

L. P. HUGHES.  
PRINTING PRESS.  
APPLICATION FILED DEC. 30, 1920.

9 SHEETS—SHEET 1.



Inventor  
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By his Attorney  
A. Alexander Thomas

1,405,515.

Patented Feb. 7, 1922.  
 9 SHEETS—SHEET 2.

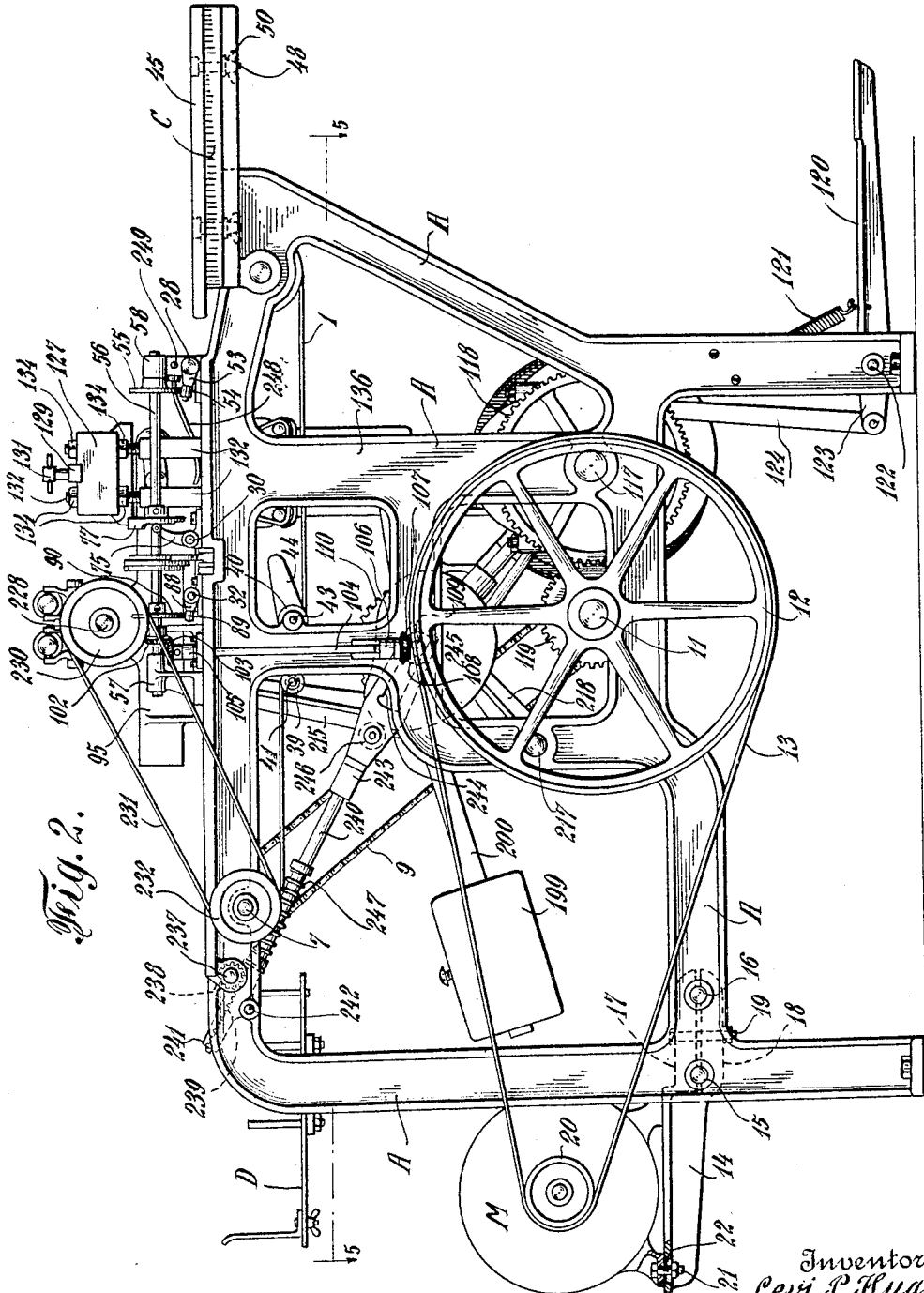


Fig. 2.

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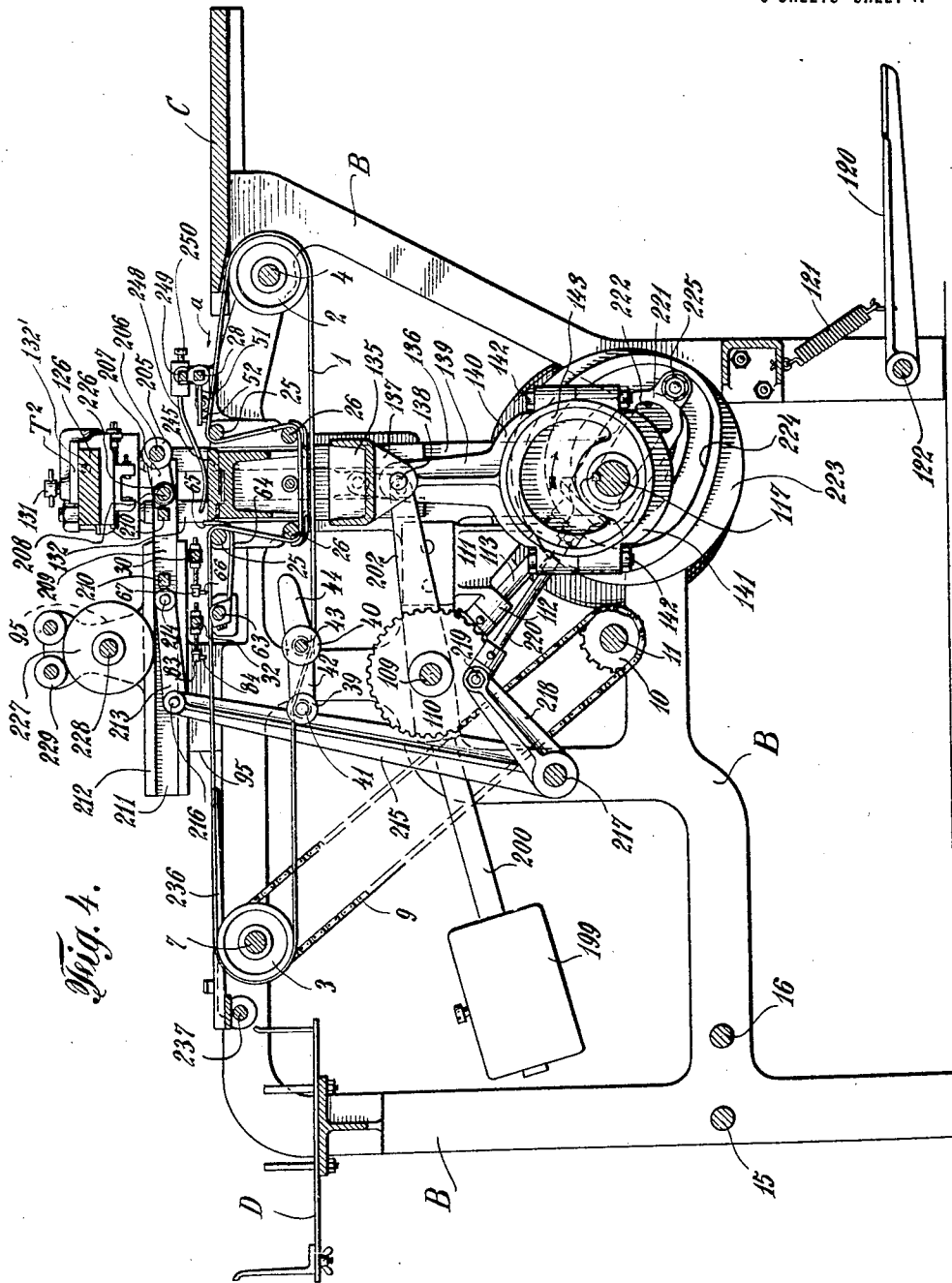
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 9 SHEETS—SHEET 4.



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9 SHEETS—SHEET 5.

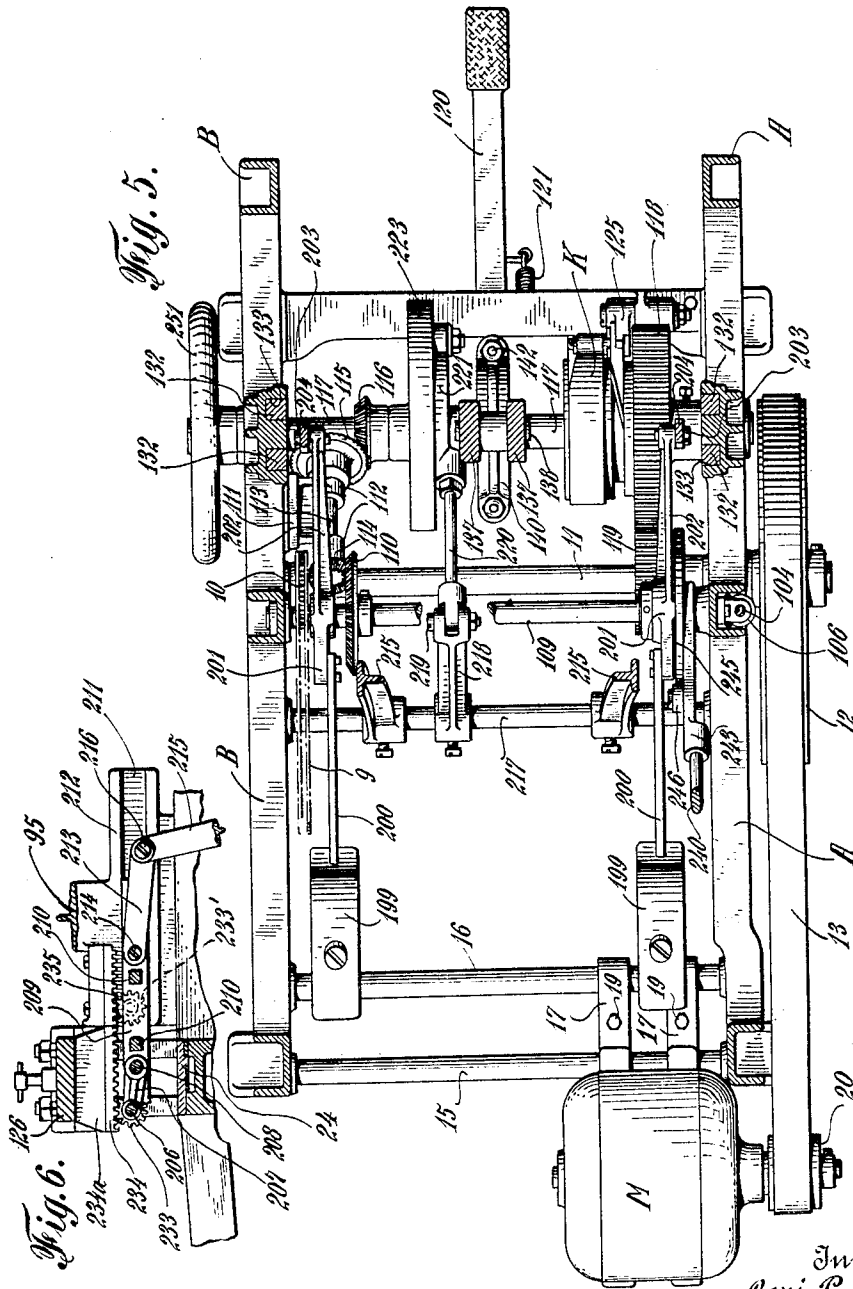
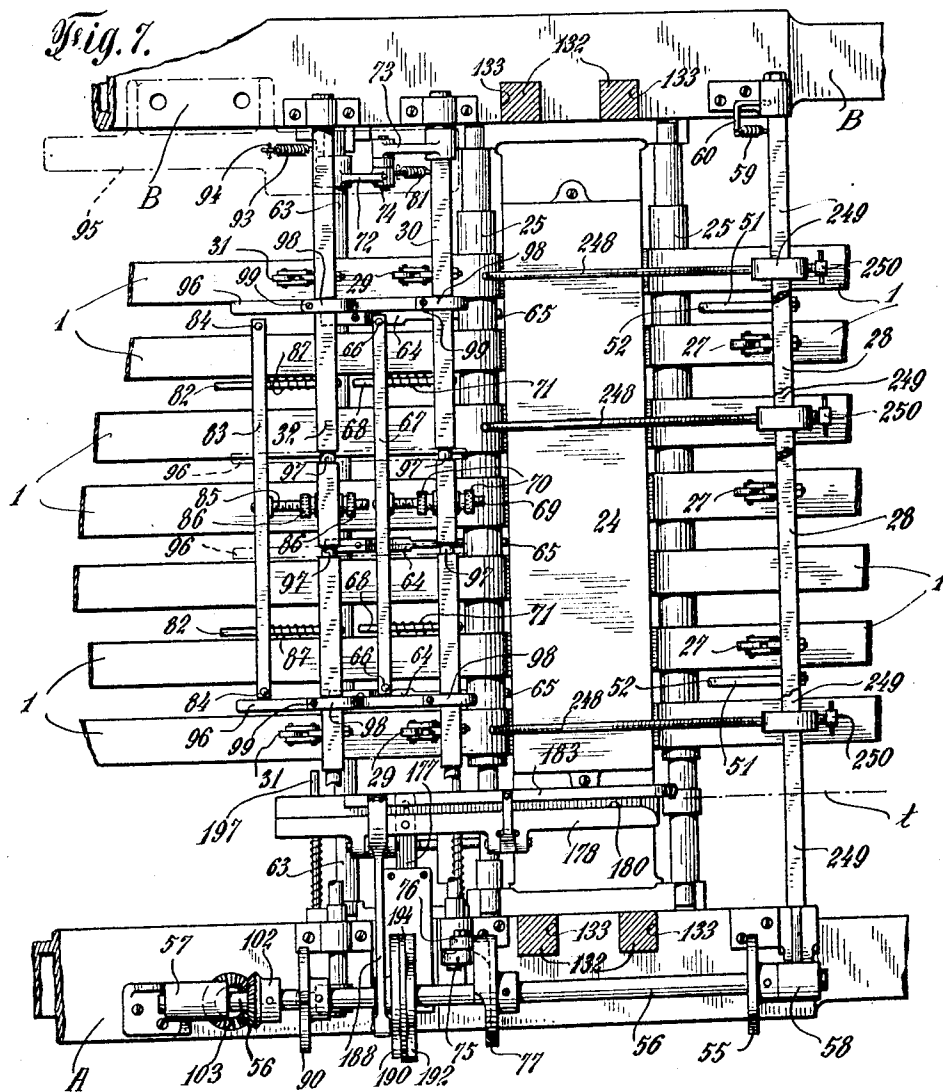
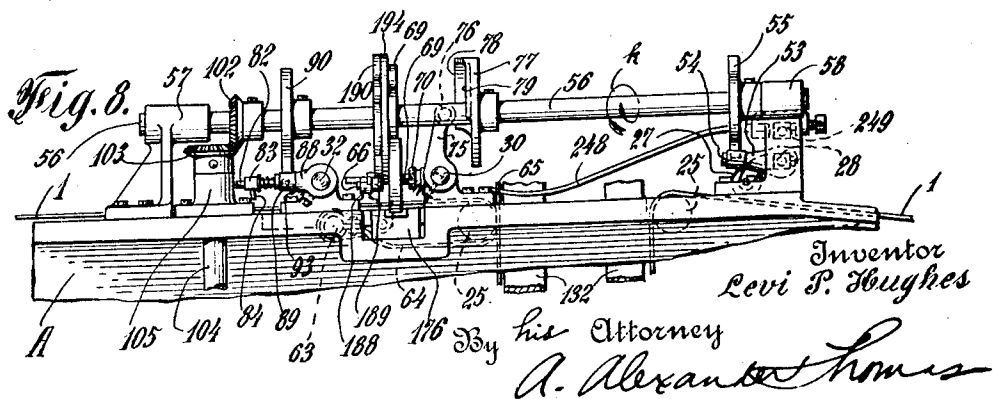
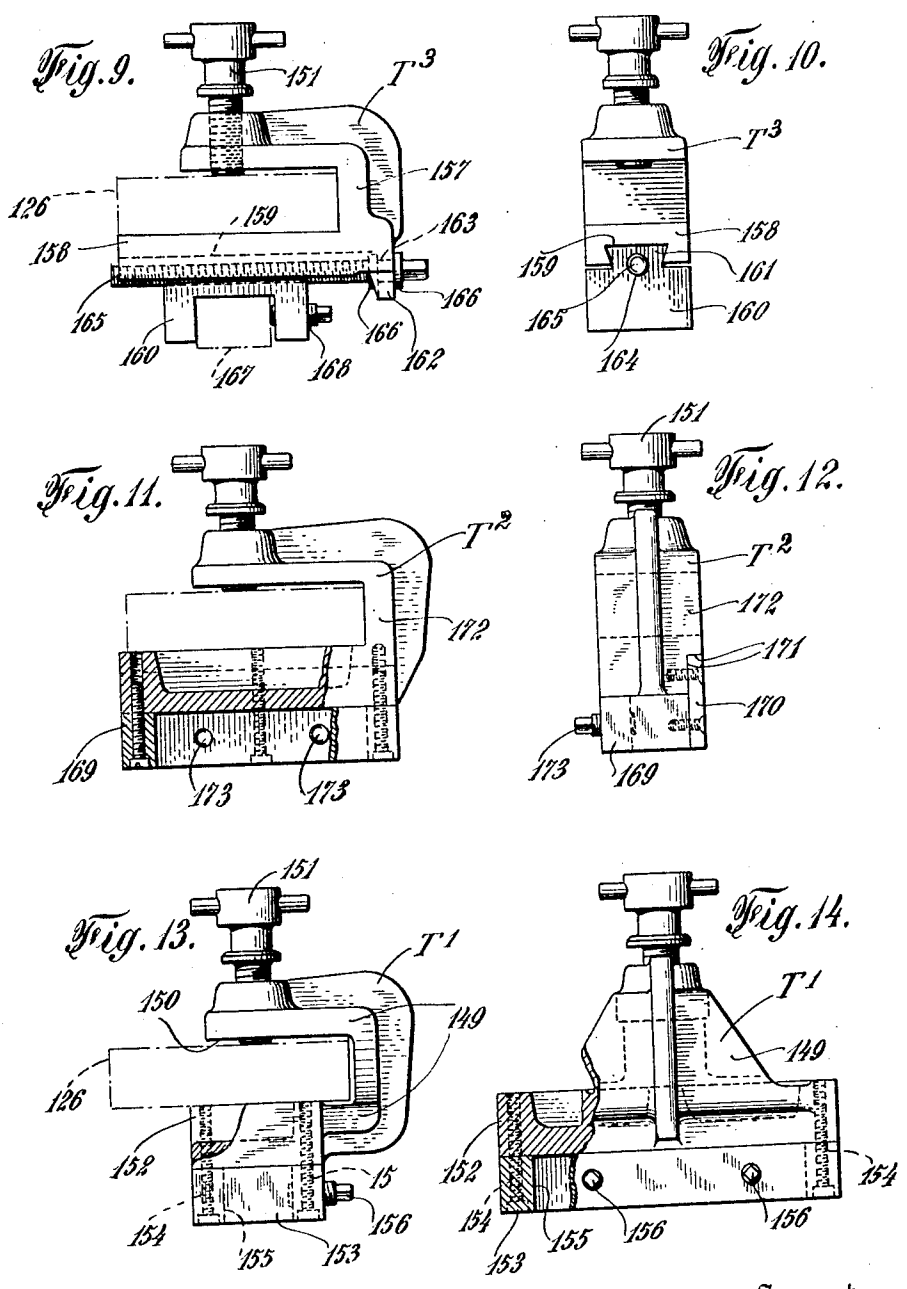


Fig. 6.

Fig. 5.

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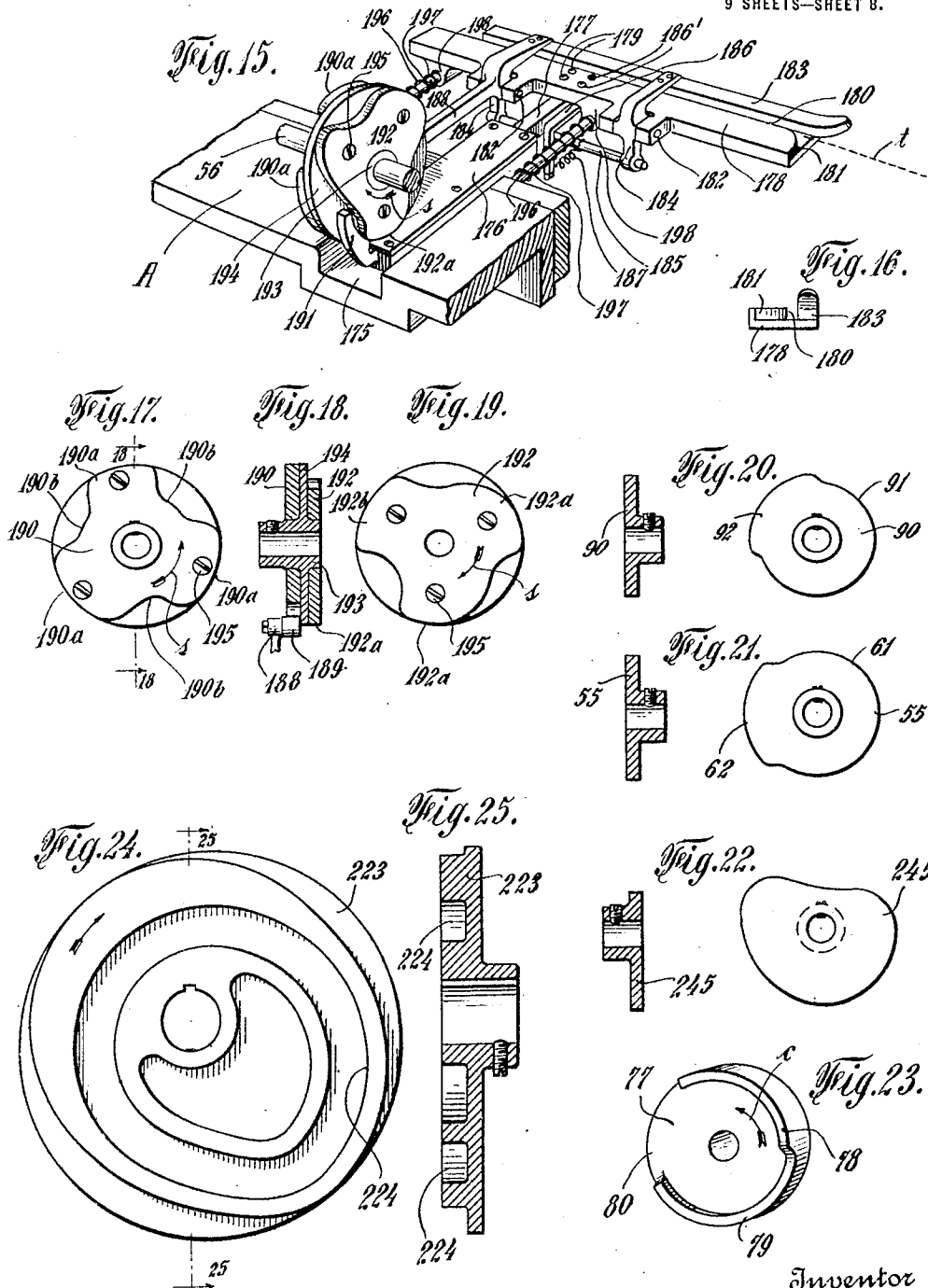


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9 SHEETS—SHEET 8.



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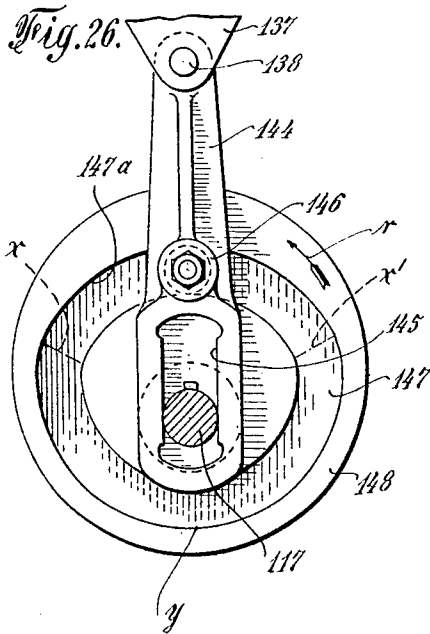
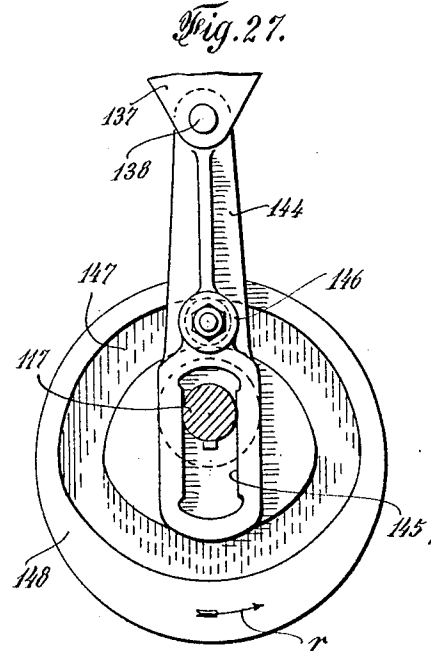
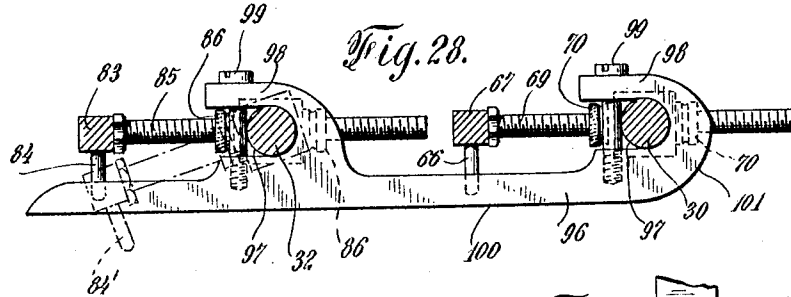
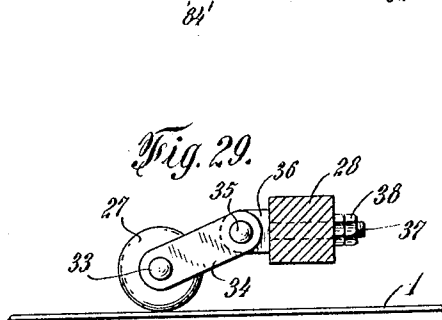
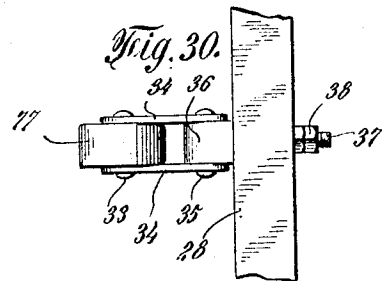
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9 SHEETS—SHEET 9.



# UNITED STATES PATENT OFFICE.

LEVI P. HUGHES, OF HOBOKEN, NEW JERSEY.

## PRINTING PRESS.

1,405,515.

Specification of Letters Patent.

Patented Feb. 7, 1922.

Application filed December 30, 1920. Serial No. 434,015.

*To all whom it may concern:*

Be it known that I, LEVI P. HUGHES, a citizen of the United States, and a resident of Hoboken, county of Hudson, and State of New Jersey, have invented new and useful Improvements in Printing Presses, (Case 3.) of which the following is a specification.

My invention relates to printing presses and embodies certain improvements over the multiform printing press disclosed in my co-pending application, Serial Number 313,717, filed July 28, 1919. The present invention, like that of the aforesaid pending application, is for a printing press especially adapted for imprinting and numbering sheets of bank checks, and for other like uses where sheets receive a series of successive impressions from the same type.

The various features of novelty of my present invention will become apparent from a detailed description of the machine illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of a printing press embodying the novel features of my invention, certain parts (such as the ink-distributing rollers) being broken away for clearness;

Fig. 2 is a side elevation of the machine;

Fig. 3 shows a front end view of the machine;

Fig. 3<sup>a</sup> is a detached diagrammatic view illustrating the operation of the first and second stops for the sheets;

Fig. 4 is a longitudinal cross-section approximately on line 4—4 of Fig. 3;

Fig. 5 is a plan view in section, taken approximately on line 5—5 of Fig. 2;

Fig. 6 is a fragmentary detail view showing the arrangement of the inking roller relative to the printing bar, this view being taken approximately on line 6—6 of Fig. 1.

Fig. 7 is an enlarged plan view of that portion of the machine which contains adjustable stops for the sheets, the printing head and inking mechanism being omitted for clearness;

Fig. 8 is a side view of the mechanism shown in Fig. 7;

Figs. 9 and 10 are, respectively, a side view and a front end view of one of the type-chases mounted on the printing bar;

Figs. 11 and 12 are, respectively, a side view and a rear end view of another form of type-chase, Fig. 11 being partly in section for the sake of clearness;

Figs. 13 and 14, are, respectively, a side view and a rear end view of still a different construction of type-chase, portions of these figures being in section;

Fig. 15 is a detached view in perspective of the side-registering device and the cams for operating it;

Fig. 16 is an end view of the clamping jaws of the side-registering device;

Fig. 17 is a detached side view of the cam which operates the movable jaw of the side-registering mechanism;

Fig. 18 is a cross-section on line 18—18 of Fig. 17;

Fig. 19 is a side view of the cam which controls the reciprocating movements of the side-registering device;

Fig. 20 shows, respectively, cross-sectional and side views of the cam which operates the third or last set of stops for the sheets;

Fig. 21 shows, respectively, cross-sectional and side views of the cam which operates the so-called gate stops;

Fig. 22 shows, respectively, cross-sectional and side views of the cam which controls the operation of the lifting or delivery fingers;

Fig. 23 shows a perspective view of the cam which controls the first and second sets of stops for the sheets;

Fig. 24 is a face view of the cam which controls the movements of the inking rollers;

Fig. 25 is a cross-sectional view on line 25—25 of Fig. 24;

Fig. 26 shows a form of cam for operating the printing mechanism, the parts being shown in uppermost position;

Fig. 27 is a view similar to Fig. 26, with the parts represented in lowermost or printing position;

Fig. 28 is a fragmentary side view, showing how the guide rails are supported over the feed tapes;

Fig. 29 is a fragmentary side view showing how the feed rollers are pivotally supported; and

Fig. 30 is a plan view of Fig. 29.

Since my co-pending basic application, already referred to, recites in detail the objects and advantages of a printing press in which sheets of paper (such as bank checks) are automatically moved into successive printing positions to receive impressions in each position, I need not repeat such statements here in the form of a preliminary

explanation. I will, therefore, at once take up a detailed description of the improved printing press shown in the drawings, and, as the description proceeds, the novel features of my invention and their advantages will become clear.

#### *Feeding mechanism.*

The operating parts of the machine are supported in a framework, preferably of metal, and (roughly speaking) rectangular in shape or outline. This framework comprises side pieces indicated as a whole by A and B, respectively, which are connected by cross-pieces to form a rigid structure. The side pieces A and B may each consist of a single casting in which the parts are preferably channel-shaped in cross-section for greater strength. On top of the supporting framework, at the front end thereof, is supported a feed table C and at the rear end of the framework is a receiving or delivery table D. The sheets of paper are fed from the table C into the machine and the printed sheets are automatically deposited on the receiving table D, as will later be explained in detail.

The sheets are carried through the machine on continuously running tapes 1, which are driven in the direction of the arrow *a* in Figs. 1 and 4. The feed tapes 1 are in the form of endless belts and are mounted on rollers 2 and 3 arranged, respectively, at the front and rear of the framework. The front rollers 2 are mounted on a shaft 4 rotatably journaled in the sides of the framework, as indicated at 5 and 6 in Fig. 3. The rear rollers 3 are mounted on a transverse shaft 7 also journaled in the sides of the framework, as best shown in Fig. 1. The shaft 7 carries at one end a sprocket wheel 8 (see Fig. 1), which is connected by a sprocket chain 9 with a sprocket wheel 10. As shown in Figs. 4 and 5, the sprocket wheel 10 is mounted near one end of a transverse shaft 11 suitably journaled between the sides of the framework. The shaft 11 may broadly be referred to as the power shaft or source of driving power for the various operating mechanisms of the machine. One end of the power shaft 11 projects beyond the side piece A and carries a large pulley 12, which is connected by a driving belt 13 with an electric motor indicated as a whole by M. The motor M, of any approved construction, is mounted on a bracket 14, which is adjustably supported on a pair of transverse rods 15 and 16 fixed in the sides of the framework, as best shown in Fig. 5. The bracket 14 is secured to the rods 15 and 16 by means of split arms 17 and 18 which may be provided with complementary grooves to form openings through which the rods 15 and 16 extend. By clamping the arms 17

and 18 together in any suitable way, as by means of bolts 19, the bracket 14 is rigidly held in place. By merely loosening the bolts 19, the bracket may be shifted along the supporting rods 15 and 16 to bring the pulley 20 of the motor M into alignment with the pulley 12. Besides being adjustable transversely of the framework, as described, the motor M is also adjustable longitudinally of the framework to permit regulation of the tension of the belt 13. This longitudinal adjustment of the motor is conveniently effected by mounting the motor slidably on the bracket 14, as by having fastening bolts 21 engage in slotted openings 22 in the bracket 14, as indicated in Fig. 2. This two-fold adjustment of the motor on the framework permits the ready installation of any suitable style or size of motor. Of course, the power shaft 11 may be connected to any other source of power and the pulley 12 is, therefore, to be regarded as broadly representing any suitable means for driving the shaft 11.

In order to avoid the fixed bed plate 24, on which the printing takes place (as later explained), the feeding tapes 1 pass around a pair of upper rollers 25 and a pair of lower rollers 26, as best shown in Fig. 4. With the feed tapes 1 cooperate feed rollers arranged to rest always in contact with the tapes, so that the sheets are held against the running tapes and fed forward with certainty. In the particular machine shown in the drawings, these feed rollers are arranged in three sets. The first set of feed rollers 27 is supported on a transverse rod 28 (see Figs. 7 and 8), which is mounted to rock in suitable bearings in the side pieces A and B of the framework. The second set of feed rollers 29 is carried by a transverse rod 30, rotatably supported between the sides of the framework, as best shown in Fig. 7. There is a third set of feed rollers 31 carried by a transverse rock bar 32 journaled in the sides of the framework a short distance back of the rockbar 30. The feed rollers 27, 29 and 31 are loosely mounted on their respective rock bars so as to lie always in contact with the feed tapes 1. As all of these rollers are similarly constructed and supported, it will be sufficient to describe in detail how one of the rollers 27 is mounted on the rock bar 28, as shown in Figs. 29 and 30. Referring to these figures, it will be seen that the roller 27 is mounted on a pin 33 carried between a pair of links 34 which are hung on a pin or stud 35 in the block 36. A bolt or screw-threaded extension 37, projecting from the block 36, passes through an opening in the bar or rod 28, and a nut 38 secures the block 36 to the rock bar 28. It will be seen from Fig. 29 that, irrespective of the rocking of the transverse bar 28, the roller 27 will always rest by

gravity on the tape 1. The purpose of rocking the transverse bars 28, 30 and 32, and the connections by which such rocking is effected, will be described later when I come to take up the stop mechanism of my machine.

A suitable device may be provided for adjusting the tension of the feed tapes 1. For this purpose I have shown rollers 39 and 40 (see Figs. 2 and 4) around which the tapes are led. The rollers 39 are carried by a transverse rod 41 mounted between a pair of arms 42, which are pivoted on a transverse shaft 43, the latter being suitably journaled in the sides of the framework. By means of a lever 44, the rollers 39 are moved up and down to place the proper degree of tension on the tapes 1, as will be clearly understood.

Preferably I employ means for guiding the sheets from the feed table C onto the tapes 1, so that the left edge of the advancing sheet is sure to be properly positioned with respect to the side-registering mechanism (to be described later). To this end I provide the feed table C with an adjustable extension 45. If this extension is made of wood I preferably attach to it a metal strip 46 to provide a guiding edge or shoulder 47 (see Figs. 1 and 3). Any suitable means may be employed for adjusting the extension 45 transversely of the feed table 46. I have shown bolts 48 passing through slots 49 in the feed table C (see Figs. 1 and 3). This permits movement of the extension 45 transversely of the machine in order to bring the guiding edge 47 into the exact position. By means of wing nuts 50, or otherwise, the bolts 48 are drawn tight to hold the extension 45 in adjusted position. In practice, the sheets to be printed are placed in a pile upon the extension 45 and are fed by the operator one by one into the machine by simply being placed with the left edge in contact with the shoulder 47 and then pushed forwardly on to the feed tapes 1. As soon as the forward edge of the sheet comes between the feed tapes and the first set of feed rollers 27, the operator need pay no further attention to the sheets, for the machine automatically does the rest, as will subsequently more fully appear.

#### *Stop mechanism.*

The transverse rock bar 28 carries a pair of rearwardly projecting rods 51 (see Figs. 1, 4 and 7), which are at their free end provided with downwardly extending stops 52. As seen from Fig. 1, the stops 52 are arranged to extend between the adjacent feed tapes, so as to project into the path of the advancing sheet and arrest the same when the stops are in lowered position. The stops 52 may conveniently be termed the gate stops, because they constitute a sort of gate

or barrier which stops the sheet prior to its advance into the first printing position. At one end of the bar or shaft 28 is fixed an arm 53 carrying at its free end a roller 54 as shown in Figs. 2 and 8. The roller 54 is arranged to engage the edge of a cam 55 fixed upon a shaft 56, as best illustrated in Figs. 7 and 8. The shaft 56, which I will call the cam shaft, is mounted lengthwise on top of the side piece A of the framework in suitable bearings 57 and 58. The roller 54 is held pressed against the underside of the cam 55 by a spring 59, or otherwise. The spring 59 is secured at one end to a fixed bracket 60 (see Fig. 7) and at the other end to a suitable arm (not shown) extending from the shaft 28. The form of the cam 55 is shown in the two detail views of Fig. 21, from which it will be seen that the edge of the cam consists of a lower section 61 and a raised portion 62. The section 61 may be called the open or inoperative portion of the cam, because, when the roller 54 is in contact with that section, the gate stops 52 are lifted and allow the sheet to pass on. When the raised portion 62 is in contact with the roller 54, the shaft 28 is held down and the stops 52 are in the path of the sheet.

I will now describe the stops which hold the sheets in the first printing position. On a transverse shaft or bar 63, rotatably journaled in the side of the framework below the upper section of the feed tapes 1, are fixed forwardly extending fingers 64, of which three are shown in the present embodiment (see Figs. 1, 4 and 7). The fingers 64 terminate at their free ends in upwardly projecting stops 65. As best illustrated in Fig. 7, the stops 65 are arranged between adjacent feeding tapes and terminate in a line approximately at the rear edge of the bed plate 24. The stops 65 may be called the first-position stops for the sheets, because they arrest the advancing sheet in the first printing position.

The sheets are arrested in their second printing position by the stops 66 carried at the ends of a cross-bar 67 adjustably mounted on the transverse shaft 30, previously referred to. This is best shown in Fig. 7. The shaft 30 has a pair of rearwardly extending pins 68 on which the bar 67 is slidably mounted. By means of a screw-threaded bolt or pin 69 and nuts 70, the rod 67 and thereby the stops 66 may be adjusted into the required position lengthwise of the machine—that is to say, toward and away from the printing bed plate 24. The precise position of the adjustable stops 66 will, of course, depend upon the form and style of sheet on which the printing is being done, and the purpose of making the stops 66 adjustable is to take care of different sizes and styles of sheets by quick and easy adjustment. If desired, springs 71 may be mounted on the

pins 68 to push against the bar 67 and hold the same firmly and evenly in adjusted position.

The transverse shafts 63 and 30, which  
 5 carry the first and second stops 65 and 66, respectively, are connected together by arms 72 and 73, as shown in the upper portion of Fig. 7 and diagrammatically illustrated in Fig. 3<sup>a</sup>. The arm 72 is fixed on the shaft  
 10 63 and the arm 73 on the shaft 30. The free ends of these arms are pivotally connected by a pin or stud 74, whereby the turning or rocking of one of these shafts produces a corresponding movement of the other shaft.  
 15 The shaft 30 carries at its left end (viewing the machine as in Fig. 3) an arm 75, which is provided at its free end with a roller 76 (see Figs. 7 and 8). This roller is arranged to bear constantly against the edge of a  
 20 crown cam 77 fixed upon the cam shaft 56. A detached perspective view of this cam is shown in Fig. 23. The operative edge of this cam consists of three sections 78, 79 and 80. The roller 76 is constantly pressed against  
 25 this cam edge by suitable spring means, such as a spring 81, which is secured at its lower end to (or near) the pivotal connection of the arms 72 and 73, and at its upper end to a fixed point of the framework. The diagrammatic view of Fig. 3<sup>a</sup> clearly indicates  
 30 how the crown cam 77 actuates (or causes the spring 81 to actuate) the stop-carrying shafts 63 and 30 into three different positions. When the roller 76 engages the  
 35 middle section 79 of the cam 77, the stops 65 and 66 are in neutral position and allow the forward passage of the sheet. This neutral position of the first and second stops is shown in full lines in Fig. 3<sup>a</sup>, where the  
 40 advancing sheet is indicated by the line S. It will be understood that the cam 77 rotates in the direction indicated by the arrow *c* in Fig. 23, since the cam shaft 56 rotates in the direction of the arrow *z* in Fig. 8.  
 45 When the roller 76 passes from the edge 79 on to the lowest edge or section 80, the contracting spring 81 rocks the shaft 63 in the direction of the arrow *z* and at the same time rocks the shaft 30 in the direction of  
 50 the arrow *e*, reference being had to Fig. 3<sup>a</sup>. This means that the first-position stops 65 are thrown upwardly into stopping position, as indicated at 65' in Fig. 3<sup>a</sup>, while the second-position stops 66 are thrown up-  
 55 wardly into an inoperative position, as roughly indicated at 66'. When the roller 76 passes from the lowest cam section 80 to the highest section 78, the shafts 63 and 30 are rocked reversely to their previous  
 60 movement, as indicated by the arrows *z'* and *e'*, respectively. This means that the stops 65 are thrown down into inoperative position, indicated at 65<sup>a</sup>, while the stops 66 are thrown down into arresting position,  
 65 as indicated at 66<sup>a</sup>. After this comes again

the neutral position of the stops 65 and 66, as already explained, and this cycle of operation is repeated.

I come now to the third set of stops for the advancing sheets. The transverse shaft 70 32 has a pair of rearwardly projecting pins 82 on which is slidably mounted a rod 83 provided at its ends with downwardly extending stops 84, as best shown in Fig. 7. A screw-threaded pin or bolt 85, extending 75 forwardly from the bar 82, passes through the shaft 32. By turning the nuts 86, the bar 83 and the stops 82 carried thereby are adjustable toward and away from the shaft 32. If desired, springs 87 may be inter- 80 posed between the bar 83 and the shaft 32. In other words, the third-position stops 84 are adjustable similarly to the second-position stops 66, so that the distance between the first and second stops 65 and 66 and 85 the distance between the second and third stops 66 and 84 are adjustable to accommodate any particular form or style of sheet.

The transverse shaft 32, which carries the third set of stops 84, is at one end provided 90 with an arm 88 carrying at its free end a roller 89, as best shown in Figs. 2 and 8. The roller 89 is arranged to bear against the edge of a cam 90 fixed upon the common cam shaft 56. As shown in Fig. 20, 95 the edge of the cam 90 has a lower portion 91 and a raised portion 92. Suitable spring means, such as a spring 93 (see upper portion of Fig. 7) is provided for keeping the roller 89 in constant contact 100 with the edge of cam 90. The spring 93 is at its lower end secured to a downwardly extending arm (not shown) of the transverse shaft 32 and at its upper end to a point on a bracket 95 fixed to the side piece 105 B of the framework. There are two of these side brackets 95, as shown in Fig. 1. The right-hand bracket is roughly indicated in dotted lines in Fig. 7. The brackets 95 are secured to the top of the sides A and 110 B by bolts 95', or otherwise.

When the roller 89 is in contact with the edge 91 of the cam 90, the stops 84 are in raised position out of the path of the advancing sheet. When the roller 89 en- 115 gages the raised edge 92 of the cam 90, the shaft 32 is rocked downwardly to bring the stops 84 into the path of the advancing sheet and thereby arrest the same. The arresting position of the stops 84 is indi- 120 cated at 84' in Fig. 28.

As the stops 66 and 84 are raised from stopping to inoperative position, it might sometimes happen that the forward portion of the sheet might be carried up along with 125 the rising stops and that might result in a buckling up of the sheet. To prevent the possible occurrence of this, I provide guiding means which positively strip the sheet from the rising stops and guide the 130

same forwardly over the feed tapes. In the machine illustrated in the drawings, this guiding means consists of one or more rails 96 secured to the transverse shafts 30 and 32, reference being had to Figs. 7 and 28. In Fig. 7 I have shown the two outer guide rails in full lines and the two intermediate rails in dotted lines. The number and precise location of these guide rails are immaterial, as long as they are arranged not to interfere with the operation of the stops.

The detail view of Fig. 28 shows the construction of the guide rails 96 and also the way in which they are secured to the transverse shafts 30 and 32. These shafts are shown square in cross-section, except that they are provided with aligned notches or grooves 97 in which the shaft is for convenience made circular in cross-section. Each guide rail 96 is provided with a pair of curved extensions 98 adapted to hook over the notched portions 97 of the shafts 30 and 32. Suitable fastening devices, such as bolts 99, lock the guide rails 96 securely on the shafts 30 and 32; while at the same time permitting ready removal of the guides when necessary. As seen from Fig. 28, the guide rails 96 are arranged with the lower edge 100 below the normal position of the stops 66 and 84, but above these stops when the latter are in lowered or stopping position. Preferably, the front edge of the guide rail 96 is rounded, as indicated at 101, to guide the front edge of the sheet downwardly. It is clear from Fig. 28 that should a sheet be caught on the rising stops 66 and 84, the edges 100 of the guide rails 96 will strip the sheet from the stops and either guide it along its forward movement or allow it to fall on to the feed tapes 1, which will carry it forwardly to the next stops or to the delivery end of the machine.

#### *Connections for driving cam shaft 56.*

The longitudinal cam shaft 56 is driven at the proper speed through the following connections: A bevel gear 102 is secured on the shaft 56 near the rear end thereof, as shown in Figs. 1 and 2, and particularly in Figs. 7 and 8. The bevel gear 102 is arranged in mesh with a bevel gear 103 fixed on the upper end of a vertical shaft 104. As shown in Fig. 2, the shaft 104 is mounted in bearings 105 and 106 carried by the side piece A of the supporting frame. The lower end of the vertical shaft 104 carries a bevel gear 107 arranged to mesh with a bevel gear 108 mounted at the left end of a transverse shaft 109, as shown in Figs. 2, 3, 4 and 5. Near the right-hand end of the shaft 109 is fixed a large bevel gear 110, as best illustrated in Figs. 3 and 5. The side piece B of the supporting framework carries a bracket 111 which has a pair of aligned bearings 112 (see Figs. 3, 4 and 5).

The bearings 112 are arranged at an angle and support a shaft 113. The upper end of the shaft 113 carries a small bevel gear 114, which is permanently in mesh with the large bevel gear 110 fixed on the transverse shaft 109. The lower end of the rotatable shaft 113 has a bevel gear 115 in mesh with a bevel gear 116 fixed upon a transverse shaft 117. It will be clear that by means of the connections just described, the rotation of the transverse shaft 117 is transmitted to the cam shaft 56.

The shaft 117 has mounted thereon a large gear 118, which is capable of rotation on the shaft independently thereof. The gear 118 is permanently in mesh with a pinion 119 fixed upon the power shaft 11, as best shown in Figs. 2 and 5. As previously described, the power shaft 11 is driven by the electric motor M. The gear 118 will, therefore, rotate while the motor is running. To control the operation of the shaft 117, I interpose a suitable clutch, which I have indicated as a whole by K, in Figs. 3 and 5. As this clutch forms no part of my invention, and as any approved construction of clutch may be employed for coupling the shaft 117 to the gear 118, I have not deemed it necessary to show and describe in detail the clutch K. It will be sufficient if I state that as long as the pedal 120 is held in raised position by the spring 121 (see Figs. 2, 3 and 5), the clutch K is idle—that is to say, there is no operative connection between the gear 118 and the shaft 117. The pedal 120 is fixed on a pivoted rod 122 which carries a rearwardly extending arm 123, as best shown in Fig. 2. To the free end of the arm 123 is pivoted a link 124 which connects at its upper end with a pivoted dog or pawl 125 (see Figs. 3 and 5). When the operator presses the pedal down, the link 124 is pushed upwardly and the dog 125 is thrown out to allow a pin (not shown) to connect the clutch K with the gear 118, whereupon the shaft 117 becomes operatively connected to the gear 118. It is obvious that any suitable means may be employed for starting and stopping the shaft 117 at the will of the operator, and the clutch K, to which I have referred, together with the connections for operating it, are to be considered merely in an illustrative sense.

#### *Printing mechanism.*

We have seen from the foregoing how the sheets are fed into the machine and automatically carried from one printing position to another. I will now describe the mechanism which imprints the desired data or characters upon the sheets in each of their printing positions. A printing bar 126 is mounted transversely of the framework in vertical alignment with the fixed bed plate 24, as may be seen from Fig. 4. The print-

ing bar 126 is pivotally supported by and between a pair of end blocks 127, as shown in Fig. 3. Pivot pins 132', indicated in dotted lines in Fig. 1, project from the ends of the printing bar 126 into the blocks 127 and permit the bar to be swung upwardly and forwardly for a purpose to be presently described. Suitable latches are provided for holding the bar 126 in fixed position on the end blocks 127. Referring to Fig. 1, I have shown there a pair of latches 129 having a slot 130 adapted to engage a headed screw or bolt 131 carried by each of the end blocks 127. By loosening the screws 131 the latches 129 may be shifted outwardly to release the bar 126. In Fig. 1 the latches 129 are shown in locking position.

The blocks 127 are rigidly secured to the upper ends of two pairs of vertical rods 132. The body portions of these rods are shown square and are accommodated in vertical recesses 133 formed in the side pieces A and B of the framework (see Figs. 5 and 7). The upper ends of the rods 133 are screw-threaded and pass through the blocks 127, nuts 134 being used to clamp the blocks securely on the rods 132, as best shown in Figs. 2 and 3. At their lower ends the rods 132 are rigidly connected (in any suitable way) to a cross-head 135, which is arranged to reciprocate vertically between the uprights 136 of the side pieces A and B (see Figs. 3 and 4). The cross-head 135 is provided with a pair of spaced lugs 137 carrying a pin 138 (see Figs. 3 and 4), and on this pin is pivoted the upper end of a link or arm 139. The arm 139 terminates in a saddle-shaped or semi-circular member 140 to which is secured a similarly shaped member 141, by means of bolts 142, or otherwise. This is best indicated in Figs. 3 and 4. The two saddle-shaped members 140 and 141 form a circular chamber within which operates an eccentric ring 143 fixed upon the shaft 117. It will be clear from Fig. 4 that as the eccentric ring 143 revolves with the shaft 117, it causes an up and down movement of the cross-head 135 through the arm 139. The pivoted pin 138 allows the necessary swinging movement of the arm 139. The eccentric mechanism just described is but one of several means that may be employed for producing the required vertical reciprocation of the printing bar 126, and I will have it clearly understood that I do not intend to be limited to any specific form of mechanism for operating the printing bar. In Figs. 26 and 27 is shown what at the present time I regard as a preferred form of cam mechanism for operating the printing bar 126, and one which I have successfully employed in actual practice. Instead of the saddle-shaped arm 139—140, previously described, I may use (and in some machines have used) an arm 144 provided at its lower end with a longitudinal slot 145

embracing the shaft 117. Intermediate its ends the arm 144 carries a roller 146 arranged to operate in the groove 147 of a cam disk 148, which is fixed upon the shaft 117 so as to rotate therewith. The cam groove 147 has a concentric section 147<sup>a</sup>, which is bounded by the dotted lines  $x$  and  $x'$  and extends over a distance of approximately 120°. The concentric portion 147<sup>a</sup> may be termed the "dwell" portion, because during the interval in which the roller 146 operates in that section of the cam groove, there is no movement of the printing head 126. In other words, the printing head "dwells", as the shopman puts it. The purpose of this "dwell" or rest position of the printing head will be described later on in connection with the inking mechanism. The cam disk 148 rotates in the direction of the arrow  $r$  in Figs. 26 and 27. While the roller is passing through that section of the cam groove 147 lying between the dotted line  $x'$  and the point  $y$ , the printing head is descending and reaches its lowest or printing position when the roller is in the position diagrammatically indicated by the point  $y$  in Fig. 26. This lowest position of the roller 146 is shown in Fig. 27. As the roller travels from the point  $y$  toward the line  $x$ , the printing head gradually rises. I may add that the distance from  $x'$  to  $y$  and from  $y$  to  $x$  is in each case approximately 120°.

The printing head carries one or more type-chases. In Figs. 1 and 3, I have shown three type-chases, indicated as a whole by T<sup>1</sup>, T<sup>2</sup>, and T<sup>3</sup>, respectively. In the specific instance illustrated, the type-chase T<sup>1</sup> is for printing a customer's name lengthwise of the check; the type-chase T<sup>2</sup> is arranged to print a customer's name crosswise at the end of a check; and the type-chase T<sup>3</sup> carries a numbering machine for successively numbering the stubs and the checks. For this purpose there will in practice be two type-chases T<sup>3</sup>, but for the sake of simplicity only one is shown in Figs. 1 and 3. The details of construction of these type-chases are shown in Figs. 9 to 14, inclusive, to which reference will now be had. I will first describe the type-chase T<sup>1</sup> which carries the type for the customer's name. This particular type-chase is illustrated in Figs. 13 and 14. It comprises an approximately U-shaped clamp or bracket 149 having an opening 150 for receiving the printing bar 126. It is clear that the bracket 149 may be adjusted longitudinally of the printing bar as well as transversely thereof. By means of a suitable screw 151, or other means, the type-chase is rigidly clamped in an adjusted position on the printing bar 126. The lower portion of the bracket 149 terminates in (or has secured thereto) a substantially rectangular or box-like member 152, which may, for convenience, be cast integral with the

bracket 149. A type-box or chase 153 is secured to the under side of the member 152 by screws 154, or otherwise. The type-box 153 has a chamber 155 in which the type is held.

By means of one or more adjustable screws 156, the position of the type within the chamber 155 may be adjusted into the desired position. It will be seen from the foregoing that I have provided an exceedingly simple type-chase or carrier which is readily insertable on and removable from the printing bar 126 and which may be adjusted into the desired position by simply loosening or tightening the screw 151.

The construction of the type-chase  $T^2$  shown in Figs. 9 and 10 is generally similar to the type-chase shown in Figs. 13 and 14 in that it consists of a U-shaped bracket 157 adapted to be slipped onto the printing bar 126 and clamped tightly in adjusted position. What was said above in regard to the adjustability of the type-chase  $T^1$  applied to the type-chase  $T^2$  and I will, therefore, not repeat the previous description. The type-chase of Figs. 9 and 10 may conveniently be called the numbering chase and differs from the signature chase  $T^1$  in the means by which the type is adjustably supported. The U-shaped bracket 157 of the type-chase  $T^2$  has

an extension 158 provided with a wedge-shaped recess 159 running longitudinally thereof. A type-carrying member 160 has a wedge-shaped projection 161 adapted to fit into the recess 159, whereby said member is supported by the extension 158. The bracket 157 has a lug 162 provided with a hole 163. The wedge-shaped projection 161 of type-carrier 160 has a hole 164 in alignment with the hole 163 and through these holes extends an adjustable screw or bolt 165. A pair of collars 166 prevent longitudinal movement of the screw 165, when it is turned. It will thus be seen that by turning the screw 165 the type-carrier is adjustable along the extension 158. When the type-chase  $T^2$  is on the printing bar 126, the turning of the screw 165 adjusts the type-carrier 160 transversely of the printing bar. In Fig. 9, I have diagrammatically indicated a

numbering machine by dotted lines 167. A set-screw 168 clamps the numbering machine firmly in position. The adjustment of the numbering machine by the screw 165 is very delicate, being practically a micrometer adjustment, and permits the precise location of the numbering machine on the printing bar after the type-chase has been moved into the desired position longitudinally of the printing bar. As bank checks differ in length and width and in the arrangement of the usual printed matter, it becomes frequently necessary to adjust the type-chases so as to print successive numbers of the checks and the customer's name in the proper positions. In this way the machine is quickly adjusted to

take care of various orders that may come in from different banks.

In Figs. 1 and 3, the numbering type-chase  $T^2$  is in position on the printing bar 126 to print successive numbers on the stubs of the check sheets. To print corresponding numbers on the checks, a second type-chase  $T^1$  is arranged on the printing bar in proper position, as will be understood.

The type-chase  $T^2$  shown in Figs. 11 and 12 is for printing a customer's name cross-wise of the check at the left-end thereof. For this purpose the type-box 169 extends transversely of the printing bar instead of longitudinally thereof, as in the type-chase  $T^1$  of Figs. 13 and 14. Otherwise, there is practically no difference in construction between the type-chase  $T^1$  and the type-chase  $T^2$ , so it will not be necessary to describe the latter in all its details. I will only say that in the type-chase  $T^2$  the type-box 169 is open at one side and is closed by a plate 170, which extends into a recess 171 of the bracket 172, as best shown in Fig. 12. The adjustability of the type-chase  $T^2$  on the printing bar and the further adjustability of the type in the type-box 169 by means of screws 173 are the same as described in connection with type-chase  $T^1$ .

In order to assist in locating the precise position of the type-chases on the printing bar 126, I prefer to provide the upper surface of this bar with guide lines 174, which run transversely as well as longitudinally, and form small squares of predetermined dimensions, as shown in Fig. 1.

It will be understood that the operation of the printing mechanism is so timed with respect to the movements of the stops 65, 66 and 84 that the advancing of the sheets from one position to another takes place while the printing bar 126 is out of printing position, and that the sheets are held in a fixed position during the printing operation, which requires only a moment or two.

#### *Side-registering mechanism.*

For the purpose of insuring the proper position of the sheet during each printing operation, I employ a device for positively moving the sheets into correct position, holding them in such position while the printing takes place, and automatically releasing the printed sheet after each printing operation. The side-registering device which I have herein shown is substantially the same in construction and operation as the mechanism shown in my co-pending applications Serial Number 313,717, filed July 28, 1919, and Serial Number 354,762, filed January 29, 1920. For the sake of making a complete description of the machine herein illustrated, I will describe in detail the side-registering device, even though such description is largely a repetition of what I

have said in my aforesaid co-pending applications.

While the side-registering device is shown in the assembly views of Figs. 1 and 7, its construction and operation will be best understood by reference to Fig. 15. The top bar of the side piece A is provided with a transverse recess 175 in which is fitted a block 176, securely held in position by any suitable means. The block 176 is provided with a longitudinal recess in which is slidably mounted a bar 177 carrying the lower jaw or clamping member 178, running longitudinally of the printing press. The jaw 178 is secured to the bar 177 in any suitable way, as by screws, bolts or rivets 179. The jaw 178 is provided with a longitudinal shoulder or edge 180 which forms a positive positioning gage for the edge of the sheet. Preferably, the front edge of the jaw 178 is rounded, as indicated at 181, so as to guide the sheet laterally, should the forward edge thereof strike said rounded end.

The lower jaw 178 is provided with a pair of pins or studs 182, on which is hinged the upper movable jaw or clamping member 183, which co-operates with the fixed or lower jaw 178 to grip the sheet along its edge when the jaws are closed. The pivoted jaw 183 is provided with a pair of downward extensions 184 which are connected by a pin 185. The lower jaw 178 carries a bracket arm 186 secured thereto by screws 186', or otherwise. A spring 187 is connected at one end to the free end of the bracket 186 and at the other end to the cross-pin 185 of the pivoted jaw 183. The normal tendency of the spring 187 is to contract and thereby move the upper jaw 183 into closed position on the lower or fixed jaw 178.

The pivoted jaw 183 is provided with a transverse extension 188, the free end of which carries a roller 189 (see Fig. 18) arranged to engage the edge of the cam 190. The slidable bar 177 has an upwardly extending lug 191 arranged to be engaged by the edge of the cam 192. For mechanical convenience I mount the cams 190 and 192 upon the hub 193 of the disk 194, which is secured on the cam shaft 56. The cams 190 and 192 are secured to the disk 190 upon opposite sides thereof by any suitable means, such as screws 195. The clamping jaws 178 and 183 are held in forward position by expansion springs 196 coiled about a pair of rods 197 extending transversely from the side piece A of the framework. At their free or outer ends the rods 197 pass through openings in lugs 198 of the lower jaw 178. In this way the rods 197 also act as guides for the reciprocating movements of the jaws.

It will be seen from Figs. 17 and 19 that the cam 190 has three raised portions 190<sup>a</sup> and the cam 192 has three raised portions 192<sup>a</sup>. The cams 190 and 192 rotate in the di-

rection of the arrows in Figs. 15, 17 and 19. When the roller 189 of the arm 188 rides over the raised edges 190<sup>a</sup> of the cam 190, the pivoted jaw 183 is in open position, because the arm 188 is held depressed. When the roller engages the lower edge portions 190<sup>b</sup> of the cam 190, the spring 187 is permitted to move the pivoted jaw 183 into closed position. Every time one of the raised portions 192<sup>a</sup> of the cam 192 encounters the upstanding lug 191 of the slidable bar 177, the clamping jaws are drawn rearwardly (that is to say, toward the left side of the machine as viewed in Fig. 3) and are held in that position until the raised portion 192<sup>a</sup> recedes from the lug 191. Thereupon the springs 196 push the jaws forwardly toward the feed tapes in printing position. The cams 190 and 192 are so constructed and arranged that, as the registering device nears the end of its transverse or lateral movement toward the feeding tapes, the jaws are open to receive the left edge of the advancing sheet; and as soon as the sheet is properly positioned against the edge 180 of the lower jaw 178, the pivoted jaw 183 closes and the sheet is clamped tight between the jaws. When the jaws have thus closed upon the sheet, they are drawn back by one of the raised portions 192<sup>a</sup> of the cam 192, and the sheet is carried into the exact printing position. During the printing operation the jaws remain closed and stationary, firmly holding the sheet in fixed position. As soon as the printing is done, the cam 190 opens the jaws and allows the sheet to be advanced over the feeding tapes 1 into the next printing position. This opening of the jaws immediately after the printing operation preferably takes place just before the stops (65, 66 and 84) rise, as otherwise the running tapes would tend to twist the sheet. It is to be understood that when the registering device advances toward the tapes to seize the sheet, the latter is being held against advance movement by one of the sets of stops previously referred to.

#### *Counterbalance for printing mechanism.*

In order to relieve the eccentric ring 143 or the cam 148 (or whatever mechanism is used) of lifting the entire weight of the framework which carries the printing bar 126, I provide a pair of counterweights 199 adjustably mounted on the rear portions of arms 200, which extend rearwardly from brackets 201 pivoted on the shaft 109, as best shown in Fig. 5. The brackets 201 have forwardly extending arms 202 pivotally connected at their free ends by pins 203 to depending lugs or ears 204 carried by the cross-head 135 (see Fig. 3). It is clear from the foregoing that the weights 199 counterbalance the weight of the printing framework, thereby insuring its smooth and easy oper-

ation and taking considerable strain off the eccentric or cam mechanism which controls the operation of the printing frame.

#### *Inking mechanism.*

For inking the type in the type-chases carried by the printing bar 126, I provide inking rollers 205 mounted on a transverse shaft 206 in alignment with the type chases, as best shown in Fig. 3. The shaft 206 is carried by a pair of short links 207, one of which is shown in Fig. 4 and the other in Fig. 6. The links 207 are pivoted on a transverse shaft 208 carried by a pair of side bars 209, one of which is shown in Fig. 4 and the other in Fig. 6. The side bars 209 may be connected by cross rods 210 (see Figs. 4 and 6) to form a rigid framework adapted to slide in the grooves or recesses 211 of a pair of fixed guide bars 212, which form part of the side brackets indicated as a whole by 95, as already referred to. Links 213 are pivoted to the rear ends of the two side bars 209 by means of pins or studs 214. The rear ends of the links 213 are connected to the upper ends of a pair of levers 215 by means of pins or studs 216. The levers 215 are fixed at their lower ends upon a transverse shaft 217 rotatably mounted in the sides of the framework, as shown in Figs. 4 and 5. A short arm or lever 218 is fixed upon the shaft 217 between the levers 215, as shown in Fig. 5, and the free end of the lever 218 is pivotally connected by a pin 219 to a rod 220 carried by a slotted arm 221 slidably mounted on the shaft 117, which extends through the slot 222 of the arm 221 (see Fig. 4). Adjacent the reciprocable arm 221 is a cam disk 223 fixed on the shaft 117 so as to rotate therewith. The cam 223 has a cam groove 224 in which engages a roller 225 carried by the lower end of the arm 221. The shape of the cam groove 224 is best shown in Fig. 24. It will be clear that as the cam 223 rotates in a clockwise direction (as viewed in Figs. 4 and 24), the arm 221 will be reciprocated and the levers 215 will be rocked back and forth. The rocking of the levers 215 produces a reciprocating movement of the slidable framework which carries the inking rollers 205.

Suitable spring means is provided for normally holding the inking rollers 205 upwardly against the type in the type-chases. In the drawings, I have shown a pair of springs 226 (see Figs. 3 and 4) coiled about the shaft 208 and connected at one end to the short links 207 in such a way that the springs tend to press these links upwardly. The inking rollers 205 are adjustable laterally along the shaft 206, so that they can readily be brought into alignment with the type-chases in whatever position the latter are adjusted on the printing bar 126.

When the framework carrying the inking

rollers 205 is drawn rearwardly, the inking rollers come into contact with suitable ink-distributing rollers 227, mounted on a transverse shaft 228, as shown in Figs. 3 and 4. If desired, additional rollers 229 may be arranged in contact with the large rollers 227 for distributing the ink. The transverse shaft 228 is mounted in the fixed side brackets 95. At one end of the shaft 228 is fixed a pulley 230, which is connected by a belt 231 with a pulley 232 fixed at one end of the transverse shaft 7, as best shown in Fig. 2. I have already described how the shaft 7 is driven from the power shaft 11 through the chain 9. Rotation of the shaft 7 will, therefore, operate the ink-distributing rollers 227 and 229. The rollers 229 are preferably mounted so as to move transversely over the rollers 227, but as this feature forms no part of my present invention it is not necessary to show or explain it in detail.

The shaft 206, on which the inking rollers 205 are mounted, carries at one end a pinion 233 adapted to mesh with a rack 234 attached to the printing head 126 and with a rack 235 fixed on one of the side brackets 95. This construction is best shown in Fig. 6. The rack 234 is fastened to a block 234<sup>a</sup> secured to the underside of the printing bar 126 near the left end thereof (as viewed in Fig. 3). The rack 234 moves up and down with the printing head 126, while the rack 235 is stationary. The movements of the reciprocating framework which carries the inking rollers 205 are so timed with respect to the movements of the printing bar that the rack 234 is in alignment with the fixed rack 235 when the pinion 233 is about to pass from the rack 235 to the rack 234 into position to ink the type carried by the printing bar. In Fig. 6, the printing bar 126 is at its highest point and is held stationary until the pinion 233 passes rearwardly out of engagement with the rack 234. When the pinion 233 is approximately in the position indicated by the dotted lines 233', the printing bar begins to descend to make the impression on the sheet then in position. The rest or "dwell" position of the printing bar 126 occurs in its highest position. The passing of the pinion 233 into and out of engagement with the rack 234 occurs while the roller 146 of the arm 144 (see Figs. 26 and 27) engages the concentric portion 147<sup>a</sup> of the cam groove 147. If the rack 234 were omitted, the inking rollers 205 would spin around rapidly as soon as the pinion 233 left the fixed rack 235 and this rapid rotation of the inking rollers while in contact with the type would not only fail to ink the type properly, but it would tend to wipe the ink off the type. This difficulty and objection are entirely removed by providing the rack 234, which insures a slow and uniform movement of the inking rollers while passing beneath

the type. At its right end (as viewed in Fig. 3), the shaft 206 carries a roller 206<sup>a</sup> adapted to ride under a block 206<sup>b</sup> depending from the printing bar 126. This equalizes the upward pressure on the printing rollers by the springs 226. Of course, if desired the rack and pinion arrangement at the left of the printing bar 126 could be duplicated at the right, instead of the smooth roller 206<sup>a</sup>.

#### *Lifting fingers.*

After the sheets leave their last printing position, they are carried over a series of lifting fingers 236 fixed upon a transverse shaft 237, as shown in Fig. 1. These fingers are arranged between the feeding tapes and lie even with or slightly below the upper surface of the tapes. The shaft 237 is provided near one end thereof with a pinion 238 adapted to mesh with a rack 239 connected to a rod 240 (see Figs. 1 and 2). The rack 239 may be slidably mounted in a guide or casing 241 pivoted to the side piece A at 242. The rod 240 extends from an arm 243 which has a slot 244, as shown in Fig. 2. The transverse shaft 109 extends through the slot 244, thereby guiding the arm 243 and the connected parts in reciprocating movement. Adjacent the arm 243 is mounted a cam 245, which is fixed upon the shaft 109, so as to rotate therewith. The shape of the cam 245 is best shown in Fig. 22. The arm 243 carries a roller 246 arranged to ride over the edge of the cam 245. Suitable spring means, such as spring 247 coiled about the rod 240, forces the roller 246 against the operative edge of the cam 245.

It will be clear that, as the cam 245 rotates, the rack 239 is drawn back and forth to oscillate the shaft 237. This movement of the shaft 237 swings the lifting fingers 236 rearwardly over the delivery table D, on which the printed sheets are thus deposited, and then swings the fingers back again into normal position. The operation of the lifting or delivery fingers 236 is so timed that as soon as the sheet has advanced from its last printing position over the fingers, the shaft 237 is rocked rearwardly and the fingers carry the sheet with them. The printed sheets drop automatically on to the delivery table D, face downward. The printed and numbered sheets are thus automatically piled up in consecutive order, the smallest number being on top when the sheets are turned over.

#### *General operation.*

The operation of my printing press will be understood from the foregoing description of the construction and operation of the various mechanisms, but I will briefly summarize the general operation of the machine as a whole.

The sheets to be printed are conveniently arranged in a pile on the extension 45 of the feed table C, and the operator feeds them one by one over the running feed tapes. The edge 47 of the extension 45 is so adjusted with respect to the side-registering device that when the left edge of the sheet is placed against the edge 47, the edge of the sheet will be in a line slightly to the right (as viewed in Fig. 3) of the shoulder 180 of the clamping jaw 178, as diagrammatically indicated by the dotted line *t* in Figs. 7 and 15. As each sheet is pushed forwardly over the feed tapes, it first encounters the gate stops 52, which arrest the sheets before they advance into their first printing position, thereby insuring a proper and uniform feeding of the sheets. After the sheets have once passed under the first set of feed rollers 27, the further operation of the machine upon the sheets is automatic, so that the operator standing in front of the feed table C need only do the manual work of feeding the sheets forwardly one by one against the gate stops 52.

When the stops 52 are raised, the sheet passes forwardly until it is arrested by the first stops 65. Thereupon the side-registering mechanism advances, grips the sheet along its left edge and pulls it laterally into the correct position to receive the first printing. As soon as the sheet has thus been adjusted, the printing bar 126 descends and makes the first impression on the sheet. During the printing operation the sheet is held stationary by the jaws 178 and 183. After the first printing operation the sheet is automatically released and permitted to advance against the second stops 66, whereupon the side-registering device again comes forward and pulls the sheet into the second printing position, and the printing head again descends to make the second impression upon the sheet. This cycle of operation is then repeated for the third printing position of the sheet. As the sheet is released by the third set of stops 84, it passes over the lifting fingers 236, which automatically carry it over the delivery table D, on which the printed sheets fall one by one in a pile.

It will be understood, of course, that the wheels of the numbering machines carried by the type-chase or chases T<sup>3</sup> are automatically advanced one unit after each printing operation, so that the numbering of the individual checks which make up the check sheets will be consecutive. Such numbering machines may be bought in the open market, and as their construction and operation are well understood, I need say nothing further about them.

To prevent the possible passage of the advancing sheet over the first set of stops

65, and also to guard against the accidental lifting of a sheet by the ascending printing bar 126, I provide one or more fingers 248 mounted on a transverse rod 249, as best shown in Figs. 7 and 8. These fingers curve downwardly toward the printing bed plate 24, but do not quite touch the same, as seen in Fig. 8. The fingers 248 extend below the top of the stops 65 when the latter are in raised position, so that it is impossible for a sheet to be lifted above those stops. In other words, the fingers act as strippers which positively prevent the accidental lifting or buckling up of a sheet. The fingers 248 are preferably mounted on the bar 249 so as to be slidable thereon. Suitable means, such as screws 250, may be employed to secure the fingers in adjusted position.

If desired, a hand-wheel 251 may be fixed upon the outer end of shaft 117 (see Figs. 1, 3 and 5) to enable the operator to turn this shaft by hand for adjusting the position of some connected part, when the motor is not running. For the same reason, a hand-wheel 252 may be provided on the shaft 228 (see Fig. 3), which carries the ink-distributing rollers 227.

It will be seen from the foregoing detailed description of the construction and operation of my improved printing press that I provide a compact and efficient machine for printing upon sheets a series of successive impressions from the same type. While I have herein set forth a machine of a certain specific construction, it is to be understood that I have done so merely for the sake of illustration and not by way of restriction or limitation. I do not herein make any claims to the broad features disclosed in my copending basic application, Serial Number 313,717, filed July 28, 1919.

What I claim is:

1. In a multiform sheet printing press, a plurality of successively arranged stops adapted to arrest a sheet in successive printing positions, means for adjusting said stops to regulate the distance between successive stops, means for gripping the sheet and carrying the same into predetermined position for each printing operation, and printing mechanism for printing upon the sheets in each adjusted position.

2. In a multiform sheet printer, mechanism adapted to grip the edge of a sheet and hold it adjusted in each of successive printing positions, stops for arresting the advancing sheet in successive printing positions, means for adjusting said stops, and printing elements adapted to print upon the sheet in each printing position.

3. In a printing press, a plurality of transverse shafts successively arranged, stops carried by each shaft to arrest a sheet, means for operating said shafts at predetermined intervals so that said stops arrest the sheets

in successive printing positions, means for adjusting the stops on certain of said shafts to regulate the distance between successive printing positions, and printing mechanism for printing upon the sheets in each arrested position.

4. In a printing press, a transverse shaft, a rod or bar slidably mounted on said shaft and substantially parallel therewith, means for adjusting said rod toward and away from said shaft and holding it in adjusted position, stops carried by said rod to arrest a sheet in printing position, means for operating said shaft to move said stops into arresting and releasing position, and printing mechanism for printing upon a sheet in arrested position.

5. In a printing press having a surface over which the sheets are fed, a transverse shaft arranged below said surface, stops carried by said shaft and having their free ends projecting upwardly above said feeding surface to arrest the sheets in their first printing position, a plurality of transverse shafts mounted successively above said feeding surface, downwardly extending stops carried by said last-mentioned transverse shafts to arrest the sheets in successive printing positions, means for operating all of said shafts to move the respective stops carried thereby into position to arrest the advancing sheets in successive printing positions, and printing mechanism for printing upon the sheets in each arrested position.

6. In a printing press having a surface over which the sheets are fed, a transverse shaft arranged below said surface, stops carried by said shaft and having their free ends projecting upwardly above said feeding surface to arrest the sheets in their first printing position, a plurality of transverse shafts mounted successively above said feeding surface, downwardly extending stops carried by said last-mentioned transverse shafts to arrest the sheets in successive printing positions, means for adjusting said downwardly extending stops longitudinally of the feeding surface to regulate the distance between successive stops, means for operating all of said shafts to move the respective stops carried thereby into position to arrest the advancing sheets in successive printing positions, and printing mechanism for printing upon the sheets in each arrested position.

7. In a multiform sheet printing press, mechanism for arresting a sheet in successive printing positions, said mechanism including means for gripping the sheet and holding the same in adjusted position during each printing operation, and means for adjusting said mechanism to regulate the distance between successive printing positions.

8. In a printing press having tapes over

which the sheets are fed, a plurality of transverse shafts arranged over said tapes, stops carried by said shafts for arresting the advancing sheets in successive positions, means for rocking said shafts to move said stops into arresting and releasing position, and feed rollers pivotally mounted on said shafts, so as to rest constantly in contact with the feed tapes.

9. In a printing press having a feeding surface over which the sheets advance, movable stops for arresting the sheets in successive printing positions, and stationary means associated with said stops for preventing the accidental lifting of the sheets and guiding them over said surface.

10. In a printing press having a feeding surface over which the sheets advance, a plurality of transverse shafts carrying stops to arrest the sheets in successive printing positions, means for rocking said shafts, and guide rails mounted on said shafts in the direction of the advancing sheets to prevent lifting of the sheets and to guide the same over said surface.

11. In a multiform sheet printer, mechanism for making a series of successive impressions upon a sheet from the same type, said mechanism including means operable independently of the sheets for automatically effecting a relative displacement between the sheet and the type for each printing operation, and means for adjusting said mechanism to regulate the amount of such displacement.

12. In a multiform sheet printer, mechanism for making a series of successive impressions upon a sheet from the same type, said mechanism including means operable independently of the sheets for automatically effecting a relative displacement between the sheet and the type for each printing operation, and screw-controlled means for adjusting said mechanism to regulate the amount of such displacement.

13. In a multiform sheet printer, mechanism adapted to grip the edge of a sheet and hold it adjusted in each of successive printing positions, stops for arresting the advancing sheet in successive printing positions, said stops being operable independently of the sheets to permit advance of the sheets after each printing operation, means for adjusting

said stops to regulate the movements of the advancing sheet, and printing elements adapted to print upon the sheet in each printing position.

14. In a multiform sheet printer, means for arresting an advancing sheet in successive printing positions, means adapted to grip the sheet and hold it in each printing position, said arresting means being adjustable to regulate the movements of the sheet from one printing position to another, said arresting means being operable independently of the sheets to permit advance thereof after each printing operation, and printing mechanism so timed as to print upon the sheets in each printing position.

15. In a multiform printing press, sheet feeding and registering mechanism comprising a plurality of stops for arresting the sheet in successive printing positions, said stops being adjustable longitudinally of the machine, and operable independently of the sheets to release the same for further advance after each printing operation, and a gripping device for clamping the edge of the sheet and holding it in adjusted position during each printing operation.

16. In a printing press having a movable feeding surface over which the sheets advance, movable stops for arresting the sheets in successive printing positions, and fingers arranged over said feeding surface to prevent accidental lifting of the sheets.

17. In a multiform sheet printer, means for arresting an advancing sheet in successive printing positions, means adapted to grip the sheet and hold it in each printing position, said arresting means being adjustable to regulate the amount of movement of the sheet between printing positions, and printing mechanism so timed as to print upon the sheets in each printing position.

18. In a multiform printing press, sheet feeding and registering mechanism comprising a plurality of stops for arresting a sheet in successive printing positions, means for adjusting said stops to regulate the distance between printing positions, and a gripping device for clamping the edge of the sheet and holding it in adjusted position during each printing operation.

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