being coupled by a pivoted connecting-link, T^3. (See Fig. 4.)

The train of gearing by which the downward movement of the vertical reciprocating bar S is made to rotate the adding-wheel R consists of a spur-wheel, S′, engaged by a spring-actuated pawl, *m*, on the bar. (See Fig. 5.) This wheel meshes into a pinion upon the arbor of a cog-wheel, S^2, which in turn meshes directly with the cogs of a pinion, S^3, formed upon or secured to the adding-wheel R. (See Fig. 5.) The spring-actuated pawl *m* is, however, controlled by means of a vertical reciprocating rod, U, (see Fig. 5,) placed parallel with the bar S, and whose lower end is fitted with a friction-roller to rest upon a cam, E′, upon the segment gear-wheel E, which sets the type-wheel F. Its contact with the cam is insured by means of a spring, *r*, bearing upon its upper end. This governing-rod U is provided with an offset, *n*, which, bearing against the pawl *m*, will hold it back, and thus prevent its engagement with the spur-wheel S′, and the position of the offset *n*, as determined by the position of the cam U, upon which the governing-rod rests, determines the point at which the reciprocating bar S and its pawl are permitted to engage the wheel S′ and produce a movement thereof, and consequently of the adding-wheel R, geared thereto. The form and position of the cam E′ with reference to the gear-wheel E, and the adjustment of said wheel with reference to the type-wheel F, and of the reciprocating bar S, rod U, and offset *n* with reference to the spur-wheel S′ and the adding-wheel R, actuated thereby, is so made and regulated as that when the type-wheel is set at O the rod U is allowed by the cam E′ to drop so far as to keep back altogether the pawl *m*, and thus prevent wholly a movement of the wheel S′ and adding-wheel R; but when the type-wheel is set at 9 the cam will so elevate the rod U as to allow the pawl *m* to engage the wheel S′ during so much of the movement of the bar S as will cause said wheel to rotate far enough to cause a full rotation of the adding-wheel, compassing 9 out of the 10 divisions thereof. If the type be set at any intermediate number, the corresponding position of the cam E′ will produce such a corresponding adjustment of the governing-rod U as to allow the pawl to actuate the spur-wheel S′ to that extent only which is required to cause the adding-wheel to turn forward the number of divisions corresponding to the number set in position for printing by the type-wheel. Each separate indicating-wheel in the adding mechanism corresponding to a separate type-wheel is thus geared to a separate spur-wheel and actuated by a separate reciprocating bar governed by a cam upon the toothed segment by which the particular type-wheel is set. The complete revolution of each adding-wheel R is made to move the wheel R′, next to it, which indicates the next higher denomination, one-tenth of a revolution, by means of the novel gearing illustrated in detail in Figs. 6 and 7 of the drawings. In addition to the teeth S^3, secured to or formed upon one side of each adding-wheel R R′, &c., to gear mediately with the spur-wheel S^2, driven mediately by the main wheel S′, as shown in Fig. 5, cogs *i′ i′*, ten in number, are formed or fitted upon the opposite side of the same wheel, to form a second toothed wheel integral with the adding-wheel, to be engaged by a single special tooth, *i*, which projects from the spur-wheel S^2, dividing the adjacent adding-wheel of next lower denomination, so as to revolve therewith upon a common axis. This special tooth *i* is so formed as that the length of its radius to its pitch-line or point of contact with the cogs *i′ i′* is greater than that of the radius to the pitch-line of the cogs *i′ i′* which it engages. Owing to this greater length of the radius of the special tooth *i*, as compared with the radius of the cogs *i′ i′* of the wheel V engaged thereby, a one-tenth revolution of said tooth *i* will exceed or cover a greater interval than a one-tenth revolution of said cogs. The tooth *i* will consequently, in making a one-tenth revolution in contact with one of the cogs *i′*, move it forward through a one-tenth revolution of its wheel V, and then pass forward beyond it far enough to be entirely clear thereof, so that the succeeding cogs *i′ i′* may pass free without interference therewith. The adding-wheel R′, with which the wheel V is connected, or upon which it is formed, will thus be free to rotate independently of the adding-wheel R, engaged by the cog-wheel S^2, with which said single tooth *i* is connected, or upon which it is formed, although the adding-wheel R′ will nevertheless be invariably thrown forward by said tooth one-tenth of a revolution at each complete revolution of said adding-wheel R. By this arrangement any number of adding-wheels may be placed side by side to rotate independently upon a common axis, and any one in the series be actuated as a units-wheel and operated systematically to move all those upon the one side indicating the higher denominations without in any way disturbing those upon the other side indicating the units of lower denominations. One slotted sliding plate, T′, is adapted to actuate two of the reciprocating bars S, so that said bars shall be actuated thereby in succession to actuate first the left-hand adding-wheel and then that on its right hand, and in a machine with four type-wheels, as illustrated in the drawings, two such slotted sliding plates are employed, the slots being so formed and adjusted that the downward movement of the printing-lever

L will actuate two of the reciprocating bars and set two of the adding-wheels, and its return upward movement will in like manner set the other two wheels.

The adding-wheels are covered by a plate, X, Fig. 2, having a longitudinal opening therein adapted to extend transversely over the wheels and exhibit in a right line the effective numeral on each. Although the bar moves with a full stroke at each movement of the printing-lever, only so much of said stroke becomes effective in producing a movement of the adding-wheel as is proportional to the denomination of the unit on the printing-wheel which it is required to add to the units already counted.

We claim as our invention—

1. The combination, with the type-wheel in a check-machine and a pivoted lever actuating the same, of a vertical indicating-rod carrying numerals corresponding to those of the type-wheel and covered by a plate or casing slotted to permit the display of one of said numerals at a time, and an intermediate mechanism, substantially as described, for communicating the movement of the lever to said rod, so that the number displayed thereon shall correspond with the number on the type-wheel brought into position for printing a check, substantially in the manner and for the purpose herein set forth.

2. The combination, in a check-printing machine, with a series of independent type-wheels arranged each to produce an impression in the same line of print with the others, and actuated each by a separate indicating-lever, and with a platen actuated by a printing-lever to move against the type to obtain an imprint therefrom, of a series of adding-wheels corresponding in number with the type-wheels, each moving independently of that preceding it in order, and mechanism, substantially as described, whereby the adjustment of either printing-wheel to print a cardinal number will throw the adding-wheel appropriate to said type-wheel into gear with the printing-lever, to be actuated by its movement in obtaining an imprint of the number on the type-wheel, substantially in the manner and for the purpose herein set forth.

3. The combination, in a check printing and adding machine, constructed substantially as herein described, with its type-wheel and with the reciprocating bar S, actuated mediately by the printing-lever L in its movement to produce an impression from the type-wheel upon the check, the pawl *m* upon said bar, the spur-wheel S′, engaged by said pawl, and the adding-wheel actuated mediately by said spur-wheel, of a toothed segment, E, geared to the type-wheel, a cam, E′, upon said segment, a reciprocating governing-rod, U, placed parallel with the reciprocating bar S, to rest upon and be adjusted by the position of the cam E′, and an offset, *n*, on said rod adapted to engage the pawl on the bar, all substantially in the manner and for the purpose herein set forth.

4. The combination, with the type-wheel in a check-printing machine, and with an adding-wheel for registering the sum of the denominations of the several checks printed from the wheel, a printing-lever by whose movement an impression is obtained upon the check-strip from the type-wheel, a reciprocating pawl engaging the adding-wheel to move it forward, and mechanism, substantially as herein described, whereby the movement of the printing-lever to produce an imprint on the check is made to actuate said pawl and move the adding-wheel, of a wheel geared to the type-wheel to move in unison with it, a peripheral cam carried by said wheel, and a movable bar interposed between the cam and the pawl to control the latter, whereby the engagement of the pawl with the adding-wheel is governed by the position of the type-wheel and cam, substantially in the manner and for the purpose herein set forth.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

WILLIAM KOCH.
CHAS. KRUSE.

Witnesses:
P. ELBERT NOSTRAND,
G. H. SPENCER.