Feb. 16, 1937. E. J. WARD 2,070,763

MACHINE FOR PRINTING MONEY VALUES

Filed Oct. 30, 1934 4 Sheets-Sheet 1

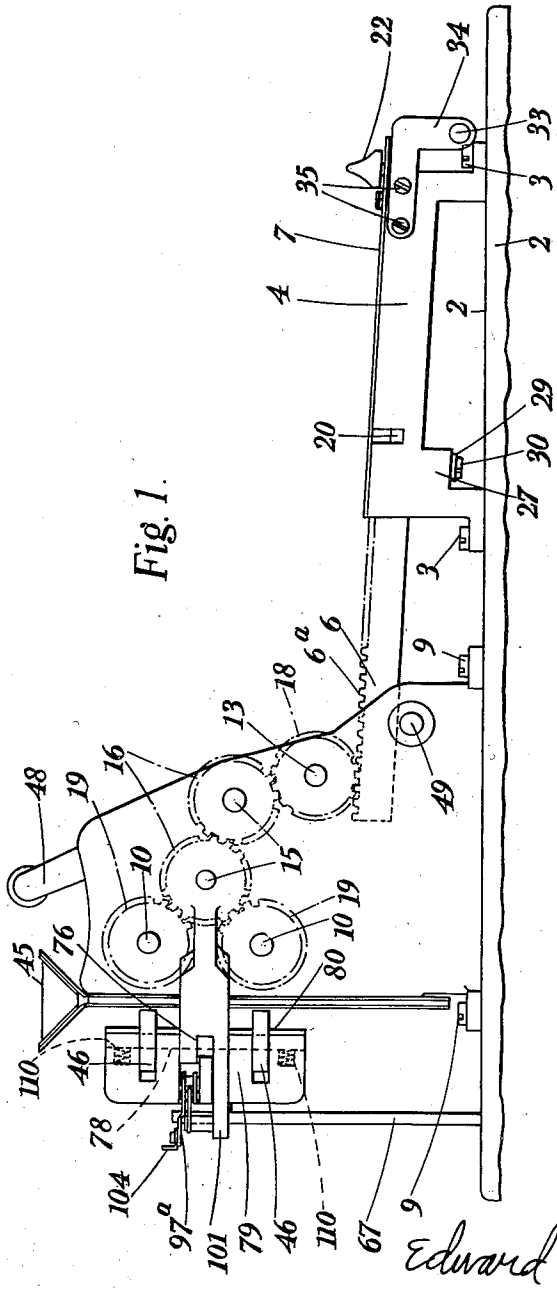


Fig. 1.

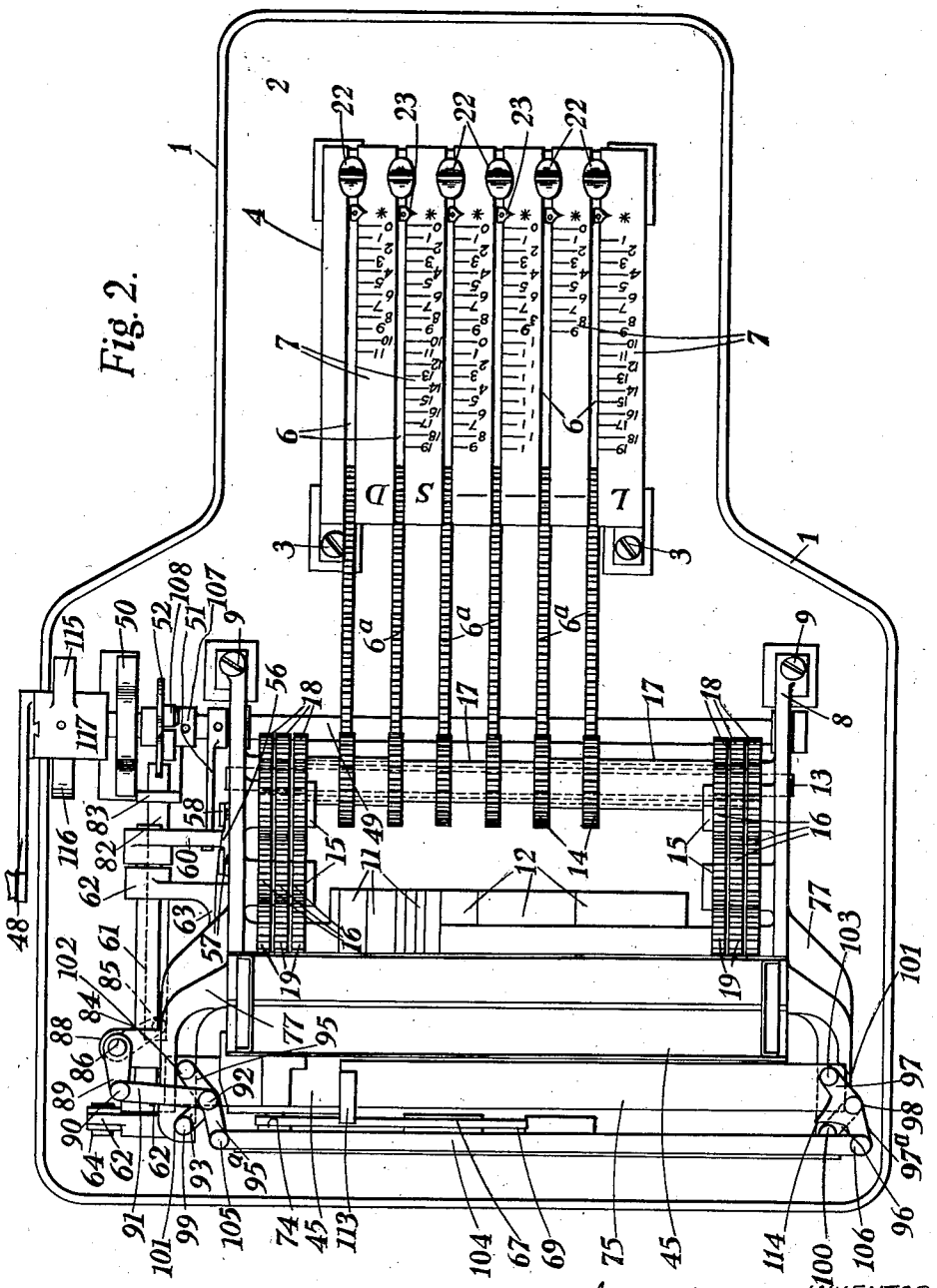
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MACHINE FOR PRINTING MONEY VALUES

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Fig. 2.



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Fig. 3.

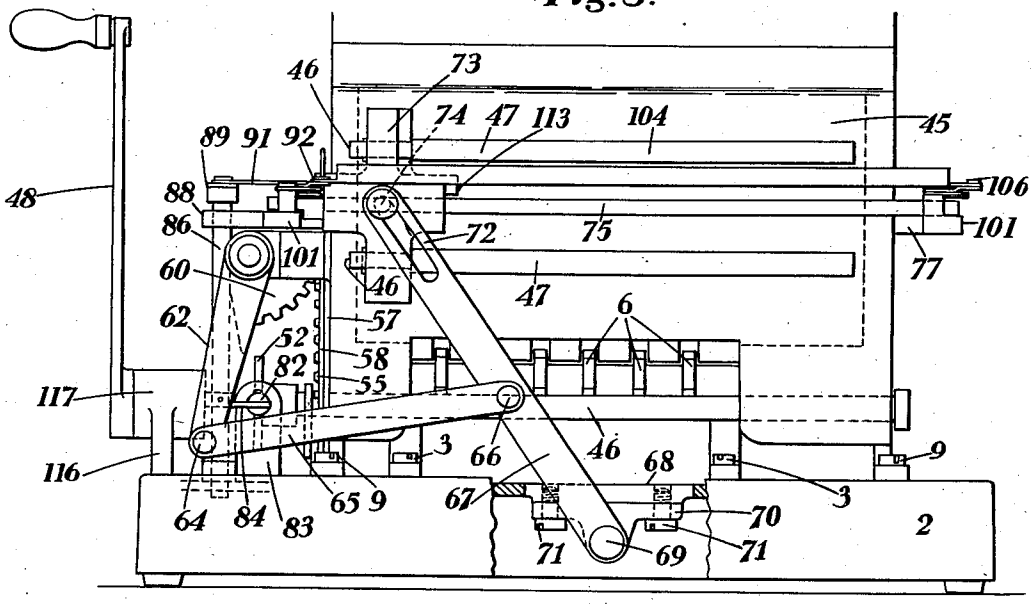


Fig. 5.

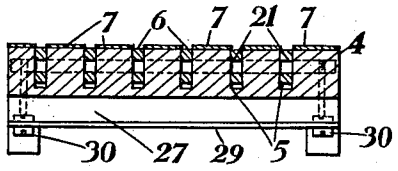
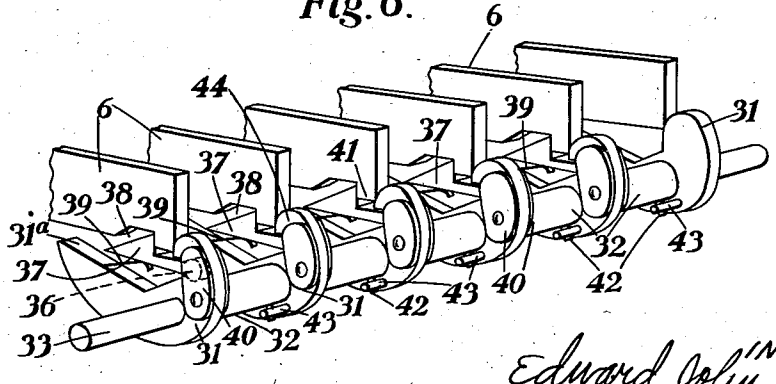


Fig. 6.



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MACHINE FOR PRINTING MONEY VALUES

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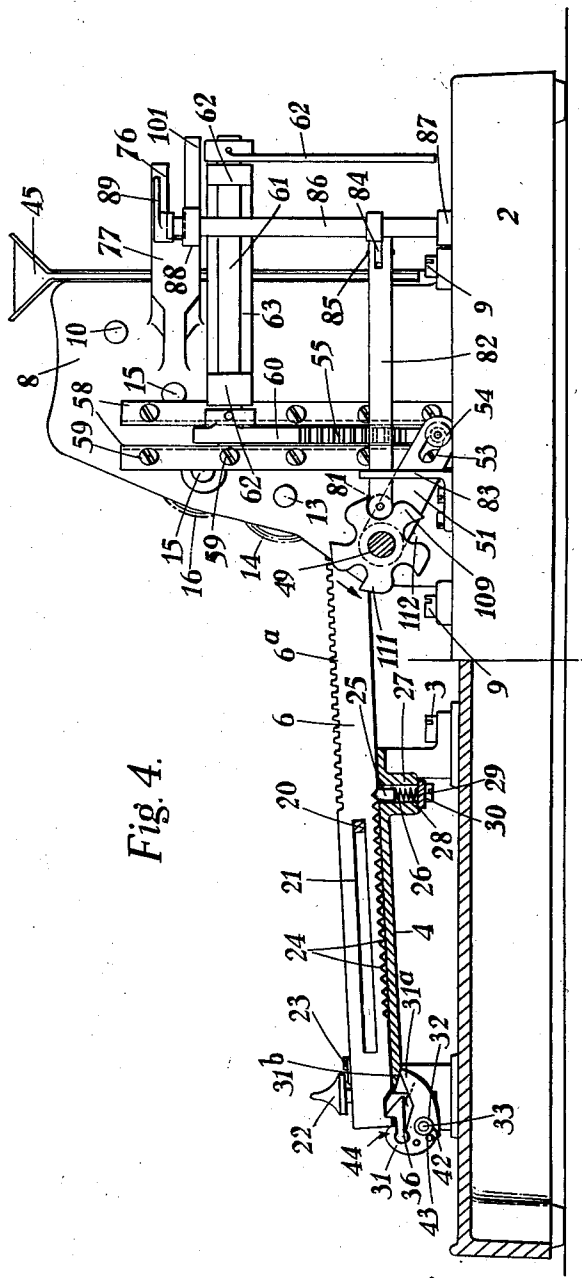


Fig. 4.

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UNITED STATES PATENT OFFICE

2,070,763

MACHINE FOR PRINTING MONEY VALUES

Edward John Ward, St. James, London, England

Application October 30, 1934, Serial No. 750,715
In Great Britain November 2, 1933

11 Claims. (Cl. 101—95)

This invention relates to a printing machine adapted simultaneously to print words and figures denoting the same amounts, the machine being designed for printing money values on cheques, dividend-warrants and the like.

The primary feature of the invention consists in setting the type rollers of the machine by means of a number of bars extending from the front towards the rear of the machine and mounted in guides permitting them to be longitudinally displaced by finger pressure applied directly to them so that toothed racks on them drive a gear train associated with word-bearing rollers and numeral bearing rollers. A suitable gear train and suitable word and numeral bearing rollers comprise those described in my United States Patent application Serial No. 413,609.

The toothed racks for actuating the gear trains extend, for example, from the rear ends for about one third to one half of the lengths of the upper edges of the bars and the rest of these upper edges are preferably plain as far as the forward ends of the bars where they have upstanding finger or thumb pieces, one to each bar, and pointers which latter are for use in conjunction with fixed scales inclining slightly upwardly from points at the front of the machine. Parts of the bars, preferably their lower edges, are provided with teeth for co-operation with plungers or flirts which yieldingly hold the bars in preset positions; and the bars have longitudinal slots and a transverse bar mounted in the bracket supporting the bars passes through the slots so as to engage the ends thereof when the bars are in either of two extreme positions with respect to the scales.

After the machine has been set to print the required amount the actual printing operation is performed by the operation of a lever, suitably located on the machine, so as to cause platen rollers to travel along the back of a previously inserted cheque and press the cheque against an inking ribbon and the inking ribbon against the lines of type. Thus, an impression of the type is made on the cheque.

A further feature of the present invention consists in new or improved means for operating the platen rollers. This means comprises a hand lever adapted to oscillate an arm which is connected to a horizontal carriage for the platen rollers through the intermediary of a push-pull rod and a lever of the third order, one end of the last mentioned lever being pivoted near the bottom of the rear of the machine and the other end connected to the carriage by means of a pin and slot.

Any of the mechanical contrivances described in my United States Patent application Serial No. 413,609 may be employed and suitably modified to adapt them to the present machine. For example, the arrangement may be such that the platen contacts with the cheque only when moving in one of two directions.

I may arrange the mechanism in such a manner that operation of a bar for printing an amount in which a nought or noughts occur will automatically cause displacement of all unoperated bars on the right in such a manner that these bars so displaced cause their numeral bearing rollers to indicate "0". Therefore, it would be possible to print, for example, "One thousand" and "1000 0 0" simply by operating the bar in the thousands' column and pulling the hand lever.

The invention will now be described with reference to the accompanying drawings wherein:

Fig. 1 is a side elevation of the present machine;

Fig. 2 is a plan view thereof;

Fig. 3 is a rear elevation of the said machine;

Fig. 4 is another side elevation, partly in section, of the machine from the side opposite to that illustrated in Fig. 1 and without certain parts which are clearly shown in other figures;

Fig. 5 is a sectional view of the guide supporting the sliding bars; and

Fig. 6 is a perspective view of the ends of the sliding bars associated with mechanism adapted to cause unoperated racks on the right of an operated one automatically to cause their type rollers to indicate "0".

The machine is provided with a suitable cover, not shown as it forms no part of the present invention, the bottom of which closely fits inside a bead 1 around the base 2 of the machine.

The front portion of the base has secured to it by screws 3 a casting 4 forming guides 5 for sliding bars 6 provided with rack teeth 6a and a carrier for scales 7. The rear portion of the base is provided near its sides with two vertical brackets 8 held in place by screws 9. The brackets 8 support the ends of spindles 10, 10 carrying numeral bearing and word bearing type rollers 11 and 12, respectively; the shaft 13 supporting nested shafts or sleeved carrying toothed wheels 14 which mesh with the racks 6a; and the stub axles 15 of idler wheels 16. The wheels 14, when rotated by the racks 6a being slid in their guides 5, cause the rollers 11 and 12 to rotate as the

wheels are connected with the rollers through nested sleeves such as 17 mounted on the shafts 13 and 10, 10, and toothed wheels 18 and 19 meshing with the idler wheels 16 all substantially in the manner set forth in my United States Patent application Serial No. 413,609.

The guides 5 for the bars 6 are formed by longitudinal slots in the casting 4 and are held in the guides by means of a transverse rod 20 passing through the casting and through slots such as 21 (Figs. 4 and 5) in the bars 6. The slots 21 are of such a length that their ends contact with the rod 20 when the bars are in their extreme positions. Hence, the maximum travel of each bar is limited by the length of its slot and the length of the slot conforms with the length of the marked portion of the scale to which the bar is allocated. The top face of the member 4 inclines upwardly towards the rear of the machine and has the scales 7 suitably secured to it. The bars 6 are rigidly provided near their front ends with finger pieces 22 which enable the bars to be directly slid by finger pressure applied to the pieces 22, and immediately in front of the finger pieces and rigid with the bars are pointers 23 for use with the scales 7.

The undersides of the bars are toothed to provide recesses such as 24 (Fig. 4) which co-operate with spring plungers such as 25 adapted yieldingly to hold the bars in preset positions to ensure that the pointers 23 exactly register each with a mark on its allocated scale. The plungers 25 are located in bores 26 formed in a transverse rib 27 on the underside of the member 4, springs such as 28 between the plungers and a bottom plate 29 secured to the rib by screws 30 acting to press the plungers against the teeth on the undersides of the bars 6.

When the bars are in the positions illustrated the type rollers 11 and 12 are set to print rows of asterisks as indicated by the pointers 23 (Fig. 2). If it be desired to print a sum in which a nought or noughts occur, operation of the bar for the highest significant figure will cause those bars to the right thereof, if in asterisk-indicating positions, to move to the "0's". These movements will cause corresponding movements of the rollers 11 and 12. The said movements of the bars are brought about by the mechanism illustrated in Figs. 4 and 6. This mechanism comprises cam-plates 31 each rigid, with the exception of the endmost on the right (Fig. 6), with a short sleeve 32 on the right. The cam-plates and their sleeves are turnably supported by a shaft 33 the ends of which are carried by L-shaped brackets 34 secured to the sides of the member 4 near the front thereof by screws 35. Each cam-plate has a key-hole slot for the reception of an enlarged end such as 36 (Fig. 6) of a pawl 37 normally urged into a recess 38 in a bar by a spring 39 extending upwardly from the rear part of the cam-plate. The ends 36 are prevented from slipping sidewardly out of the key-hole slots by small plates 40 riveted to the sides of the cam-plates. As previously stated the bars are in positions for printing asterisks. If any bar, with the exception of that at the right hand end, be operated a tooth 41 forming the front of a recess 38 engages a pawl 37 and causes the pawl to pull the top of its cam-plate forwardly. The sleeve rigid with the displaced cam-plate is thus turned and a pin 42 at the end remote from the cam engages a pin 43 extending laterally from the next cam-plate. Hence, the said next cam-plate is turned similarly, and so on. Actually, the cam-plates of and to the right of the operated bar turn simultaneously. The said turning of the cam-plates causes toes 44 on them to thrust against the forward ends of the teeth 41 (or bars 6) and the relative proportions of the parts are such that the bars so displaced by the toes are advanced to the nought position. When the bars are set to the asterisk positions the forward ends of the teeth override the pawls and engage the toes 44 to restore them to their ready-to-operate position. Overturning of the cam-plates by the restored racks cannot take place because parts 31*a* of the cam-plates engage the underside of the member 4 at 31*b* (Fig. 4).

A cheque or the like to be printed is placed in a carrier 45 mounted on the backs of the brackets 8. Platen or impression rollers 46, adapted to enter slots 47 in the carrier 45 are drawn across the cheque so as to press it against an ink-ribbon (not shown) and the ribbon against lines of type borne by the rollers 11 and 12 and previously set-up by appropriate operation of the bars 6. In order to prevent smearing of the impression, the impression rollers act on the cheque only when moving in one direction and are out of contact with the cheque when returning to their initial position in readiness for the subsequent printing operation.

The said movements of the rollers are effected by mechanism operated by a handle 48 non-rotatably mounted on a shaft 49 that, in addition to its function as a shaft, provides a support adjacent the wheels 14 for the rearward ends of the bars 6 in-as-much as the said bars rest on the said shaft and the shaft takes the counter-thrust of the wheels 14. The said shaft 49 is supported by the brackets 8 and adjacent the handle by a bearing bracket 50. Mounted on the shaft and between the right hand bracket 8 and the bearing bracket 50 are located an arm 51 and a star wheel 52.

The arm 51 is included in the mechanism for causing the impression rollers 46 to move across the cheque. The said mechanism comprises this arm which extends rearwardly of the machine and is slotted at 53 to receive a pin 54 connecting it to a vertical rack 55. The rack projects from a slide 56 movable in a vertical guide formed by a machined face between two vertical ribs 57 on the bracket 8 and by two metal strips 58 screwed at 59 to the ribs 57 so as to overlap the slide 56. The toothed rack meshes near its upper end with a toothed quadrant 60 carried by a horizontal rearwardly extending shaft 61 mounted in eyes 62, 62 projecting sidewardly from a bracket 63 secured to the right hand bracket 8. The rear end of the shaft 61 is rigid with a downwardly extending arm 62 jointed at 64 to a push-pull rod or link 65 which, in turn is jointed at 66 to a lever 67. The lower end of the lever 67 passes through a slot 68 in the base 2 and is pivotally carried at 69 by a bracket 70 secured by screws 71 to the underside of the said base. The other end of the lever 67 is slotted at 72 and connected to a block 73 by means of a pin 74 passing through the slot 72 and entering the block 73. The block 73 is slidable along a horizontal bar 75 extending across the back of the cheque-holder 45 and supported at its ends in machined forks 76 at the rear ends of arms 77 extending rearwardly from and cast integrally with the brackets 8. The impression rollers are carried by a vertical shaft 78 arranged in a vertical slot 79 in the front of the block 73 and

closed at its front by a plate 80 screwed to the front of the block.

The mechanism for causing the impression rollers to contact with the cheque when moving in only one of two directions across the cheque includes the star wheel 52. When the parts are in the positions illustrated in the drawings a recess in the star wheel receives a roller 81 at the front end of a rearwardly extending horizontal rod 82. The front end of the rod 82 is slidably mounted in a bracket 83 rigidly upstanding from the base 2 and the rear end of the rod is slotted to receive an end of an arm 84 which is jointed to the rod by a pivot pin 85. The other end of the arm 84 is rigid with a vertical shaft 86 the lower end of which enters a hole in the base 2 to provide, in conjunction with a thrust collar 87 a bearing for the lower end of the said shaft; and the upper end of the shaft after passing through a bearing eye in a finger 88 rigid with the right hand finger 77 is fixed to one end of a rearwardly extending arm 89. The rearward end of the arm is pivotally jointed at 90 to a link 91 which in turn is pivotally jointed at 92 to the knee of a toggle formed by links 93 and 95. This toggle is located at the right hand side of the machine and at the left hand side thereof is located a substantially like toggle comprising links 96 and 97, the knee of this second toggle being indicated by 98. Links 93 and 96 are pivotally jointed at 99 and 100, respectively, to the rearward end of the lower limb 101 of the forks on fingers 88; and the other links of the toggles are pivotally jointed at 102 and 103, respectively, to the opposite ends of the horizontal bar 75. The toggles are connected together by means of a push-pull bar 104 pivotally jointed at 105 and 106 to rearward extensions 95*a* and 97*a* of the links 95 and 97. The push-pull bar 104 is of L-section to give rigidity.

When the handle 48 is pulled towards the front of the machine the shaft 49 is given a partial turn. A like angular movement is imparted to the arm 51 whereby the rack 55 is lifted, the quadrant and, therefore, the shaft 61 and arm 62 turn, and the link 65 thrusts towards the left-hand side of the machine. This movement turns the lever 67 on the pivot 69 and the lever, through the slot and pin connection 72, 74 causes the block 73 to travel from right to left of the bar 75, i. e., transversely of a cheque in the holder 45. The said partial turn of the shaft 49 is also conveyed to the star wheel 52 through a uni-directional drive comprising a ratchet-wheel element 107 rigid with the shaft 49 and a spring influenced pawl 108 on the wheel 52. The partial turn of the star wheel causes the "point" such as 109 thereof immediately beneath the roller 81, which "point" comprises a cam, to thrust the rod 82 rearwardly. The rearward movement of the rod turns the arm 84, vertical shaft 86 and the arm 89 clockwise (Fig. 2) so that the link 91 is pulled to the right. The toggle 93, 95 is, therefore, opened and so is the toggle 96, 97 because the two toggles are connected by the parts 95*a*, 104, and 97*a*. The pivots 99, 100 being anchored to the limbs 101, but the pivots 102 and 103 carried by the bar 75, causes the bar to slide towards the front of the machine with the result that the impression rollers enter the slots 47 and press against the cheque. The pressure is yielding owing to the provision of springs 110 contained in recesses in the block 45 and tending to push the shaft 73 against the plate 80.

The movement of the rollers into contact with the cheque occurs almost immediately after the hand lever 48 is operated and continued movement of the lever effects the transverse travel of the block 45 and rollers 46. If desired, the arm 51 may have an arcuate slot concentric with the shaft 49 so that there is sufficient lost motion between the arm 51 and the pin 54 to give the star wheel 52 time to operate the toggles before the transverse movement takes place.

The points 109 have profiles 111 concentric with the shaft 49 and these profiles are of such a length that the impression rollers are held against the cheque until they have nearly completed a movement from right to left of the machine. A depression such as 112 then enters into register with the roller 81 and a striker plate 113 on the left-hand side of the block 45 engages a nose 114 projecting to the right of link 97—97*a*. This restores the toggles and associated parts to the positions illustrated in the drawings with the result that the bar 75 removes the impression rollers from the cheque. The block 45 and the rollers 46 (out of contact with the cheque) are then returned to the positions shown in the drawings by the operator's forcing the handle rearwardly. The machine is then ready for a subsequent printing operation, the roller 81 having been introduced into a depression 112 when the striker plate 113 contacted with the nose 114.

Forward and backward movements of the lever are limited by projections 115 and 116 extending from a boss 117 rigid with the shaft 49 and the lever 48.

What I claim is:—

1. A machine with type rollers that print monetary amounts, comprising setting bars, guides slidably supporting said bars, means enabling finger pressure to be directly applied to said bars for sliding them in said guides by positive pressure, toothed racks on said bars, gear-trains containing elements meshing with said racks and associated with said type rollers whereby said sliding of said bars effects displacement of said type rollers to set them, and means actuated by an operated bar arranged to move unoperated bars on the right to a position where the said unoperated bars displace their type rollers to indicate nought, said movements of said unoperated bars being positively effected by finger pressure applied to said operated bar and transmitted through said operated bar and through said means actuated thereby to said unoperated bars.

2. A machine with type rollers that print monetary amounts, comprising setting bars, guides slidably supporting said bars, means enabling finger pressure to be directly applied to said bars for sliding them in said guides, toothed racks on said bars, gear-trains containing elements meshing with said racks and associated with said type rollers whereby said sliding of said bars effects displacement of said type rollers to set them, and means actuated by an operated bar adapted to move unoperated bars on the right to a position where the said unoperated bars displace their type rollers to indicate nought, said means actuated by said operated bar comprising cam-plates, a mounting permitting turning of said cam-plates, toes on said cam-plates and contacting with the forward ends of said bars, pawls extending from said cam-plates, teeth on said bars engaged by said pawls, and pins rigid with said cam-plates, said tooth on said operated bar being adapted, through said pawl, partially to turn said cam-plate on said mounting whereby

one of said pins rigid with said cam-plate engages another of said pins rigid with the next cam-plate, and so on, whereby unoperated bars to the right of the operating bar are moved by pressure from said toes into a position where they displace their type rollers to indicate nought.

3. A machine according to claim 1, wherein said means enabling finger pressure to be directly applied to said bars comprises finger pieces rigid with said bars.

4. A machine according to claim 1, comprising scales mounted above said guides, said bars being slid by said finger pressure in said guides with respect to said scales.

5. In a machine according to claim 1, wherein said setting bars have longitudinal slots, a transverse bar passing said slots and across said guides, said transverse bar being adapted to limit the extent of said sliding movements of said bars by contact with the ends of said slots.

6. A machine according to claim 1, wherein said setting bars have notches in them and said guides have detents mounted yieldingly to engage said notches, said notches and detents ensuring that said bars when slid each assume any one of a number of predetermined positions.

7. In a machine according to claim 1, a bracket member, said member being slotted to provide said guides slidably supporting said bars and having its top face inclining upwardly toward the rear of the machine, and scales mounted on said top face, said bars being slidably mounted in said guides with respect to said scales.

8. In a machine according to claim 1, wherein said setting bars have notches in them, a bracket member, said member being slotted to provide guides slidably supporting said bars and having its top face inclining upwardly towards the rear of the machine, scales mounted on said top face and detents mounted on said guide member and engaging said notches, said notches and said detents ensuring that said bars when slid each assume any one of a number of predetermined positions with respect to said scales.

9. A machine according to claim 1, and having impression rollers moved across a cheque by operation of a hand lever, comprising a block carrying said impression rollers, a bar slidably carrying said block, fork members slidably supporting the ends of said bar, toggles attached to the ends of said bar and to the fork members, and means actuated by said hand lever for causing said toggles to thrust said bar towards said cheque before said rollers are moved across said cheque and to move said bar away from said cheque after said rollers have so moved whereby said rollers may be returned to their initial position out of contact with said cheque.

10. A machine according to claim 1, and having impression rollers moved across a cheque by operation of a hand lever, comprising a block carrying said impression rollers, a bar slidably carrying said block, fork members slidably supporting the ends of said bar, toggles attached to the ends of said bar and to the fork members, a star wheel, a uni-directional coupling between said star wheel and said hand lever, a thrust rod contacting with the profile of said star wheel, and a linkage between said thrust rod and said toggles, said hand lever, when operated, being adapted to turn said star wheel to effect displacement of said thrust rod to cause said toggles to thrust said bar towards said cheque before said rollers are moved across said cheque and to move said bar away from said cheque after said rollers have so moved whereby said rollers may be returned to their initial position out of contact with said cheque.

11. A machine according to claim 1, and having impression rollers moved across a cheque by operation of a hand lever, comprising a toothed rack, a mounting permitting sliding movement of said rack, an arm connected with said hand lever and said rack whereby movement of said hand lever displaces said rack, a toothed quadrant meshing with said rack, a shaft rigid with said quadrant, an arm rigid with said shaft, a link jointed to said arm, a lever jointed intermediate its ends to said link, a pivot at the lower end of said lever and turnably supporting same, the other end of said lever being slotted, a block carrying said impression rollers, a mounting permitting sliding movement of said block transversely of said machine, and a pin passing through said slot in said lever into said block whereby operation of said hand lever effects said transverse movement of said block through said rack, quadrant, shaft, arm, link, lever, and slot and pin.

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