

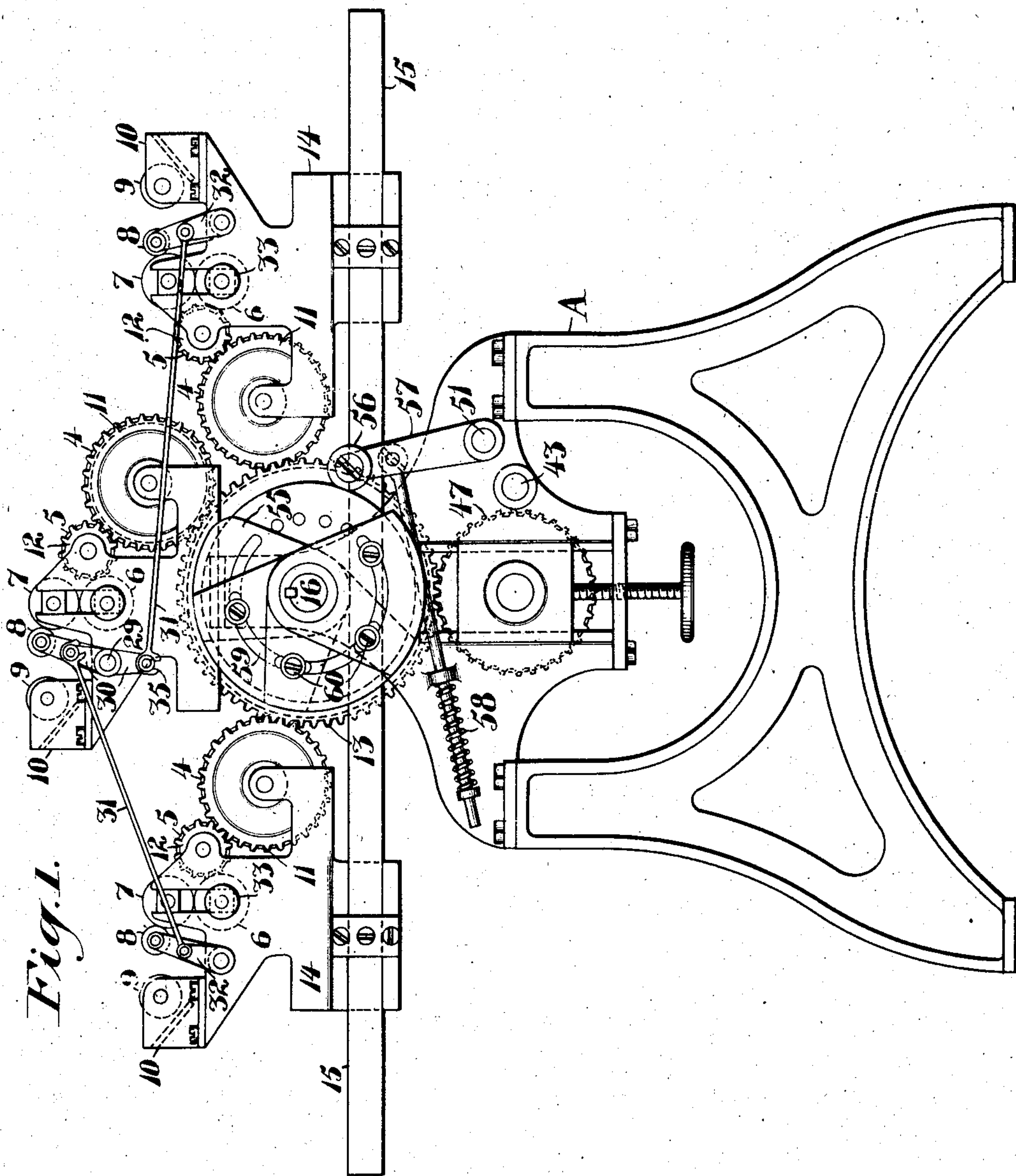
No. 833,908.

PATENTED OCT. 23, 1906.

J. F. AMES.
PRINTING PRESS.

APPLICATION FILED FEB. 21, 1906.

5 SHEETS—SHEET 1.



Witnesses:-
F. C. Fiedner
J. A. Amos

Inventor,
John F. Ames
By Geo H. Strong, Atty

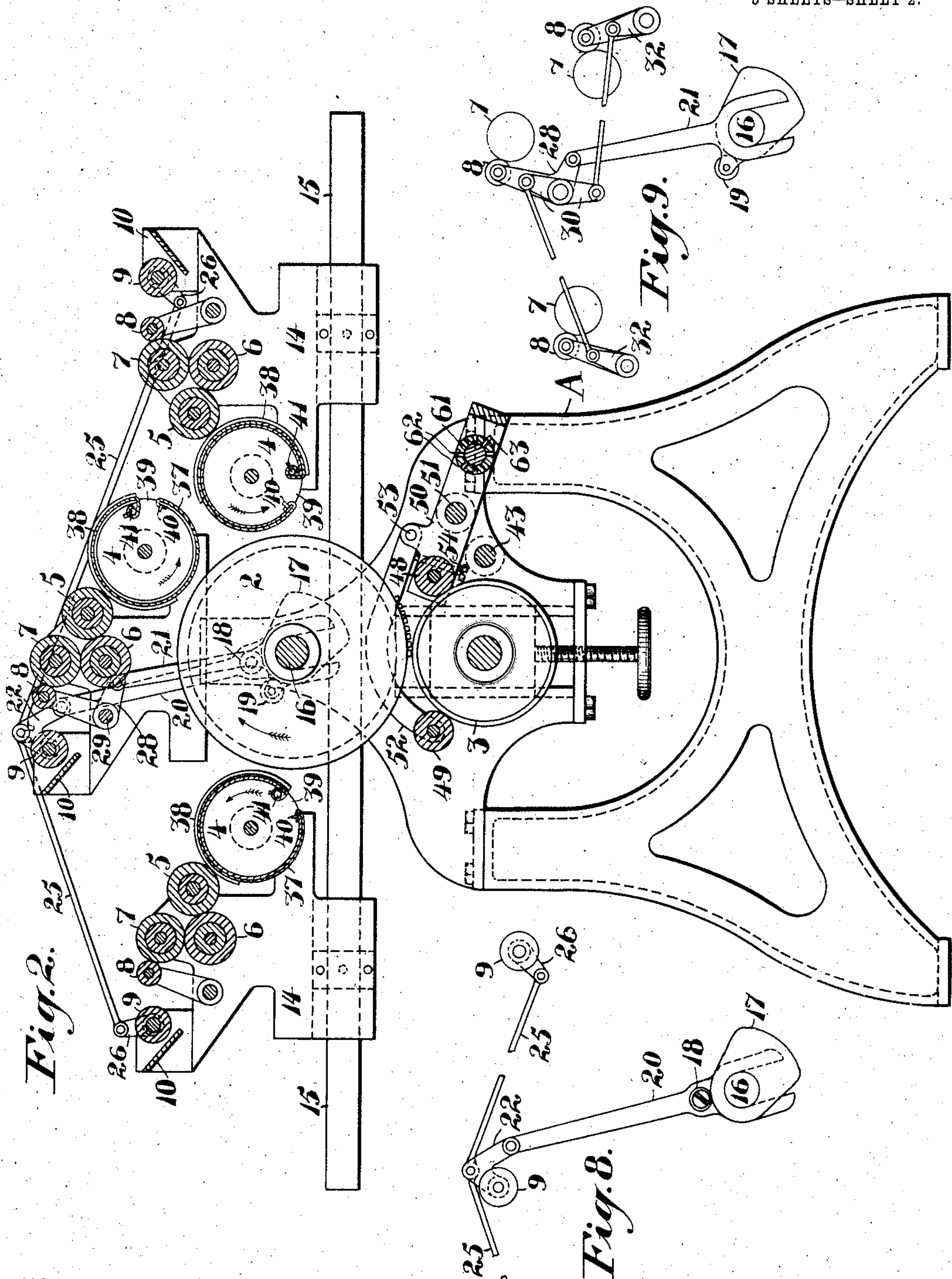
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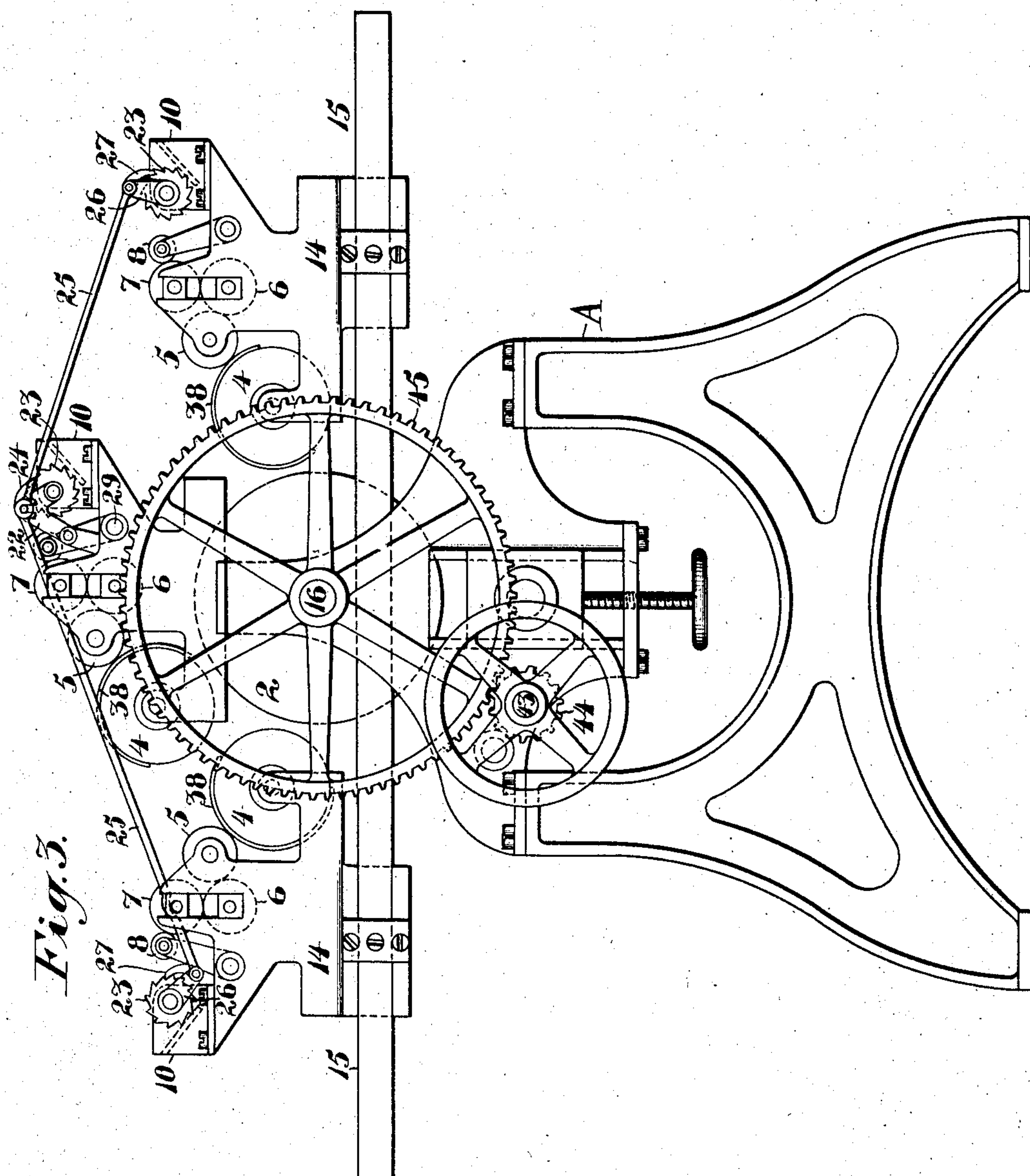
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5 SHEETS—SHEET 3.



Witnesses:-

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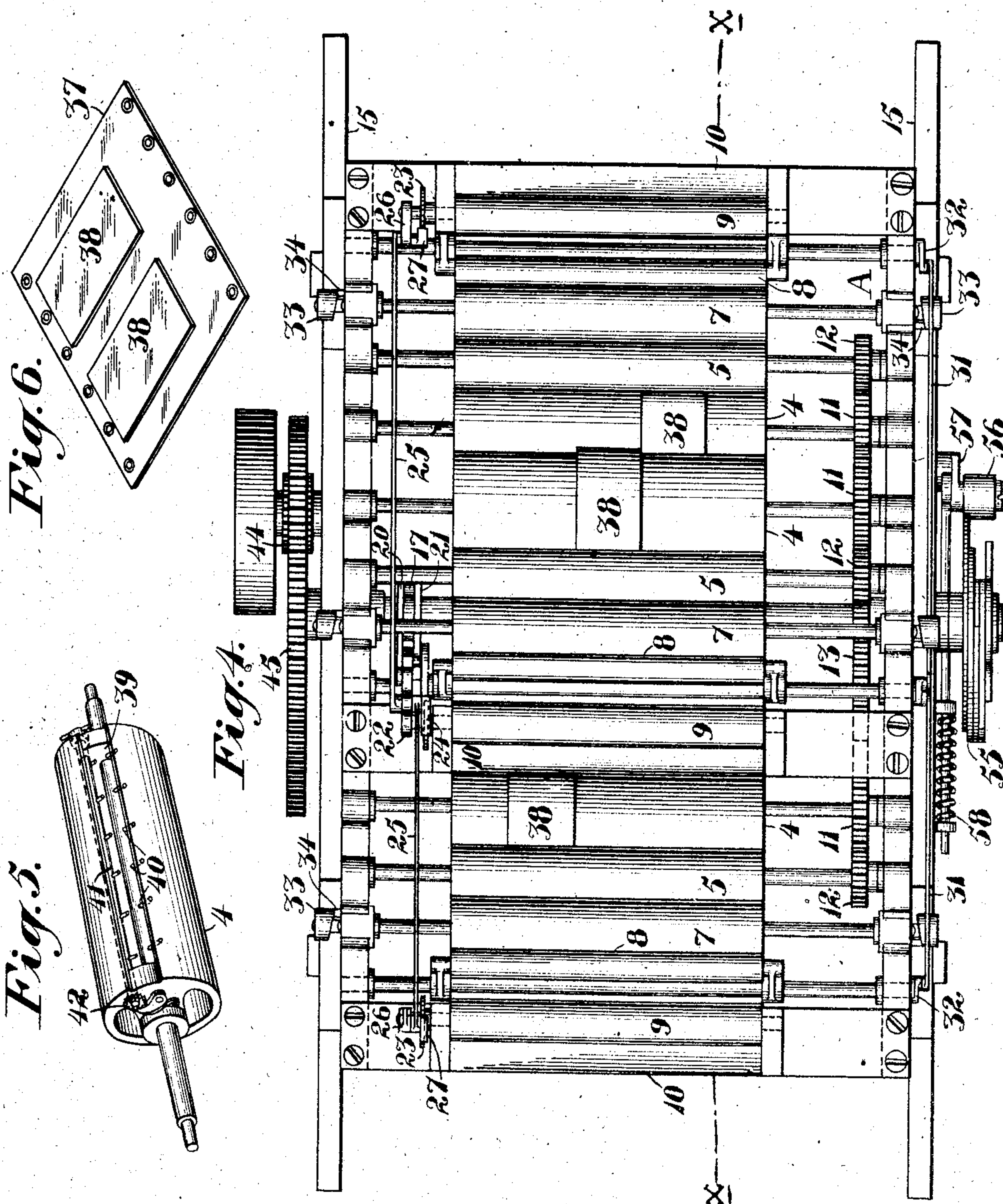
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6 SHEETS—SHEET 4.



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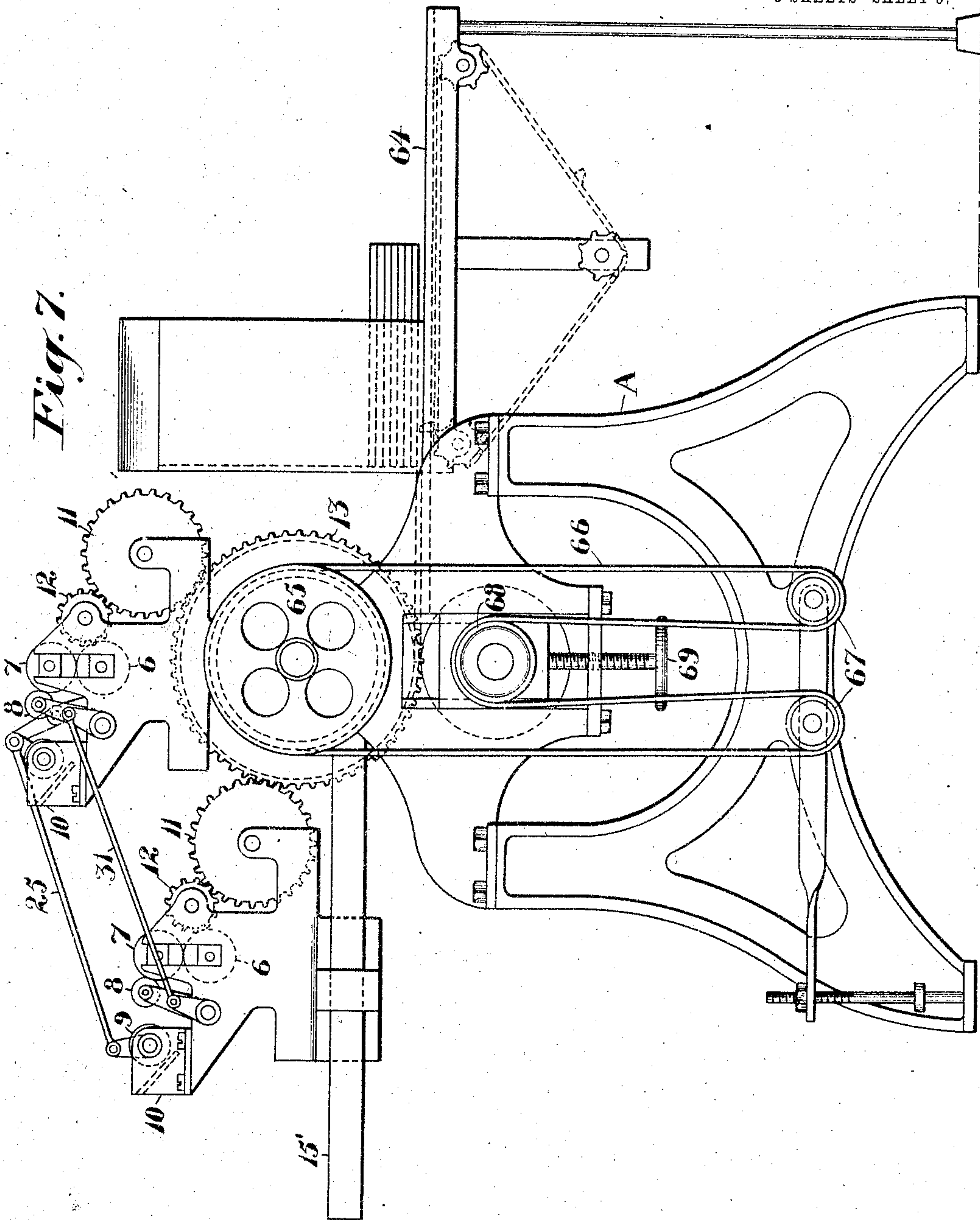
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5 SHEETS—SHEET 5.



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UNITED STATES PATENT OFFICE.

JOHN F. AMES, OF PORTLAND, OREGON.

PRINTING-PRESS.

No. 833,908.

Specification of Letters Patent.

Patented Oct. 23, 1906.

Application filed February 21, 1905. Serial No. 246,733.

To all whom it may concern:

Be it known that I, JOHN F. AMES, a citizen of the United States, residing at Portland, in the county of Multnomah and State of Oregon, have invented new and useful Improvements in Printing-Presses, of which the following is a specification.

My invention relates to printing-presses, and especially to multicolor cylinder-presses for printing on fabric, wood, metal, or other surfaces. Its object is to provide a press in which a single printing-cylinder will apply to a fabric or other surface a plurality of different colors simultaneously and in which press the several inking mechanisms or units may be operated singly or collectively with the printing-cylinder according as it is desired to print in one, two, or more colors, and, furthermore, to provide a means of suitably feeding the material to the form-cylinder to prevent smudge, and, furthermore, to provide means for readily adapting the feed of the press to bags, sheets, and the like of different sizes and to brands of different sizes, and, finally, to provide a press which is easily convertible from a press to print on fabric and like soft-surface material to one which is equally well adapted to print on boards and like hard surfaces.

The invention consists of the parts and the construction and combination of parts, as hereinafter more fully described and claimed, having reference to the accompanying drawings, in which—

Figure 1 is a side elevation of my printing-press viewed from the bottom of Fig. 4. Fig. 2 is a sectional view on line *x x*, Fig. 4. Fig. 3 is a side elevation of the press viewed from the top of Fig. 4. Fig. 4 is a plan of the press. Fig. 5 is a perspective of the inking-roller. Fig. 6 is a perspective of the inking-pad. Fig. 7 is a side elevation of the press modified for printing boxes. Fig. 8 is a diagrammatic view of the lever mechanism for operating the fountain-rollers, omitting the pawls. Fig. 9 is a similar view of the mechanism for operating the oscillating rollers.

In Figs. 1, 2, 3, and 4 I have shown the press as particularly adapted to printing on fabric for use in the manufacture of bags, the fabric being wound on a roll, fed through the press, printed at regular intervals, and after being printed delivered for subsequent dividing into various lengths. A represents a suitable frame, 2 the form-cylinder, carrying

the type and characters by which an impression is transferred to the surfaces of the fabric to be printed on, and 3 the impression-cylinder, between which and the form-cylinder the said fabric is adapted to be passed in order to receive the impression. The form-cylinder carries all the printing matter it is desired to print. Associated with the form-cylinder are a plurality of ink-applying mechanisms or units by which any desired number of colors may be applied to the printing-surface on the form-cylinder, and these printing mechanisms are operatable either independently or coördinately, according as it is desired to print in one or more colors. Each inking mechanism or "inking unit," as I choose to term it, since each is complete in itself, comprises an inking-roller 4, a distributing-roller 5, a vibrating or reciprocating roller 6, a second distributing-roller 7, an oscillating roller 8, a fountain-roller 9, and the fountain 10. The inking-roller 4 and roller 5 may be positively driven in unison by the engagement of the respective gears 11 12, and the several inking-rollers are operated positively and coördinately with the form-cylinder by the interengagement of the gear 13 on the latter with the gears 11. One of these inking units, as the central upper one, may be permanently carried by the bed-frame, as shown; but the others are preferably mounted on individual carriages 14, which are slidable and adjustable to and from the form-cylinder on the guide-tracks 15. Thus the three units, each applying a different color to a different area on the form, may be operated in unison and simultaneously, or the adjustable unit on one side of the form may be uncoupled from the form and moved back where only two colors are needed, or both of the carriages 14 may be shifted, so as to carry the inking-rollers out of contact with the form-cylinder, whereupon the press will print in only one color. To facilitate the separation of the inking units from the printing-plate or form-cylinder, the means for operating the oscillating rolls 8 and fountain-rolls 9 are made easily detachable from the main frame and from the central and driving mechanism.

As shown in Figs. 1, 3, 2, 8, and 9, the shaft 16, on which the form-cylinder is mounted, carries a cam 17, which successively engages respective rollers 18 19 on the vertically-sliding connecting-rods 20 21. Rod 20 connects with a lever 22, shown as preferably ful-

crumed concentric with the fountain-roll 9 of the central inking unit. The shafts of each of the several fountain-rolls 9 carry ratchets 23, and appropriate connections are provided between the lever 22 and the several ratchets, whereby on each revolution of the form-cylinder the several ratchets will be actuated to turn the fountain-rolls a part of a revolution, and thus pick up a fresh supply of ink from the fountains to be collected on the succeeding forward movement of the several oscillating rolls 8. These connections between the lever 22 and ratchets are here shown as comprising a pawl 24 on the lever directly engaging the adjacent fountain-roll ratchet on the central or stationary unit and as detachable connecting-rods 25, pivoted to the lever 22 and to an oscillating part 26 on the carriages 14, and the pawls 27 carried by the part 26 engaging corresponding fountain-roll ratchets 23 on the movable units. The sliding rod 21 actuates the oscillating rolls 8 at each revolution of the form-cylinder through the following simple and detachable connections: The rod 21 connects with a bell-crank lever 28, Fig. 9, keyed on the rock-shaft 29. The oscillating rolls of the central stationary unit are journaled at one end on the lever 28 and at the other end on a corresponding arm or projection on the shaft 29, so that both ends of the roll are carried back and forth in unison on the rocking of the shaft 29 through the medium of the cam 17 and roller 19. Shaft 29 also carries projections 30, each of which latter is connected by a detachable rod 31 with one or the other of the oscillating frames 32, which support the rolls 8 on the movable inking units.

In the operation of the rolls 8 9 the latter are set in motion through the medium of the cam 17, rod 20, and its described connections, and while these rolls are turning the oscillating rolls are thrown forward into frictional contact with them, so that for a brief instant both the fountain-rolls and oscillating rolls turn in unison, thus insuring the latter picking up a sufficient quantity of ink. On the cam 17 leaving rollers 18 19 the rods 20 21 drop by gravity, causing the fountain-rolls to cease turning and the oscillating rolls to drop back into frictional contact with the constantly-revolving vibrating rolls 6, whence the ink is suitably distributed to the inking-surface on the inking-rolls 4. A simple and novel means of reciprocating the vibrating rolls is provided in the employment of the removable collars 33 on the ends of the vibrating-roll shaft and providing these collars with cam-surfaces to cooperate with corresponding cam-surfaces 34 on the side of the frame or inking-unit carriage, these cam-collars 33 and cams 34 being so positioned that as a roll is revolved it is constantly shifting its position lengthwise or made to vibrate in the desired manner. To

render the rods 25 31 detachable from the central inking unit, they are here shown as having curved and forked or slotted ends 35 to engage over pins on their respective levers 22 30, Figs. 1 and 3. By throwing these rods upward and back all connection except the gear connections 13 11 between the inking units and the form-cylinder is severed, and it only requires a loosening of the clamps on one or the other, or both, of the carriages 14 and tracks 15 to allow either, or both, of the adjustable inking units to be thrown out of or brought into operation. This construction of a press with inking units capable of operation either singly, in pairs, or collectively is of the greatest benefit and utility in many forms of work, particularly where printing in a variety of colors is required and where the character of the printing is constantly changing, as in printing on bags and sacks or on cloth to be made into bags and sacks. For instance, one customer will send in an order for ten thousand bags of a particular size, with a brand of a particular size, design, and color. Other customers will send in other orders for quantities of any amount, all for different sizes of bags and different sizes, designs, and colors of brands. Each order requires a different type-form to print with, a corresponding change in the inking-surface of the inking-rollers, and the use of one, two, or more colors. Furthermore, the orders of each customer may have to be duplicated from time to time. Hence it is that I have designed a press for all classes of work in which a single form-cylinder is adapted to carry all the printing matter, either in the form of a stereotype or removable type, and with which may be used one or more entirely independent inking units, according as whether one color or two or more different colors are to be applied to the form. If the brand is to be applied in one solid color, I employ only one inking unit, usually the central one. If two colors are to be applied, I couple up one of the movable units with the form-cylinder, and if three colors I employ the three units.

In the application of the different-colored inks to the form-cylinder I employ a removable inking-pad, as 37, Fig. 6, consisting of canvas or the like, on the surface of which has been molded a suitable body of elastic ink-transferring composition, as indicated at 38. The rollers 4, Fig. 5, are hollow and have a longitudinal peripheral slit 39, into which one end of a pad is inserted and suitably engaged with pins 40 in the roller. The other end of the pad is passed around the roller and into the slit and engaged with pins on a rotatable shaft 41. The latter carries a ratchet 42, locked by a pawl against unintentional turning in one direction. By turning the shaft in the proper manner the pad is stretched and held over the surface of the

roller 4 to properly present the ink-transferring body 38 to the form when the parts are moved into operative engagement.

Where the brand is to be printed in one solid color, the inking unit employed will have a pad whose ink-transferring body 38 corresponds to the size of the form, but where two or more colors are to be applied to the form each pad will have an ink-transferring body of such shape and size as will apply ink to only a limited and proper area of the form. The ink-transferring composition being soft and easily cut it becomes a very simple matter to attach the pads to their rolls or holders, and having inked the form move the rollers to engage the gears 11 13, (having these gears of course so marked that certain teeth will always be brought together,) make one revolution of the form-cylinder, move the inking-rolls back out of engagement with the form-cylinder, and then rout out or cut away such portions of the composition of each pad as that particular pad is not to print with. When the rolls are moved up again to and matched with the form-cylinder and locked, each pad will contact with a different and limited portion of type on the form and apply ink thereto, according to the color of the ink carried in the fonts of the several operating units.

By employing a removable ink pad and holder as described and having the several units independently adjustable to and from the form-cylinder it is possible to use the same pads over and over again and to duplicate at any time any customer's order. The same press, the same form-cylinder, the same inking-rollers can be used to print an endless variety of brands in one or more colors on bags or sacks of a great variety of sizes. For example, the same press with only the change of the inking-pads and a resetting of the form or change of the brand, will print a five-pound salt-sack in three colors, or one-hundred-pound flour-sack in one, two, or three colors.

The form-cylinder is driven continuously and may be operated from any suitable source of power through shaft 43, carrying a small pinion 44, engaging the gear 45 on the cylinder-shaft 16. The impression-cylinder 3 is positively driven in unison with the form-cylinder by the gear 13 on shaft 16 meshing gear 47 on the impression-cylinder. The latter is covered with felt or other substance commonly employed for receiving the impress of the type, and this felt may be attached to the roller in a manner similar to that described in connection with the inking-pads and their rollers, the impression-cylinder being constructed accordingly. The cloth, if it is desired to print on cloth, is wound as a continuous strip in a roll and is fed from the roll between the cylinder carrying the printing-form and the impression-

cylinder. As the two cylinders are connected by gears and move on the surface at equal speed, it will be seen that the revolution of the cylinders with the cloth between them when the printing-form contacts with the impression-cylinder would operate to move the cloth forward a distance equal to the width or length of the brand. It is not desirable, however, to rely on the intermittent contact of the two cylinders to advance the cloth through the press, since after each impress by the form, should the cloth be allowed to come to a standstill, there would be a smudge of ink at the beginning of each contact of the form and the cloth. Moreover, the cloth would likely be drawn forward unevenly and result in an uneven brand on the finished bag. Furthermore, such intermittent action of the cloth does not advance the cloth sufficiently between each imprint to allow for borders, cutting, seams, &c., of the imprinted bag-blanks which are subsequently severed from the strip. So in order to advance the cloth sufficiently before and after each impression and overcome smudging I provide means to feed the cloth prior to and subsequent to each imprinting operation and at a unison speed with that of the form-cylinder and by means independent of the frictional contact of the form and impression cylinders.

On opposite sides of the impression-cylinder 3 are the feed-rollers 48 49, Fig. 2. Roller 48 is journaled in arms 50, locked to the rock-shaft 51. Roller 49 is journaled in the arms 52, which are pivoted to arms 50 at 53. By means of set-screws 54 the two rollers are adjusted so as both to contact simultaneously with and with equal pressure on the impression-cylinder 3, the one roller to bear on the cloth before it passes beneath the type-form, the other to bear on the cloth after it has passed the form and to aid in stripping the cloth from the form and prevent its following the form-cylinder around. These feed-rollers are of sufficient weight that when they rest on the cloth which is supported on the impression-cylinder the cloth will be fed forward at the same rate of speed at which the form-cylinder revolves, since the latter and the impression-cylinder turn in unison through the engagement of the gears 13 47, as described. This contact of the feed-rolls with the impression-cylinder is periodic and is regulated according to the width of the bag-blank—for small bags is less, while for large bags it is more—and their contact with the impression-cylinder is such that the cloth is set in motion long enough ahead of the contact of the type-form with the cloth and is prolonged sufficiently after the type-form leaves the cloth to prevent smudging and to advance the cloth the required bag-blank distance. This intermittent contact of the feed-rollers with the impression-cylinder to

so feed the cloth as thus desired is effected through the medium of an adjustable and expansible cam 55 on shaft 16 periodically engaging a roller 56 on an arm 57, keyed to rock-shaft 51. Roller 56 is pressed always into the path of the cam through the agency of spring 58.

Cam 55 is important, since it is circumferentially extendible or contractible by reason of the pivoted concentric sectors composing it, to offer a more or less extended contact-surface to roller 56. The several sectors are slotted, as at 59, and are adapted to be locked in suitable mutual relation by the lock screws or bolts 60. The size of the cam is commensurate with the maximum and minimum sizes of the different bags to be printed. In actual practice I have adapted a press to print a continuous length of cloth to be cut into individual blanks for small salt-sacks and also to print, with the utmost precision, a strip to be subdivided after printing into blanks for fifty-pound flour-sacks. By opening out the cam-sectors the period of contact with roller 56 is prolonged to cause the feed-rollers to remain out of contact a corresponding length of time with the constantly-revolving impression-cylinder. By closing up the cam-sectors the operation of the feed-rollers is lengthened, and hence a greater quantity of cloth is run through the press during and between each revolution of the form-cylinder. Obviously with the press running at a constant rate of speed the period that the cloth would remain at rest between each impression for a small bag would be greater than for a large bag. The imprint is given by the form-cylinder at some time during the beginning and the end of the contact of the cam with the roller 56, although that is not so important as that the engagement of the form with the cloth should be subsequent to the starting in motion of the cloth, so as to prevent smudge, as before stated. In order to properly direct the cloth strip between the roll and to the printing-form, the arms 50 are connected at the rear by a cross-bar 61, having a series of holes 62 for the receipt of the guide-pins 63, which can be separated more or less or shifted from side to side, according to the width of the strip and the relative location of the brand on the form-cylinder.

A great advantage of a press of this construction is that it is easily convertible from a press for color-printing on a continuous roll of cloth, paper, or like flexible material to one for printing in one or more colors on boards or boxes and like hard surfaces.

Fig. 7 shows the press equipped for hard or inflexible surface printing in which one inking unit and its supporting-carriage has been removed and the feed-table 64 substituted. A pulley 65 occupies the position of the cam 55, and the driving connections between the form-cylinder and the impression-

cylinder are, through the belt 66, passing over pulley 65, the two lower pulleys 67, and the pulley 68 on the impression-cylinder, in lieu of the positive gear connections 13 to 47 in the flexible-surface-printing machine. This flexible drive is for the purpose of allowing the impression-cylinder to accommodate itself readily to boards of different thickness or to those thicker along one side than the other, the impression-cylinder having its bearings adjustable vertically and being supported, as shown at 69, to permit of this movement. Suitable means, not necessary here to be described, may be employed to advance the material on the table to the cylinders. Such a feed mechanism and other features common to this particular press are shown in my former patent, Reissue No. 12,124, dated June 23, 1903.

The main feature of this press as a box-printing press is its adaptability to the printing in one or more colors rendered possible and practicable by the shiftable printing unit mounted on its tracks 15' and its detachable connections with the remaining printing unit all as described in the first instance.

It is possible that various changes and modifications may be made in my invention without departing from the principle thereof, and I do not wish to be understood as limiting myself to the specific construction nor the specific uses herein described.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a printing-press the combination with a form-cylinder and the shaft thereof, of a plurality of inking units arranged circumferentially about said form-cylinder, and separable connections between the several units and between the units and the shaft for operating said inking units singly, in pairs, or collectively

2. In a printing-press, the combination with a form-cylinder, of a plurality of independently-operable inking units and separable connections between the several units, said units independently adjustable with relation to the form-cylinder.

3. In a printing-press, the combination with a form-cylinder, of a plurality of inking-rollers, each having an independent ink-applying device, means for operating said rollers independently or coördinately and separably-connected hinged rods between the several ink-applying devices for operating the latter.

4. In a printing-press, the combination with a form-cylinder and the shaft thereof, of a plurality of inking-rollers, a sliding carriage for one of said inking-rollers, ink-applying devices on said carriage for said roller, means for operating the form-cylinder, the inking-rollers and the said ink-applying devices conjunctively, said means for operating

the ink-applying devices including separable connections with the form-cylinder shaft.

5 In a printing-press, the combination with a form-cylinder, of a plurality of movable inking units independently adjustable with relation to the form-cylinder, each unit comprising an inking-roller and ink-applying devices, separable connections between the said ink-applying devices of the several units
10 for operating them in unison, and means whereby one or more of said inking units may be moved into or out of operative position with the form-cylinder.

6 In a printing-press, the combination
15 with a form-cylinder, of a plurality of inking-rollers, each having independent ink-applying devices, said ink-applying devices including an oscillating roller and a fountain-roller, separable connections between the said oscillating and fountain rollers of the several ink-applying devices, certain of said inking-rollers being movable into and out of engagement with the form-cylinder.

7 A printing-press having in combination
25 a form-cylinder, a shaft therefor, a plurality of independently-operable inking units positioned relative to the cylinder and independently adjustable relative thereto, said units each comprising an inking-roller, and
30 ink-applying rollers therefor, and said ink-applying rollers including an oscillating roller and a fountain-roller, a cam on the form-cylinder shaft, a cam-lever operated by the cam, and separable connections between the
35 cam-lever and the fountain-roller and oscillating roller of each inking unit.

8 In a printing-press, the combination with an inking-roller, of a distributing-roller contacting therewith, a vibrating roller engaging said distributing-roller, said vibrating roller having cam-collars on the ends of its shaft, stationary cams intermediate of said collars and positioned relative thereto whereby the roller is reciprocated longitudinally at
45 each revolution, a second distributing-roller in contact with the vibrating roller, an oscillating roller and a fountain-roller, and means for operating the several rollers.

9 A printing-press having in combination
50 a form-cylinder, a shaft therefor, a plurality of independently-operable and independently-adjustable inking units, said units each comprising an inking-roller and ink-applying rollers therefor, said ink-applying rollers including an oscillating roller and a fountain-roller operatably associated with an inking-roller, a cam on the form-cylinder shaft, two cam-levers operable by said cam, and separable connections between the cam-levers
55 and the fountain-roller and oscillating roller of each inking unit.

10 In a printing-press, the combination with the form-cylinder of two inking units having each an inking-roller, a fountain-roller, an oscillating roller and a distributing-
65 roller, a movable carriage for one of said units to permit its movement into and out of engagement with the form-cylinder, and separable connections between the fountain-rollers of the two units, and means operated by said connections for giving said fountain-rollers a rotative movement.

11 In a printing-press, the combination with the form-cylinder of two inking units having each an inking-roller, a fountain-roller, an oscillating roller and a distributing-roller, a movable carriage for one of said units to permit its movement into and out of engagement with the form-cylinder, separable connections between the oscillating rollers of the two units, and means for operating said rollers from the cylinder-shaft.

12 In a printing-press, the combination of a form-cylinder, a plurality of independently-movable inking units circumferentially positioned relative to the form-cylinder and operative singly or collectively, said units including each an inking-roller, distributing-rollers and fountain-roller, an oscillating roller operable between the fountain and distributing rollers, separable connections between the oscillating rollers of the several units and independent of the cylinder, and means for imparting motion to the said oscillating rollers.

13 In a printing-press, the combination of a form-cylinder and its shaft, a carriage movable to and from said cylinder, an inking unit carried by said carriage and comprising an inking-roller and ink-applying rollers, said ink-applying rollers including a fountain-roller and an oscillating roller, means operated from the cylinder-shaft to give the fountain-roller a step-by-step movement, and other means operated from said cylinder-shaft to operate the oscillating roller.

14 In a printing-press, the combination of a form-cylinder and its shaft, a carriage movable to and from said cylinder, an inking unit carried by said carriage and comprising an inking-roller and ink-applying rollers, said ink-applying rollers including a fountain-roller and an oscillating roller, detachable means operated from the cylinder-shaft to give the fountain-roller a step-by-step movement, and detachable means operated from the cylinder-shaft to operate the oscillating roller.

15 In a printing-press, the combination with a form-cylinder and its shaft, of a plurality of independently-adjustable and independently-operable inking units, said units each including an oscillating roller and a fountain-roller, a cam on the form-cylinder shaft, levers operable by said cam, detachable connections between one of said levers and the several fountain-rollers, and detachable connections between the other lever and the several oscillating rollers.

16 In a printing-press, the combination of a form-cylinder and its shaft, and an inking unit to permit its movement into and out of engagement with the form-cylinder, and separable connections between the fountain-rollers of the two units, and means operated by said connections for giving said fountain-rollers a rotative movement.

17 In a printing-press, the combination of a form-cylinder and its shaft, and an inking unit to permit its movement into and out of engagement with the form-cylinder, and separable connections between the fountain-rollers of the two units, and means operated by said connections for giving said fountain-rollers a rotative movement.

mechanism for said form-cylinder, said inking mechanism including an inking-roller, a fountain-roller and oscillating roller, said inking-roller consisting of a longitudinally-slotted hollow cylinder and a removable inking-pad stretched over the cylinder with its ends passed through the slot and secured within the cylinder, and operative connections between the oscillating and fountain rollers and the form-cylinder shaft independent of the inking-roller.

17. In a printing-press, the combination of a frame, a form-cylinder thereon, a form-cylinder shaft, said frame provided with trackway extensions, a carriage slidable on said trackway extensions, an inking-roller and inking appliances mounted on said carriage, said inking-roller comprising a hollow longitudinally-slotted cylinder and a removable pad stretched over said cylinder and having its ends passing through the slot in the cylinder and engaged with stretching devices within the cylinder, said pad having a suitable inking composition on its exposed surface, said ink-applying devices including fountain and oscillating rollers and separable

connections independent of the inking-roller between said fountain and oscillating rollers and the form-cylinder shaft for operating said two last-named rollers.

18. The combination with a single form-cylinder of a plurality of independently-movable inking units, each unit including an oscillating and vibrating roller, said oscillating rollers of the several units separably connected with each other and independent of the cylinder and said units independently movable in and out of operative position with the form-cylinder.

19. The combination of a form-cylinder with a plurality of inking units separably connected with each other, a single cam on form-cylinder shaft, and a cam-lever, the separable connections between each unit being operated by the cam-lever actuated by said cam.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JOHN F. AMES.

Witnesses:

S. H. NOURSE,

JESSIE C. BRODIE.