

No. 788,396.

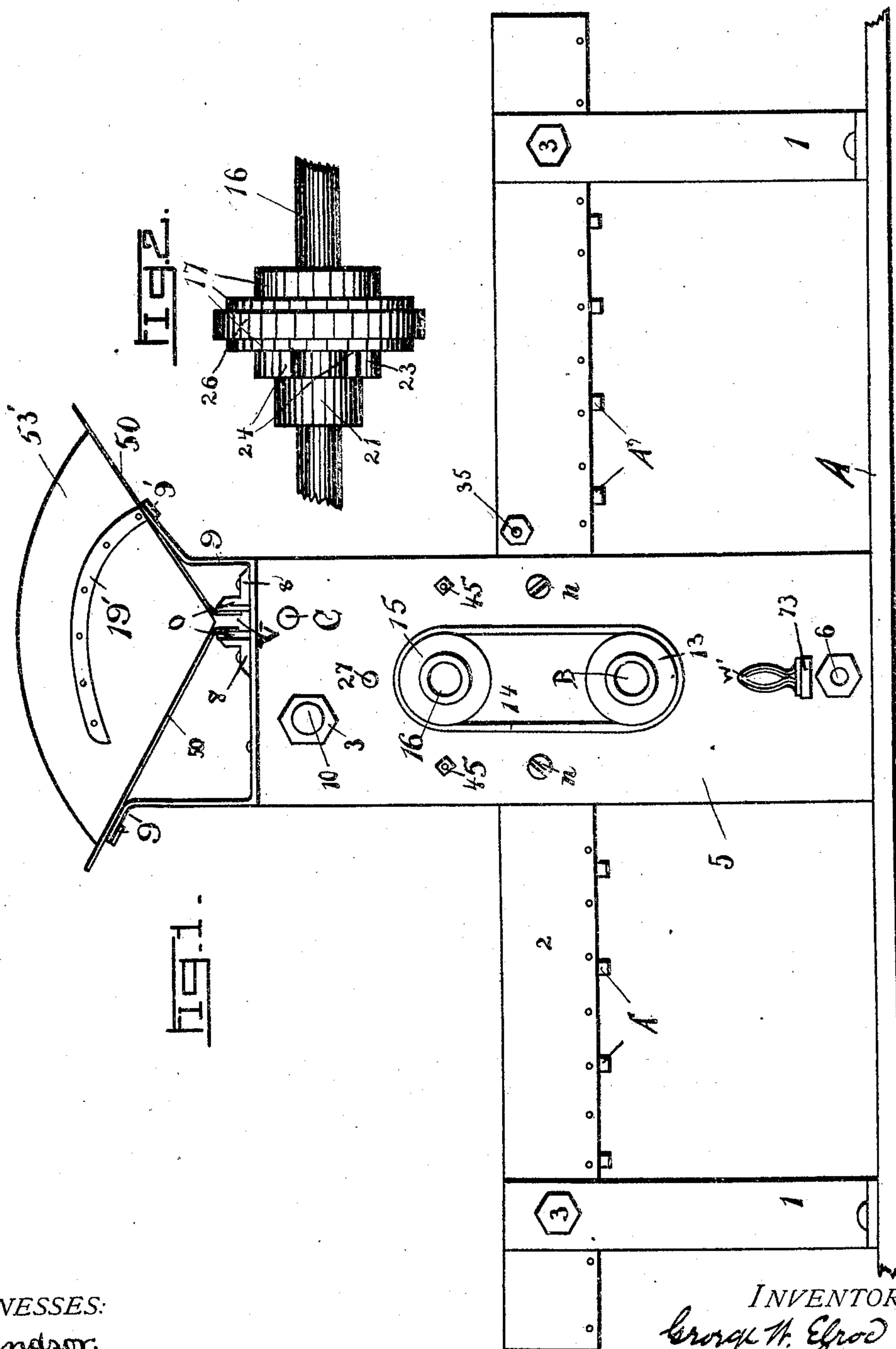
PATENTED APR. 25, 1905.

G. W. ELROD.

MECHANISM FOR PRINTING ON CYLINDERS.

APPLICATION FILED JAN. 24, 1903.

5 SHEETS--SHEET 1.



WITNESSES:
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N. Oberman.

BY

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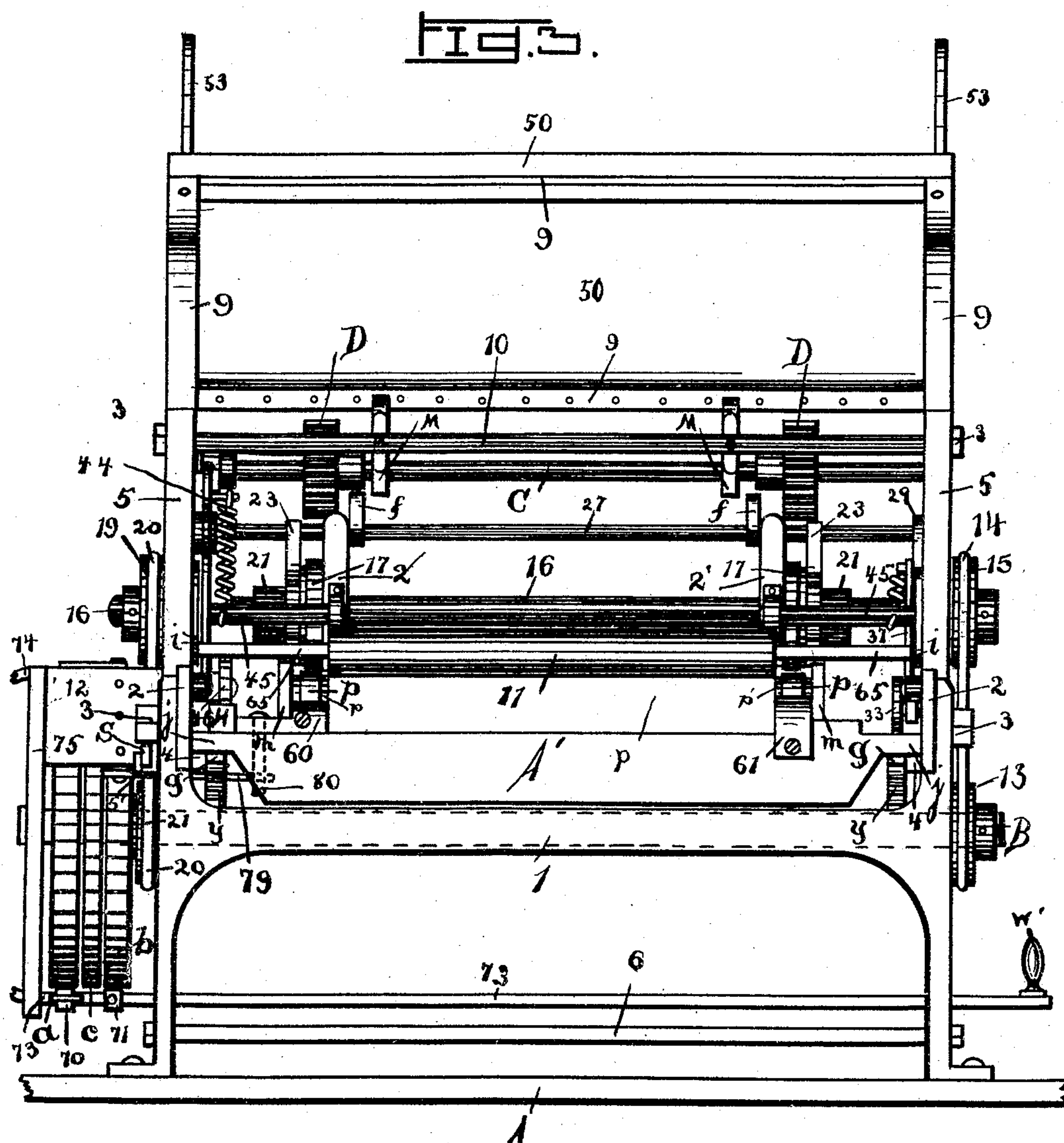
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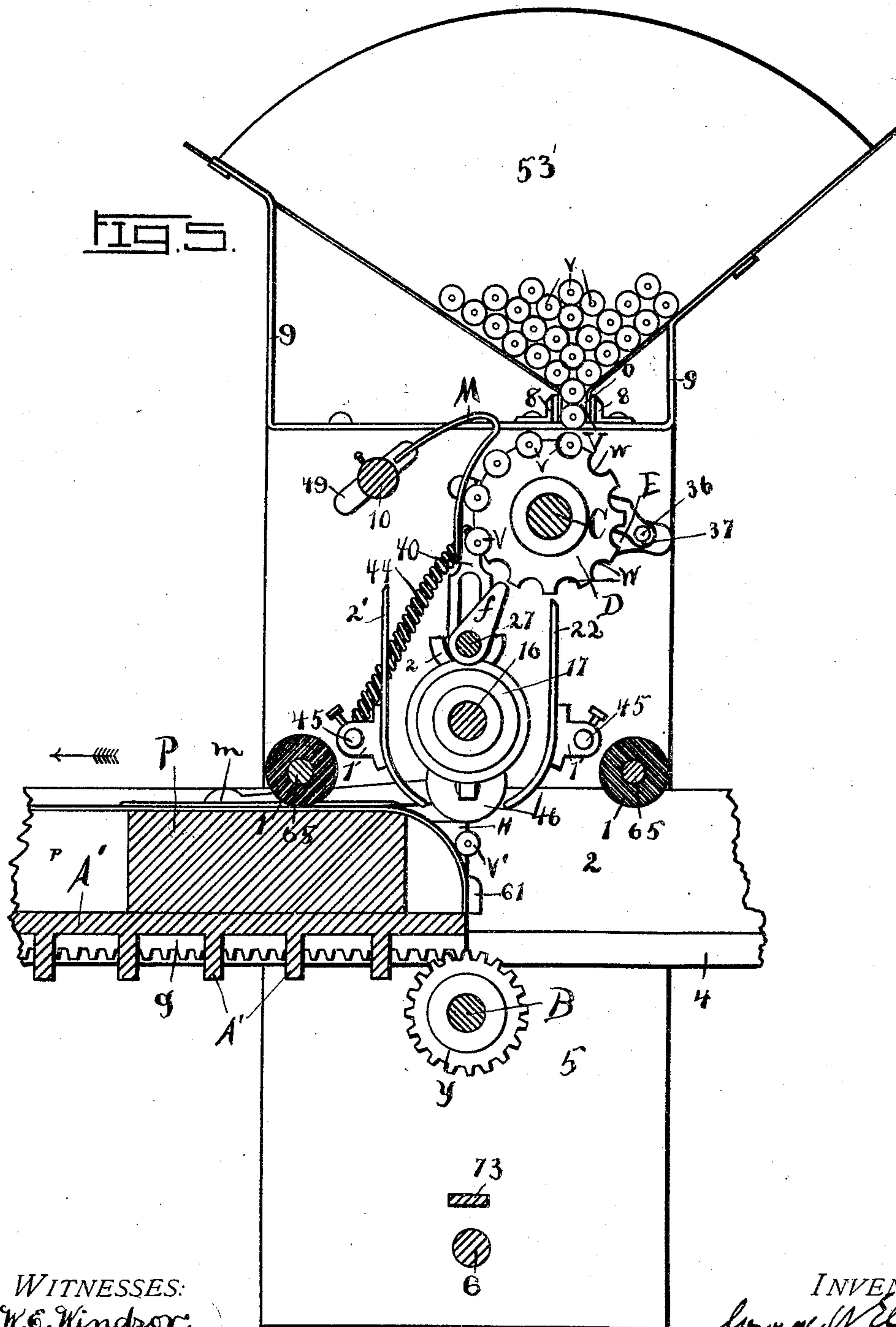
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5 SHEETS—SHEET 4.



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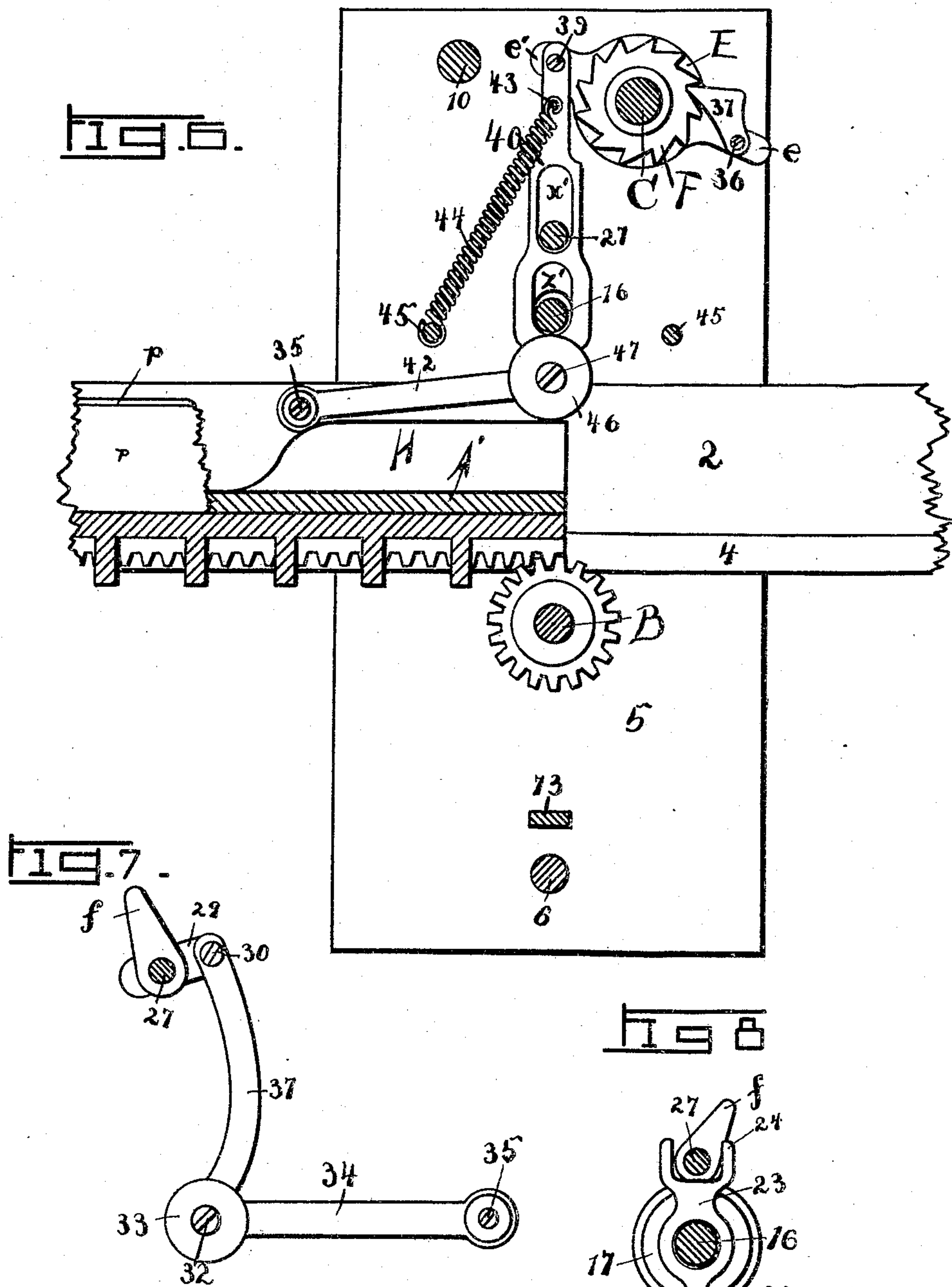
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5 SHEETS--SHEET 5.



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UNITED STATES PATENT OFFICE.

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MECHANISM FOR PRINTING ON CYLINDERS.

SPECIFICATION forming part of Letters Patent No. 788,396, dated April 25, 1905.

Application filed January 24, 1903. Serial No. 140,415.

To all whom it may concern:

Be it known that I, GEORGE W. ELROD, residing at Omaha, in the county of Douglas and State of Nebraska, have invented certain useful Improvements in Mechanism for Printing on Cylinders; and I do hereby declare that the following is a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to a new and useful apparatus for printing on cylinders.

The aim of my invention is to provide a machine so constructed that cylindrical articles of manufacture—such as lead-pencils, pill-boxes, mailing-tubes, and the like—may be fed into a suitable hopper, thence by means of a feed mechanism be deposited upon the rails of a reciprocating type-carrying table, the article being revolutely held by means of a detent and yieldingly forced upon said rails and type by means of spring-held platen-rollers, so that the article is rotatably held while the type carried by the table is conveyed below the article to rotate and print the same, a printed article being delivered at each stroke of the table; and my invention further embodies a new and useful method of printing on cylindrical articles, as will be described more fully hereinafter and finally pointed out in the claims.

In the accompanying drawings I have shown in Figure 1 a side view of an apparatus embodying my invention. Fig. 2 shows a detail of one of the platen-rollers. Fig. 3 discloses an end view of a machine constructed according to my invention. Fig. 4 discloses a top view of my machine. Fig. 5 shows an enlarged detail disclosing a portion of the feed mechanism and a portion of the reciprocating table. Fig. 6 discloses an enlarged detached detail of the feed mechanism. Fig. 7 discloses an enlarged detached detail of the guide-arms used in connection with the feed-wheels, while Fig. 8 shows an enlarged detached detail of the platen-rollers and one of the detents.

In carrying out the aim of my invention I provide a suitable base A, which is provided with suitable standards 1, which support two

side bars 2, secured to the standards by means of the screws 3, as shown in Figs. 1 and 3. Each side bar 2 is provided with a projecting flange 4, as disclosed in Figs. 3 and 5. Centrally secured to these side bars 2 are the two plates 5, as disclosed in Figs. 1 and 5. These plates are secured to the side bars 2 by means of the screws *n*, as shown in Fig. 1. Near the upper end these plates are secured by the transverse bolt 10 and near the lower end by means of the transverse bolt 6, as shown in Figs. 1 and 5. Above these, plates 5 are further secured by means of the bars *o*, (shown in Fig. 1,) secured by means of the brackets 8, a channel V being formed between these bars *o*, as disclosed in Fig. 1.

Secured to the top of each side plate 5 are rectangular brackets 9, which are strengthened by means of the transverse bars 9'. Supported by these brackets 9 and the bars 9' are the two similar hopper members 50 50, one of these members, 50, being slotted, as is shown at 50' in top view in Fig. 4. The hopper members 50 are placed a suitable distance apart to form a slot or escape-opening through which the pencils drop, as is shown in Fig. 4, to enable the articles placed within the hopper to be readily removed. These hopper members 50 and 50 are provided with the side plates 53', as shown in Figs. 1 and 4, and these plates in turn are strengthened by the side bars 19', as shown in Fig. 1. Revolutely held within suitable bearings of these plates 5 is an operating-shaft B, which upon one side projects beyond one of the plates, as is disclosed in Fig. 3, and is provided upon the projecting end with the two loose pulleys *a* and *b* and with the intermediate driving-pulley *c*, as clearly indicated in Fig. 3. In order to support the projecting end of this shaft B, I provide a bracket 12, from which depends a bar 75, adapted to receive the end of the driving-shaft B. Upon the opposite end, as shown in Fig. 1, this driving-shaft B is provided with a suitable pulley 13, receiving an elastic belt 14, passing above over a suitable pulley 15, as shown.

Positioned above the driving-shaft B is an adjustably-held platen-roller shaft 16, provided outside of the plates 5 with the pulleys 15 and 19, as shown in Fig. 3, and interme-

diately with the platen-rollers 17 17. This shaft 16 is movably held to permit an upward-and-downward movement. Passing over the pulley 19 is an elastic belt 20, below working
5 over the pulley 21, secured to the main driving-shaft B, as shown in Fig. 3.

Extending from one of the plates 5 to the other and near the upper end is a feed-wheel shaft C, which shaft is provided with the feed-wheels D, (shown in Fig. 5,) the shaft C further being shown in Fig. 6. The feed-wheels D are secured near the end of the shaft C, as disclosed in Fig. 3, and this shaft at one end supports a pawl-arm E, which arm is provided
15 with the projecting ear *e*, extending in one direction, and the projecting ear *e'*, extending in the opposite direction, as disclosed.

Secured to the ear *e* by means of the pin 36 is the pawl 37, engaging the ratchet-wheel F, secured to the feed-wheel shaft C, as shown in Fig. 6.

Pivotally secured to the pawl-arm E, as shown in Fig. 6, by means of the pin 39, is a slotted bar 40, provided with the upper slot
25 *x'* and the lower slot *z'*, while to the lower end of this bar is secured a screw 47 to pivotally secure to this bar 40 the arm 42, pivotally secured to one of the side members 2 by means of the screw 35, as shown. Secured
30 near the upper end of this slotted bar 40 is a pin 43, from which extends the spring 44, secured to the projecting pin 45, secured to one of the plates 5. In Fig. 3 this spring 44 and the pin 45 are clearly shown. By means
35 of this spring 44 the pawl-arm E is normally forced in one direction.

Revolubly mounted upon the screw 47, as shown in Fig. 6, is a roller 46, which roller normally rides upon the bottom of the shifting table A'. This platen-roller shaft 16 is provided adjacent the platen-rollers 17, as is disclosed in Figs. 2 and 3, with suitable collars 21, and between these collars 21 and the platen-rollers 17 are held the detents 23, one
45 of which is disclosed in detail in Fig. 8, each detent 23 being bifurcated to provide the ears 24 and having the downwardly-extending lip 25. These platen-rollers 17 are each provided with an elastic tire 26, as disclosed.

Positioned immediately above the platen-roller shaft 16 is the rock-shaft 27, (shown in Figs. 3, 5, and 7,) extending from one of the plates 5 to the other, and this rock-shaft 27 is provided with the ear 29, to which by means
55 of the screw 30 is secured the arm 37. Below this, arm 37 is secured, by means of the screw 32, supporting the roller 33, to the rock-arm 34. This rock-arm by means of the screw 35 is secured to one of the side bars 2, as disclosed in Figs. 3 and 7.

It will be remembered that I set forth above that the articles to be printed were rotated by means of a reciprocating table. This is accomplished by means of the table A', provided below with suitable strengthening-ribs,
65

as shown in Fig. 5, and which table is supported by means of the side projections *j*, (shown in Figs. 3 and 4,) which slide upon the flanges 4. This table A' is provided with the rails *p* along opposite plates H H' and L, as shown. One of the rails, *p*, as shown in Fig. 4, is secured by means of the screws *r*, so that this rail is adjustably secured, the screws *r* being adapted to thread into a suitable opening.

By means of the cam-plates H and H' the roller 46 is actuated to operate the pawl-arm E to rotate the feed-wheel shaft C, supported within the plates 5, so that at the end of each stroke or movement of the table A this shaft C is actuated. This feed-wheel shaft C supports the feed-wheels D, the peripheral edges of which are provided with suitable seatings *w*, adapted to receive the cylindrical articles to be printed. In Fig. 5 the hopper is shown
85 as containing a number of lead-pencils *v*, adapted to drop through the bottom slot V within the hopper and gravitate into the seatings of the feed-wheels D.

The pawl-arm E is so adjusted that one set of feed-wheel seatings is normally below the slot V within the hopper. In Fig. 5 a lead-pencil is shown resting within the uppermost seating within the feed-wheels, while two pencils are shown within the feed opening or
95 slot V.

In order to prevent the pencils leaving the feed-wheels, I secure to the bolt 10 the plugs 49, which secure the guard-fingers M, as clearly indicated in Figs. 5 and 3. Extending from both plates 5 are the four similar pins 45. (Shown in Figs. 3 and 5.) These pins 45 support the ears 1', to which are secured the guard-plates 2' and 22', so that when a pencil *v* drops from the feed-wheels it falls downward, being deflected either forward or backward by the valve-arms *f* and dropping upon the rails *p* of the table. Referring to Fig. 6, it will be noticed that the movably-held shaft 16, supporting the platen-rollers 17, works
110 through the slot *z'* of the slotted bar 40.

I have described the rock-arm 34 as secured, by means of the screw 35, to a side bar 2 of the bed and that this rock-arm 34 actuates the rock-shaft 27, provided with the valve-arms *j*. Now in order to actuate this rock-arm 34, provided with the roller 33, I provide the nosing-plate L, (shown in Fig. 4,) which nosing-plate actuates the rock-shaft 27 to set the valve-arms *f* so that the lead-pencil about
120 to escape out of the feed-wheels will be directed upon the side of the platen-roller toward which the table in its next stroke will travel, as disclosed in Fig. 5, where the valve-arms *f* are shown in one position. As soon, however, as the roller 33 travels off of the nosing-plate L the rock-shaft 27 will rock in the opposite direction, so that the valve-arms tilt toward a new direction, as is shown in Fig. 7, so that the next pencil that drops out
130

of the feed-wheels will drop upon the opposite side of the platen-rollers.

The hopper 50 is made of a size to accommodate the cylindrical articles to be printed.

5 In the drawings a hopper is shown adapted to receive the lead-pencils, and the slot within the bottom of the hopper as well as the seatings within the feed-wheels are made to receive an ordinary lead-pencil.

10 The rails *p*, described as secured to the reciprocating table A' above, are provided with a cushion-strip *p'*, of rubber or other suitable material. In Fig. 3 I have shown an end view of these rails, as well as the clamps 60 and
15 61, which hold the ends of the elastic strips *p'*. Near each end, as shown in Figs. 3 and 4, are suitable ink-pads P, positioned between the rails *p*.

Mounted within suitable holders *i* (shown
20 in Fig. 3) are the shafts 65, supporting the ink-rollers 11', said rollers being held within any suitable holders, so that they may be readily removed. These ink-rollers are adapted to work over and upon the ink-pads P.

25 In its operation the table A' is shifted automatically in opposite directions. This is accomplished in providing the pulley *a* with a straight belt and the pulley *b* with a cross-belt, which belts are engaged by the arms 70
30 and 71, secured to the shifting rod 73, one end of which is curved upward, as shown at 74, and slides within the bar 75, as shown in Fig. 3. This shifting rod 73 is actuated by means of the arm 76, (shown in Fig. 4,) se-
35 cured to the pivotally-held holders 77, which below is provided with the stem 80. Secured to the shifting table A' below and on opposite edges, as shown in Figs. 3 and 5, are racks *g*, which are engaged by suitable pinions *y*,
40 and these pinions are mounted upon the driving-shaft B, so that this table is automatically reciprocated in opposite directions.

The shifting of the belts is accomplished by means of the striker-rod *s*, as disclosed in
45 Fig. 4, which is supported by the lugs 5 and 5'. This bar *s* is provided with the projecting pins 6', which are encountered by a suitable pin to shift this rod *s* backward and forward. I claim nothing new as regards the
50 shifting of the table, as the means described are those ordinarily used in shifting an ordinary planer-table.

Secured to the table A' between the ink-beds P is the type X, to be used in printing
55 a lead-pencil, for instance. This type is set at an angle to a line passing centrally through the table, as will be understood in referring to Fig. 4.

Now when all the instrumentalities have
60 been properly arranged and adjusted the operation of my device will be as follows: A suitable number of pencils are placed into the hopper. The shifting rod is then actuated to start the machine, so that one of the belts will engage
65 the belt-pulley *c*, secured to the main driving-

shaft B. This will cause the table to be reciprocated backward and forward. As soon as the pencils are fed into the hopper one will drop into the seating within the feed-wheels immediately below the hopper-opening. Now
70 as the table is actuated the roller 46 will be engaged by the cam-plate H' to raise the same to actuate the pawl 37 and carry the shaft C forward one movement and advance one pencil and permitting another one to enter the feed-
75 wheels. At the end of the next stroke the cam-plate H will engage the roller 46 to again actuate the pawl and move the shaft C forward another division, permitting still another pencil to drop into the feed-wheels. In the mean-
80 time, of course, the valve-arms *f* have been thrown idly from side to side. However, the first pencil soon travels downward far enough to drop out of its seating and be deflected by the valve-arms, we will assume, against the
85 guard-plates 22', the table A' in its movement being advanced in the direction of the arrow, as shown in Fig. 5. The pencil will then gravitate downward and be engaged by the platen-rollers 17 and be rotated by the move-
90 ment of the table below, assisted by the movement of this platen-roller above, and be rotated by the table toward the lips 25 of the detents 23, as shown in Fig. 8. The rotary move-
95 ment of the platen-rollers is so timed that they revolve in unison with the movement of the rails. The pencil, it should be remembered, however, is being revolvably held upon the upper traveling edges of the rails *p*, which rails
100 are being moved forward by means of the table, while the platen-rollers which have been described as being secured to a movably-held shaft are being yieldingly forced downward upon the pencil. Now as the table travels for-
105 ward the type is brought below one end of the pencil, and this type is as high as the rails, so that the type is directed below the revolving pencil, the degree of pressure being controlled by the elasticity within the strips upon the rails and tension of the spring-held platen-
110 wheels. As the pencil is rotated over the type the matter will appear printed upon the same in the path of a spiral until the end is encountered, when the pencils will drop off of the rails. The rails *p* at the end are slightly
115 raised, so that the pencils will pass over the ink-pads P and drop through an opening within the table into a suitable receptacle. In Fig. 5 I have shown at *m* the additional strip as se-
120 cured to the rails to insure the pencils passing over the ink-pads P. At the end of every other stroke of the table the rock-shaft 27 is actuated to throw the valve-arms *f* in opposite direction. It is of course understood that the movement of these platen-rollers is re-
125 versed at the end of each stroke of the table. Now in order that the pencils may be more directly brought below the center of the platen-rollers 17 the detent-lip 25, (shown in Fig. 8,) which stops and holds the pencil, is permitted
130

a rocking movement by virtue of the bifurcations 24, so that the lip 25 will be carried beyond the center a suitable distance to permit the pencil to come directly below the center of the platen-wheels. In Fig. 8 the lip 25 is shown just before being moved its full distance to permit the pencil *v* coming directly under the platen-rollers. The next and the subsequent pencils will be rotated above the type by means of the table and platen-wheels in the manner described. From this it will be seen that one pencil is printed at each stroke of the table and that the pencils are rotated a number of times in order that the printed matter may appear upon the same in the path of a spiral. As the article to be printed is supported by the rails at each end and the line of type strikes the article at but one point, there is no blurring of the ink.

In Fig. 4 but one line of type X is shown. It is of course understood that two or more lines of type could be placed adjacent to another, and in adjusting the pitch of the single line the same may be made to appear upon the pencil in a coarse or fine thread, giving the appearance of matter set up solid or leaded.

In order to make the matter appear in paragraphs upon the article to be printed, a plurality of lines of type are placed upon the table, all starting from a common line. So, also, may a plurality of lines of type be placed side by side to have the matter appear in different languages. When more than one line of type is used, it is of course understood that the article is engaged by the type at more than one point.

In connection with my machine no special type is needed, as the ordinary printing-type may be locked in a galley or form at a proper angle and be secured to the reciprocating table A'.

Now, having thus described my said invention, what I claim as new, and desire to secure by United States Letters Patent, is—

1. The combination with a suitable supporting-frame, of a reciprocating table held by said frame, a hopper positioned above said reciprocating table, a feed mechanism below said hopper, a detent below said feed mechanism, a loosely-held platen-roller positioned above said table and adjacent said detent, and means to operate said table.

2. The combination with a suitable supporting-frame of a reciprocating table, supported by said frame, a hopper positioned above said reciprocating table, a feed mechanism below said hopper, guard-plates positioned above said reciprocating table, a platen-roller positioned between said guard-plates, valve-arms rocking from side to side alternately toward said guard-plates, and means to operate said instrumentalities.

3. The combination with a suitable supporting-standard, of a table reciprocating within said standard, a cam-plate secured to said table

at each end, a hopper, a shaft provided below said hopper, a ratchet secured to said shaft, a pawl in engagement with said ratchet, an arm in connection with said pawl, said arm being actuated by said cam-plates, a loosely-held platen-roller positioned above said table and below said hopper, a detent positioned adjacent said platen-roller, and means to actuate said table.

4. The combination with a suitable supporting-standard, of a reciprocating table supported by said standard, a hopper above said table, a feed mechanism below said hopper, a rock-shaft, valve-arms secured to said rock-shaft, a bar secured to said rock-shaft, a cam-plate secured to one end of said table to actuate said bar, a loosely-held platen-roller, a detent positioned adjacent said platen-roller, guard-plates positioned adjacent said platen-roller, and means to reciprocate said table.

5. The combination with a suitable supporting-standard, of a table reciprocating upon said standard, rails secured to said table, a cam-plate secured at each end to said table, a hopper, a feed mechanism below said hopper, a ratchet-wheel secured to said feed mechanism, a pawl positioned adjacent said ratchet, said pawl being actuated by said cam-plates, a rock-shaft below said feed mechanism, valve-arms secured to said rock-shaft, an arm pendent from said shaft, said pendent arm being engaged by one of said cam-plates, a loosely-held platen-roller positioned below said feed mechanism, a detent positioned adjacent said platen-roller, guard-plates positioned adjacent said platen-roller, and means to actuate said table and feed mechanism.

6. The combination with a suitable supporting-standard, of a reciprocating table supported by said standard, a main driving-shaft to actuate said reciprocating table, rails secured to said table, nosing-plates secured to said table upon opposite ends, a suitably-supported hopper positioned above said table, a movably-supported shaft below said hopper, feed-wheels secured to said shaft provided with suitable seatings, a ratchet-wheel secured to said shaft, a pawl in engagement with said ratchet-wheel said pawl being actuated by said nosing-plates, a rock-shaft below said shaft supporting said feed-wheels, valve-arms secured to said rock-shaft, a bar pendent from said rock-shaft adapted to be engaged by one of said cam-plates, a movably-supported platen-roller held under spring tension above said rails, a movable detent positioned adjacent said platen-roller, and guard-plates positioned adjacent said platen-roller, all arranged substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE W. ELROD.

Witnesses:

GEORGE W. SUES,
MARY MICHAELSEN.