

Feb. 10, 1931.

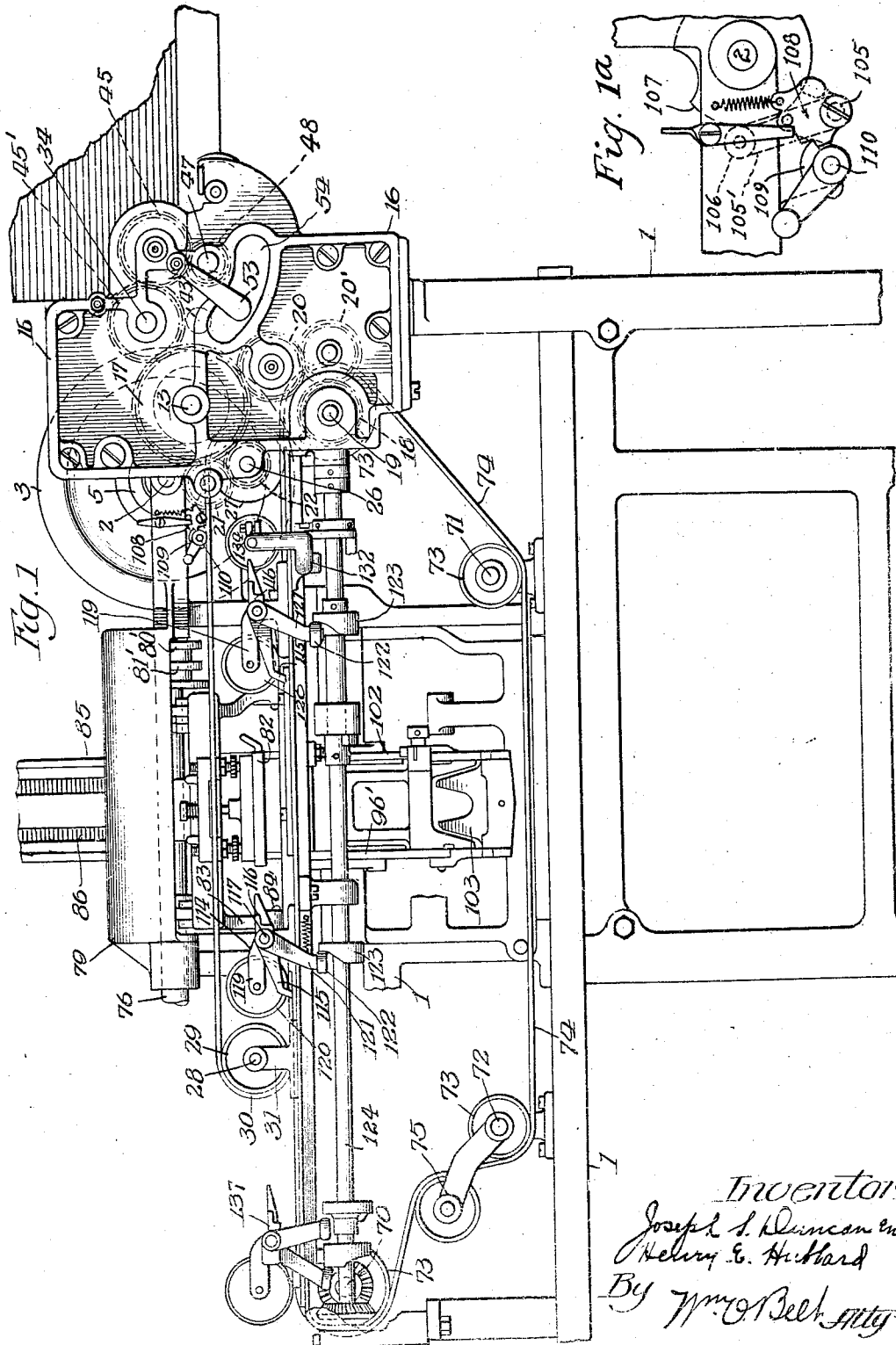
J. S. DUNCAN ET AL

1,792,149

PRINTING MACHINE

Filed Aug. 12, 1927

9 Sheets-Sheet 1



Inventors.
Joseph S. Duncan and
Henry E. Hubbard
By Wm. O. Beek, atty.

Feb. 10, 1931.

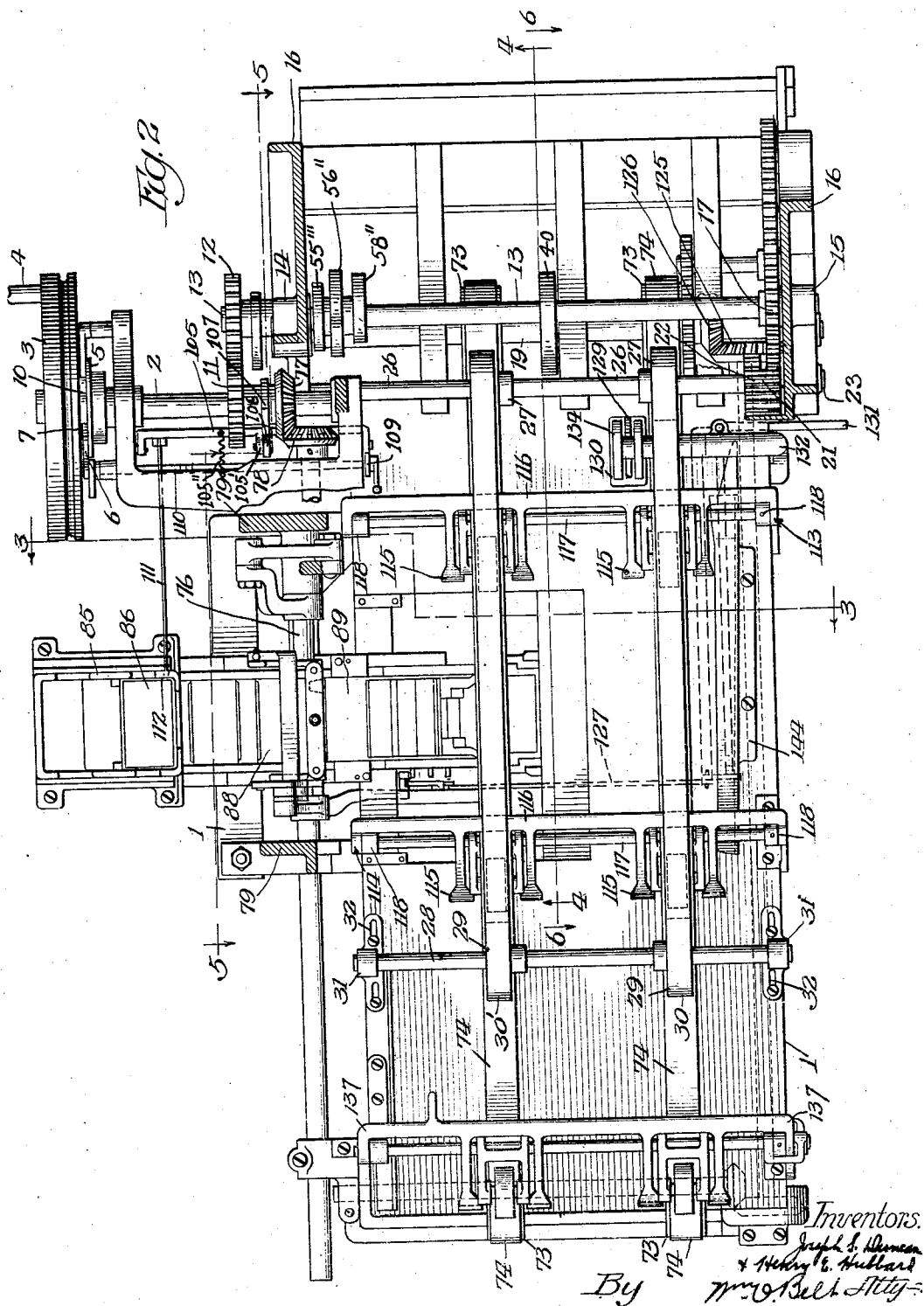
J. S. DUNCAN ET AL

1,792,149

PRINTING MACHINE

Filed Aug. 12, 1927

9 Sheets-Sheet 2



Feb. 10, 1931.

J. S. DUNCAN ET AL

1,792,149

PRINTING MACHINE

Filed Aug. 12, 1927

9 Sheets-Sheet 3

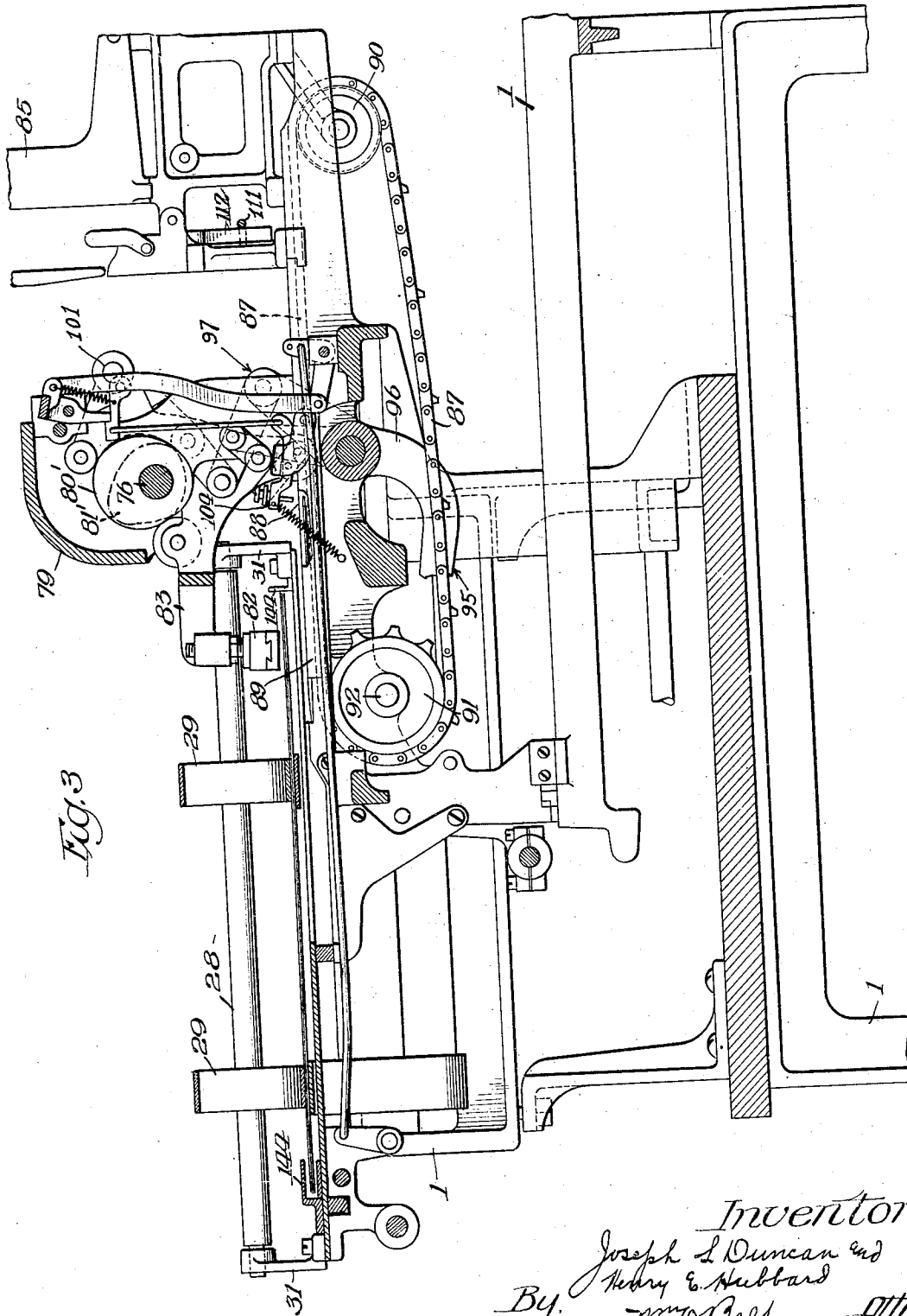


Fig. 3

Inventors
Joseph L. Duncan and
Henry E. Hubbard
By Wm. O. Bell Atty.

Feb. 10, 1931.

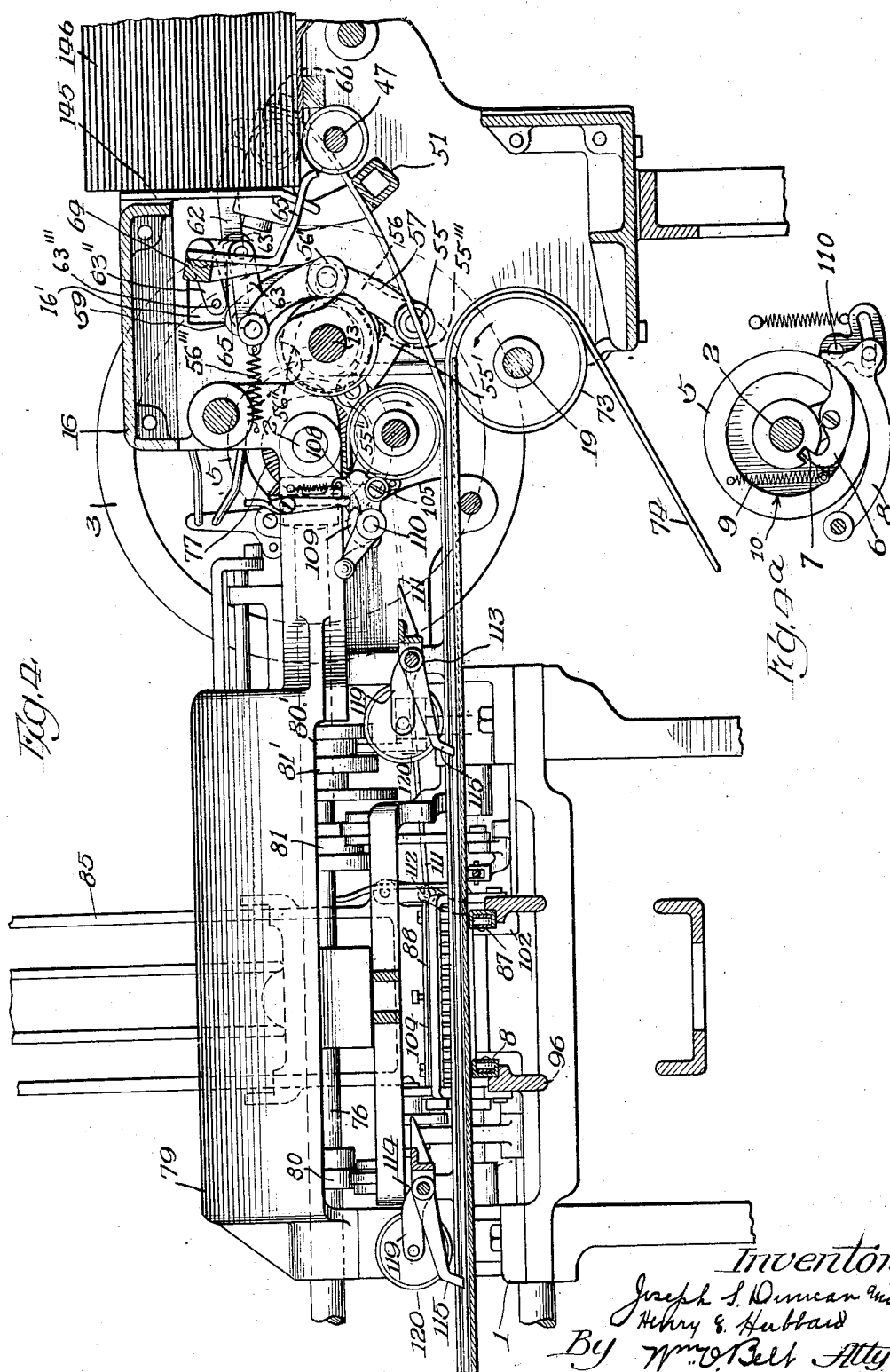
J. S. DUNCAN ET AL

1,792,149

PRINTING MACHINE

Filed Aug. 12, 1927

9 Sheets-Sheet 4



Feb. 10, 1931.

J. S. DUNCAN ET AL

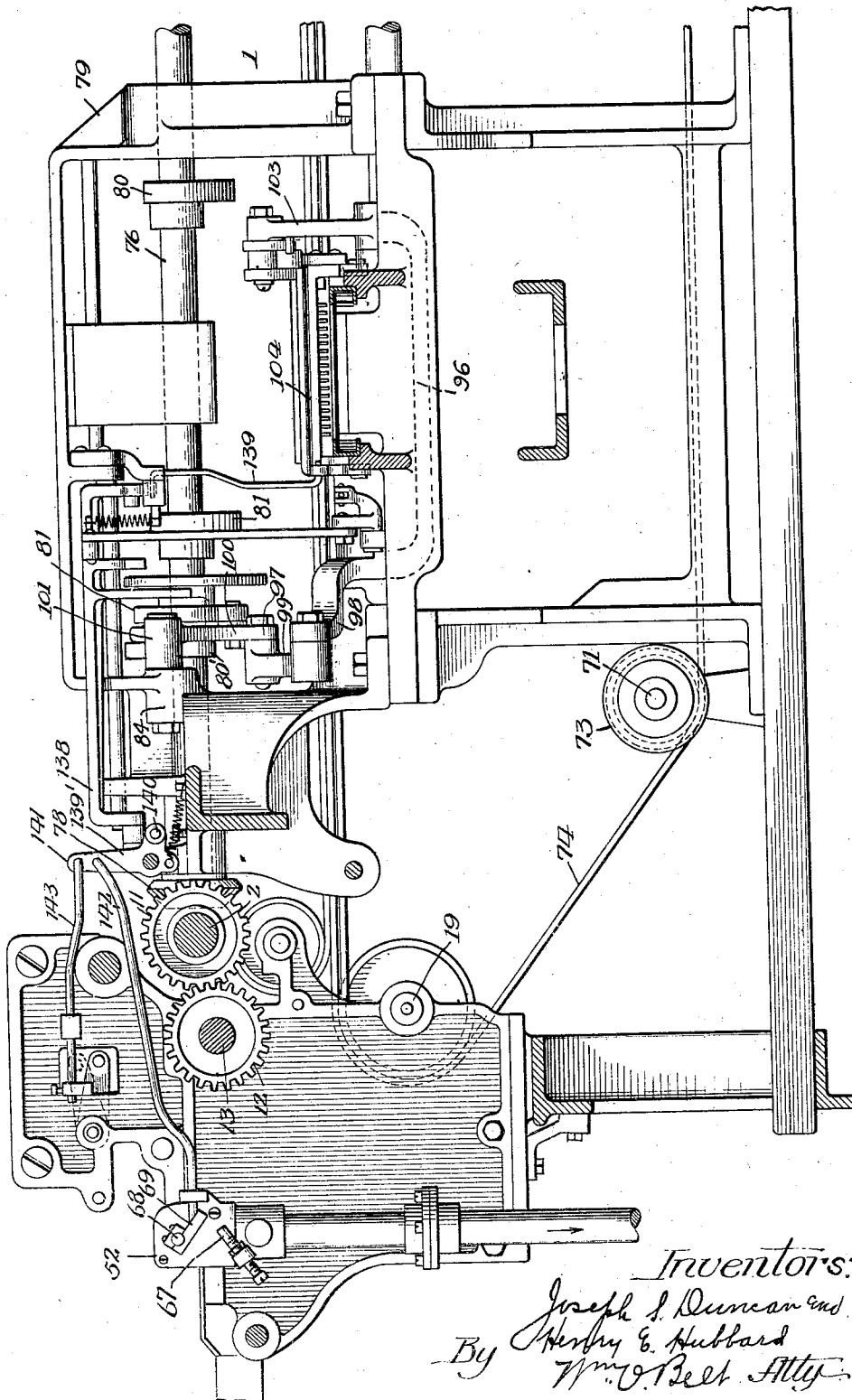
1,792,149

PRINTING MACHINE

Filed Aug. 12, 1927

9 Sheets-Sheet 5

Fig. 5



Inventors:
Joseph S. Duncan and
Henry E. Hubbard
By Wm. O. Reel, Atty.

Feb. 10, 1931.

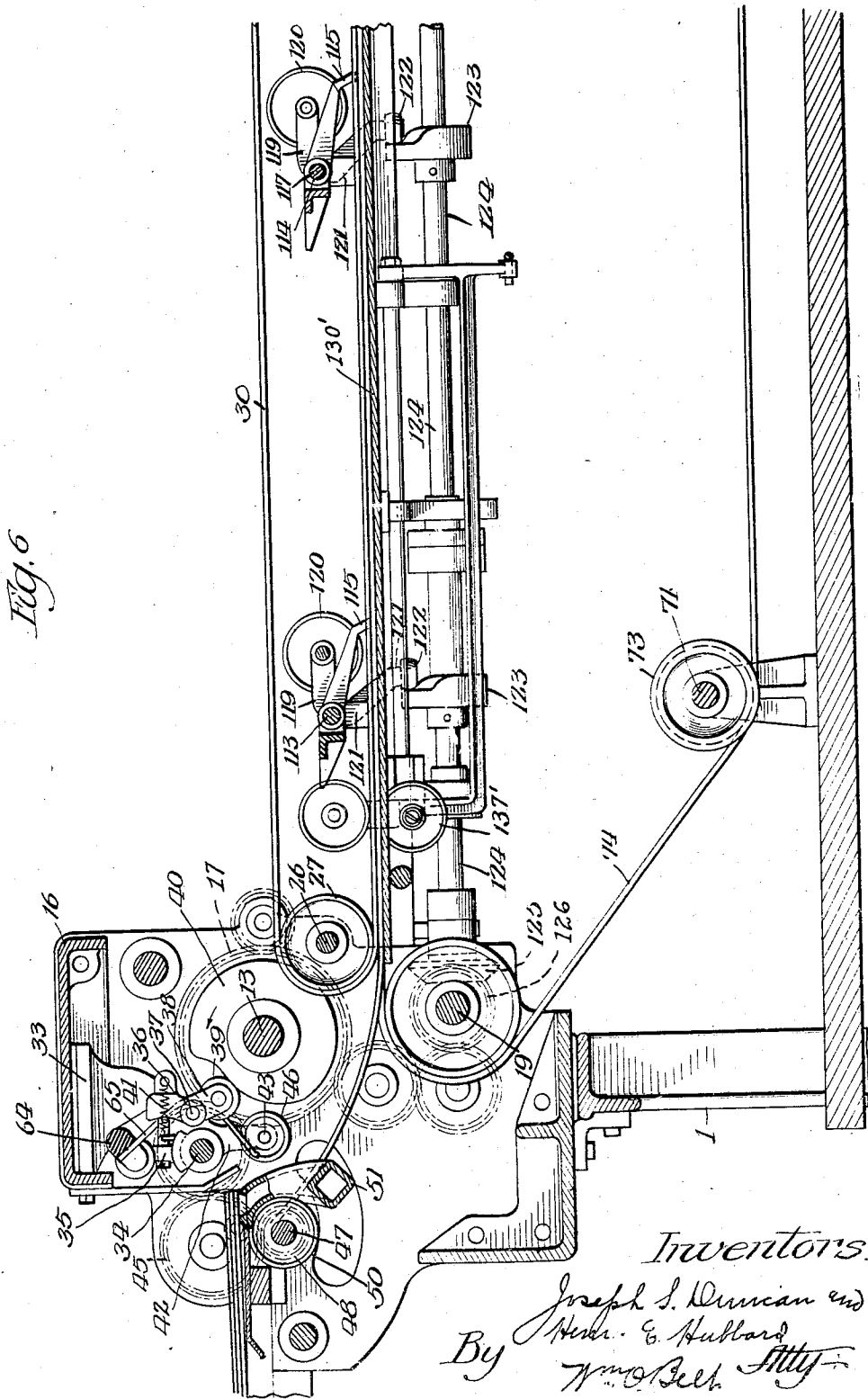
J. S. DUNCAN ET AL

1,792,149

PRINTING MACHINE

Filed Aug. 12, 1927

9 Sheets-Sheet 6



Inventors:
Joseph S. Duncan and
Herb. C. Hubbard
By *Wm. B. Bell* Atty.

Feb. 10, 1931.

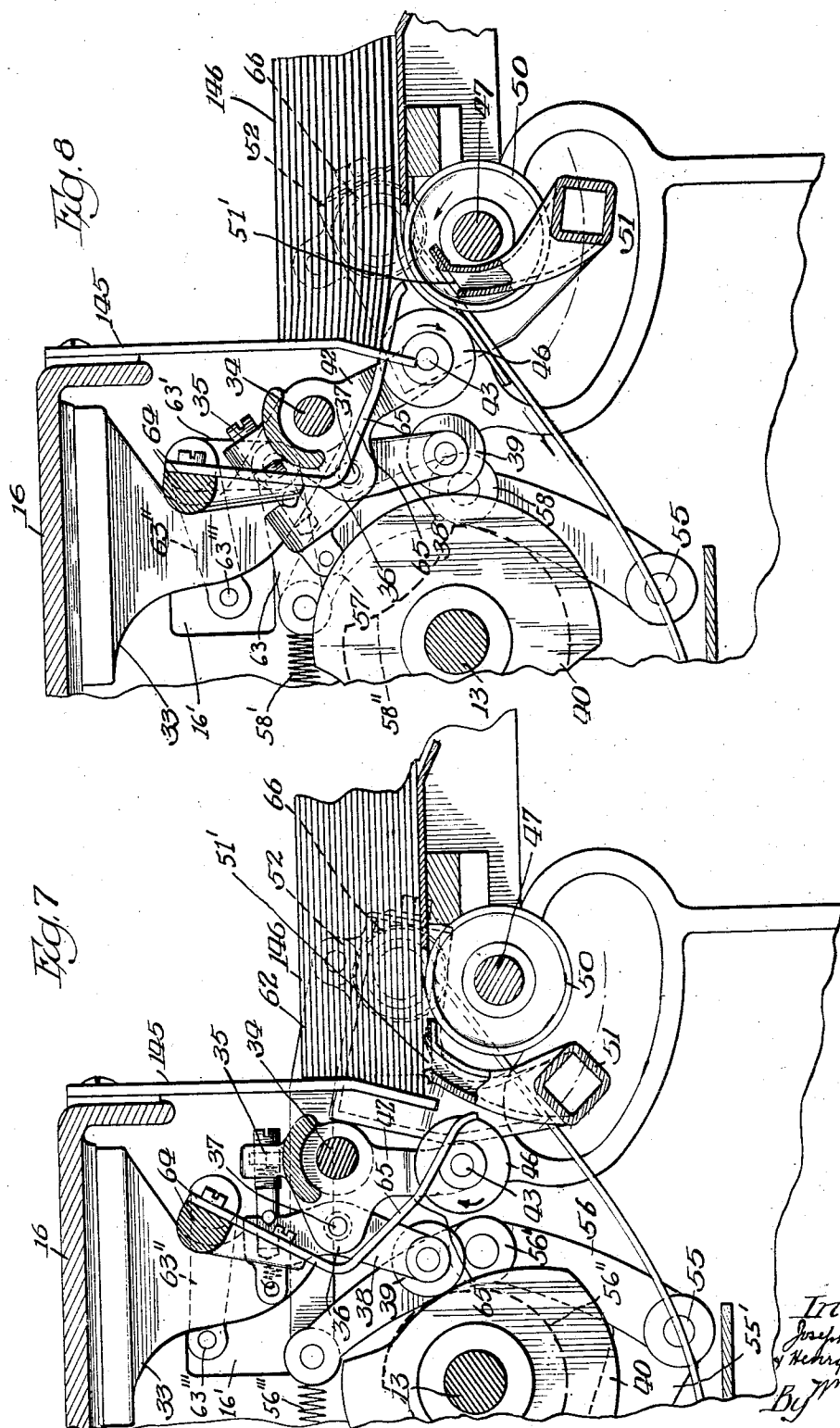
J. S. DUNCAN ET AL

1,792,149

PRINTING MACHINE

Filed Aug. 12, 1927

9 Sheets-Sheet 7



Feb. 10, 1931.

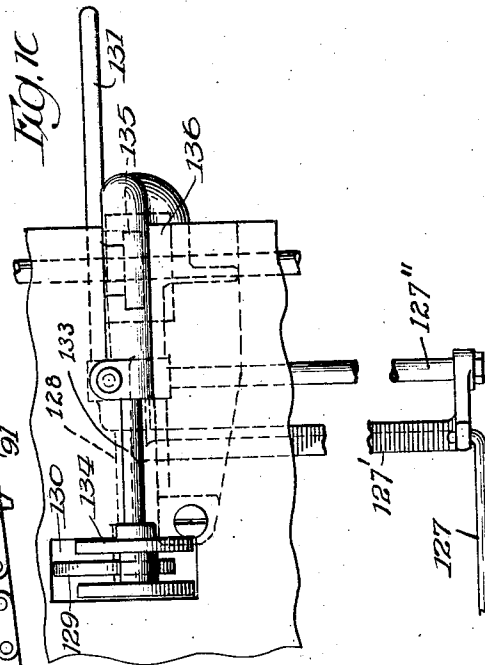
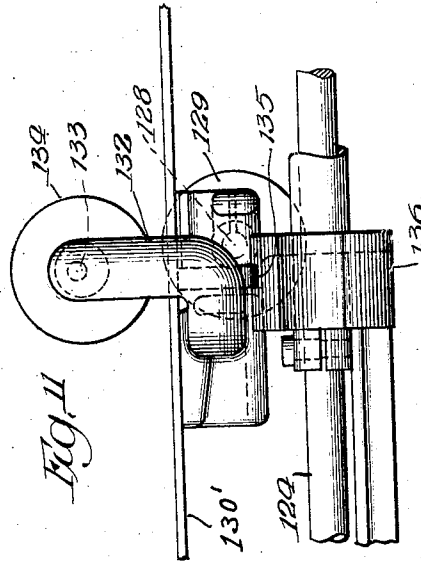
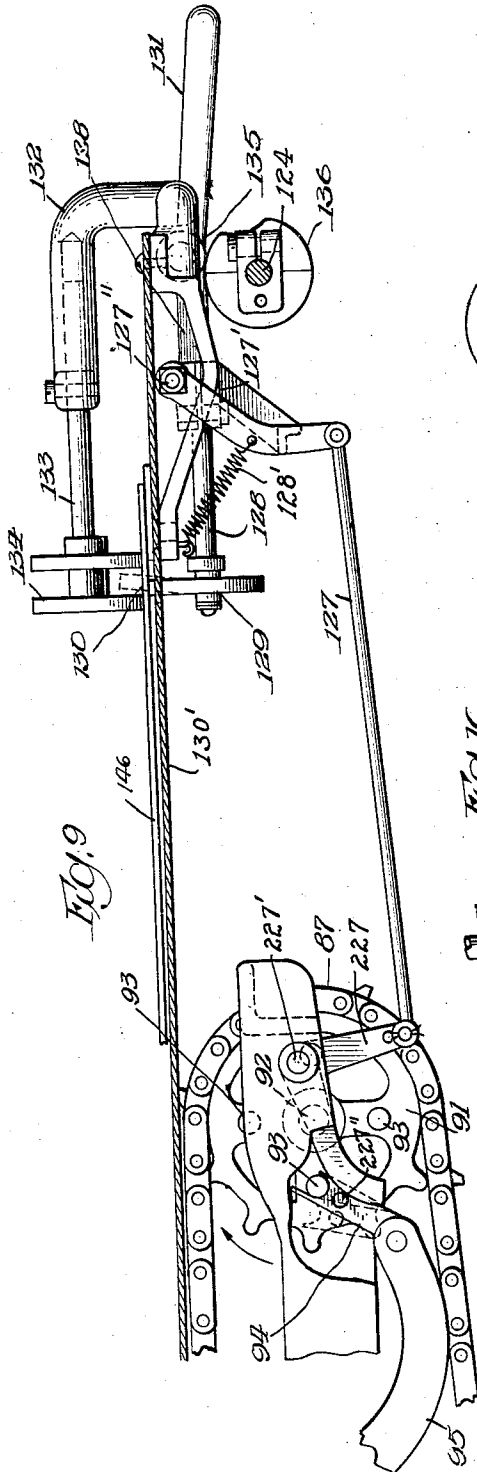
J. S. DUNCAN, ET AL

1,792,149

PRINTING MACHINE

Filed Aug. 12, 1927

9 Sheets-Sheet 8



Inventors:
Joseph S. Duncan
Henry C. Nuttall
By Wm. O. Belt Atty.

Feb. 10, 1931.

J. S. DUNCAN ET AL

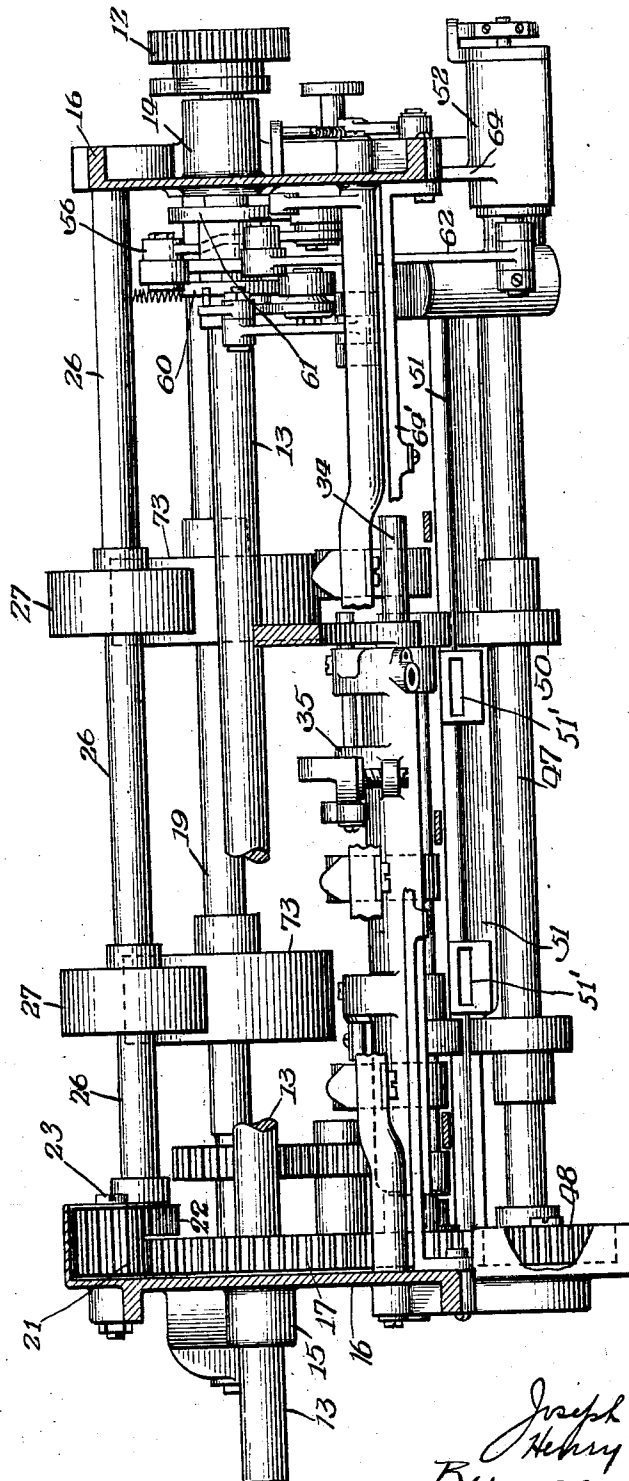
1,792,149

PRINTING MACHINE

Filed Aug. 12, 1927

9 Sheets-Sheet 9

Fig. 12



Inventors:

Joseph S. Duncan +
Henry C. Hubbard
By Wm. O. Bell Atty.

UNITED STATES PATENT OFFICE

JOSEPH S. DUNCAN AND HENRY E. HUBBARD, OF CHICAGO, ILLINOIS, ASSIGNORS, BY
MESNE ASSIGNMENTS, TO ADDRESSOGRAPH COMPANY, OF CHICAGO, ILLINOIS, A
CORPORATION OF DELAWARE

PRINTING MACHINE

Application filed August 12, 1927. Serial No. 212,424.

This invention relates to machines for printing addresses or other matter on magazines, and its object is broadly to provide a novel automatic machine for feeding a series of printing devices bearing address forms successively to printing position, and for feeding the magazines successively to printing position, and for printing an individual address upon each magazine.

Another object of the invention is to feed individual printing devices to printing position and to automatically select certain predetermined printing devices to be printed and to skip other printing devices which are not to be printed.

And a further object of the invention is to provide automatic means operated by a printing device which is to be skipped to interrupt the magazine feed so that when the printing device passes by the printing position, no magazine will be fed to printing position.

A still further object is to provide improved means to operate on the printing device feed for causing the printing device selected for printing to remain in printing position when the magazine feed has skipped.

The invention has other objects in view incidental to these primary objects which will appear hereafter in the detail description of a selected embodiment of the invention chosen for illustration in the accompanying drawings, referring to which

Fig. 1 is a front elevation of the machine.

Fig. 1^a is an enlarged fragmentary detail view.

Fig. 2 is a top plan view.

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 2.

Fig. 4 is a longitudinal sectional view taken on the line 4—4 of Fig. 2.

Fig. 4^a is a detail view of the clutch mechanism on the main drive shaft.

Fig. 5 is a sectional view taken on the line 5—5 of Fig. 2.

Fig. 6 is a longitudinal sectional view taken on the line 6—6 of Fig. 2.

Fig. 7 is a detail sectional view of the feeding mechanism and shows the parts in normal position.

Fig. 8 is a detail sectional view similar to

Fig. 7 and shows the parts in operating position just before feeding the article to be printed.

Fig. 9 is a side elevation of the plate safety which is operated by the article to be printed.

Fig. 10 is a plan view of the device shown in Fig. 9.

Fig. 11 is a front elevation thereof.

Fig. 12 is a detail plan view, partly in section of the feed operating mechanism on an enlarged scale.

Referring to the drawings 1 designates a suitable frame upon which the drive shaft 2 is mounted. A fly wheel 3 is arranged in one end of the shaft and is driven by any suitable means, such as an electric motor (not shown). A suitable handle 4 may be arranged on the fly wheel for operating the machine by hand when desired.

A collar 5 which rotates with the shaft is rigidly mounted on the shaft 2, adjacent the fly wheel. A pawl 6 is mounted on the collar and arranged adjacent the fly wheel and is adapted to engage a slot 7 in the shaft 2. The pawl 6 operates within the arm 8 which forces it into or out of the slot. A spring 9 works on the pawl to normally hold it inwardly. This mechanism forms a clutch 10 which is clearly shown in Fig. 4^a.

A gear 11 mounted on the driving shaft 2 meshes with a gear 12 on the cam shaft 13 which operates the mechanism for feeding the magazines one at a time into the machine. The cam shaft 13 extends transversely across the machine at one end thereof and is mounted in suitable journals 14 and 15 in the feed mechanism casing 16.

The cam shaft 13 has a main gear 17 mounted on the front end thereof and this gear drives the gear 18 mounted on the shaft 19 of the belt conveyor through the idlers 20 and 20'. Fig. 1, which are journaled in the side of the casing 16. An idler 21 meshes with the gear 17 and operates the gear 22 which is mounted on the pulley shaft 26. The idler 21 is mounted on the stud shaft 23 and is a wide gear which meshes with both gears 17 and 22. Pulleys 27 are spaced a suitable distance apart on the shaft 26 and are free to rotate with the shaft.

Another shaft 28 carrying pulleys 29 is spaced a suitable distance from the shaft 26 and is parallel therewith. A pair of belts 30 and 30' connect these pulleys as shown in Fig. 2. The pulleys are so positioned and are of sufficient diameter to allow the bottom edges of the belts to just clear the top of the machine and render sufficient friction to allow the article to be printed to be carried longitudinally across the machine. As shown in Figs. 1 and 2, the shaft 28 is supported by uprights 31 mounted on the front and back of the frame. These uprights have their bases grooved as at 32 to allow longitudinal adjustment thereof.

The gripper roll rocker 35 is pivotally mounted on the gripper roll rocker shaft 34 supported by a suitable hanger 33 which is connected to the casing 16 and extends downwardly therefrom. A pair of closely spaced arms 36 rigidly formed on the gripper roll rocker 35 carry a short shaft 37. A lever 38 is pivotally mounted on this short shaft and carries a roller 39 which rides on a cam 40 fixed to the shaft 13. A spring 41 is attached to the upper end of the lever 38 and holds the roller 39 against the cam. Rotation of the cam, with the roller riding thereon, moves the lever 38 back and forth and transmits this motion to the gripper roll rocker 35.

Arms 42 on the gripper roll rocker 35 support a shaft 43 on which the gripper rolls 46 are mounted. The feed roller shaft 47 is mounted in the frame and carries a gear 48 which is driven from the main gear 17 on the drive shaft 13 through the idle gears 45 and 45'. Feed rollers 50 are fixedly mounted on the feed roller shaft opposite the gripping rollers 46. The rollers 46 and 50 are driven to rotate in opposite directions so that when the gripper roll rocker reciprocates towards the feed roller shaft 47 the article to be printed is grasped or clamped between the rollers 46 and 50 and fed into the machine.

In order to provide positive feeding of the article to be printed a pneumatic feed is furnished. This feed comprises a rocking hollow rod or sucker bar 51. This sucker bar has one end pivotally connected to the valve casing 52 and the other end pivotally connected to the side of the casing 16 by means of an arm 53 which is free to travel in a slot 54 in the casing, Fig. 1. A suitable connection is made to a compressor (not shown) for creating a vacuum or suction inside of the sucker bar, Fig. 5. A stud 55 which extends inwardly from the casing 16 has two levers 56 and 57 pivotally mounted thereon, Figs. 7 and 8.

The lever 56 carries a roller 56' which is held in contact with cam 56'' by a spring 56''' and this lever is also connected at its upper end by a link 62 with the pneumatic valve casing 52, Fig. 7, for reciprocating or rocking

the sucker bar 51. An arm 55', Fig. 4, rigid with the arm 56 carries a roller 55'' which engages a cam 55''' on the drive shaft 13. The two rollers 56' and 55'', on their levers 56 and 55' operating on the two cams 56'' and 55''' on the same shaft, provide a positive movement for the lever 56, the link 62 and the suction means. Another lever 57, Fig. 8, is mounted on the stud 55 and carries a roller 58 which is held by a spring 58' against a cam 58'' on the drive shaft 13. The upper end of this lever 57 is connected by links 63, 63' to the finger bar 64 which is mounted to rock in the casing 16. Fingers 65 are fastened to the finger bar at suitable intervals and are arranged to engage the bottom of the stack of magazines 146 at the forward end thereof to hold the magazines so that they will not be affected while the bottom magazine is being fed away from the stack, as shown in Fig. 8. An arm 63'' on the finger bar 64 carries a stud 63''' which operates in an opening 16' in the side of the casing, Fig. 8, to provide a positive stop and limit to the rocking movement of the finger bar. The sucker bar 51 has open ends 51' which reciprocate between the gripper roll shaft 43 and the feed roll shaft 47 to engage the forward marginal edge portion of the bottom magazine in the stack and to pull it down upon and partly around the feed roller so that the gripper roller may clamp that portion of the bottom magazine against the feed roller for feeding the bottom magazine from the stack. While the sucker bar is thus operating on the bottom magazine, the fingers 65 swing away from the stack, Fig. 7, and after the sucker bar has pulled the front portion of the bottom magazine down, the fingers again engage the stack, Fig. 8, to prevent the other magazines from being affected while the bottom magazine is being fed away from the stack.

A pneumatic valve 66, Figs. 7 and 8, is arranged within the valve casing 52 which, during its reciprocation or rocking movement, causes the suction to be alternately turned on and off. In operation this valve is timed to cause suction when the feed rocker is towards the feed, Fig. 8, and upon reverse movement, Fig. 7, to shut off the sucking action and release the suction grip on the magazine; and at approximately the same time the rollers 46 and 50 engage the magazine and carry it onward to printing position.

An arm 69, Fig. 5, on the pneumatic valve stem 68 is arranged to engage a stop 67 on the valve casing in the form of a screw which can be adjusted to control the movement of the valve.

The belt conveyor which is shown in several figures, particularly in Fig. 1, and to which reference was formerly made, comprises the shafts 19 and 70 mounted below and close to the top of the frame, and the shafts 71 and 72, mounted in a lower portion of the frame.

Rollers 73 over which continuous belts 74 pass are mounted on these shafts. The belt receives its momentum from the belt roller shaft 19. The rollers 73 on the shaft 19 are fixed thereto and are rotatable therewith, while the rollers 73 on the remaining shafts are loosely mounted. The belts 74 provide the necessary friction, or carrying power, to carry the magazine to printing position and, after the magazine is printed, carries it beyond the machine to a suitable table or receptacle (not shown). A belt tightener 75 may be provided to take up slack in the belts. This belt tightener may be situated in any convenient position but in this case is shown as being arranged on the shaft 72, Fig. 1.

A longitudinal cam shaft 76 is mounted on the rearward side of the frame and receives its motion from the drive shaft 2 through the bevel gears 77 and 78 mounted on the drive shaft 2 and cam shaft 76 respectively, Figs. 2 and 5. This cam shaft extends through a casing 79 which is connected to the frame and is supported thereby. A pair of cams 80' and 81', Figs. 3 and 5, are mounted on this cam shaft and operate the platen 82 and its connecting parts. This platen is carried by a platen arm 83 mounted at 84 in the frame of the machine, as more fully disclosed in Letters Patent No. 1,481,860, patented January 29, 1924.

A magazine 85 is arranged on the rear of the machine and near the center thereof for holding a stack of printing devices 86 which are fed one at a time by intermittently operated feed chains 87 from the bottom of the stack through selecting position 88 to printing position 89, Figs. 2 and 3.

The feed chains 87 are arranged in parallel relation traveling on sheaves 90 and driven by sprockets 91, Figs. 3 and 9. The sprockets are fixed to a shaft 92 suitably mounted in the frame of the machine. One of the sprockets, Fig. 9, is provided with a plurality of projecting pins 93. A pawl 94 carried by an arm 95 is arranged to engage these pins successively to turn the sprockets and actuate the chains intermittently. The arm 95 is part of a rocker 96 which is actuated through suitable connections 97 by cams 80' and 81' on the cam shaft 76, Figs. 3 and 5. The connection 97 includes an arm 98 connected by a link 99 with one arm 100 of a bell crank lever which is pivotally mounted at 101 in the frame of the machine.

A lever 96' is attached to the lower end of the rocker 96 and operates the drive packer rocker 102, Fig. 1, which reciprocates back and forth a predetermined distance to pack the printing devices in a drawer after they are fed through the machine. This packer is so timed and constructed that as soon as a printing device falls in the drawer, after passing through the machine, the packer will urge that device, and the preceding devices,

rearwardly to provide a space in the front end of the drawer to accommodate the succeeding devices. This construction is well known in the art and further reference thereof need not be made.

An arm 103, Fig. 5, secured to the rocker 96 and extending upwardly therefrom connects with the selector pin bar 104, and during the reciprocating motion of the rocker 96, moves the selector bar pin up and down to work all the cooperating parts of the selector mechanism. This selector mechanism is now well known in the art and is fully disclosed in Patent No. 1,503,822, dated August 5, 1924. Reference is also made to Patent No. 1,082,505, dated December 30, 1913, and No. 1,209,414, dated December, 1916.

A bar 105 pivotally mounted on the frame carries an upwardly disposed arm 105' which has a cam roller 106 mounted thereon, Figs. 1^a, 2. The roller is adapted to ride on a cam 107 which is fixed to the driving shaft 2. A spring 105'' has one end thereof fastened to the bar 105 and the other end to the frame to keep the roller 106 against the cam 107 at all times. The front end of the bar 105 is provided with a clutch member 108 which is adapted to engage with a clutch member 109, Fig. 1. The clutch member 109 is fixed on a rod 110 which communicates with the clutch 10 on the fly wheel 3. When the clutch members are engaged as shown in Fig. 4, the machine is in operating position; but when not engaged the pawl 6 is not in engagement with the fly wheel and therefore the machine will not operate. When the cam roller 106 hits the low spot of the cam 107 it throws the bar 105 outward and moves the clutch members 108 and 109, Fig. 1, and Fig. 1^a, out of engagement, thereby shifting the rod 110 and disengaging the clutch 10. The arm 8 causes the pawl 6 to become disengaged from the slot 7 in the drive shaft 2, Fig. 4—A, thereby ceasing operation of the machine by leaving the drive shaft 2 idle.

However, this condition is only desirable when there are no printing devices to be fed, so the following means are provided to keep the clutches in engagement when printing devices are being fed. A rod 111 connects the bar 105 to a pivoted finger 112, Figs. 2 and 4, which is arranged on the magazine rack. When printing devices are in the rack and finger 112, through the rod 111 moves the bar 105 outwardly thereby prohibiting the cam roller 106 from attaining the low spot on the cam 107 and keeping the clutch members 108 and 109 in engagement. When no plates are in the magazine the roller will strike the low spot of the cam and disengage the clutch members 108 and 109 and throw out the clutch 10 to cease operation of the machine.

To properly print the article it is necessary that the article remain stationary dur-

ing the printing operation and this is accomplished by providing stops 113 and 114 to hold the article from moving along with the belt during the printing operation. The stop 114 is to keep the magazine to be printed stationary, during the printing operation, and the stop 113 is to prevent the succeeding magazine from being fed on top of, or against the one being printed. Each stop in Figs. 1, 4 and 6 comprises fingers 115 projecting from a bar 116 which is rigidly connected to a rod 117. The rod is supported in suitable bearings 118 fastened to the frame, Fig. 2, and it is provided with arms 119 to support rollers 120 which bear down slightly on the magazine and insure movement thereof by the belts.

An arm 121 is secured to the end of the bar 116 and carries roller 122 loosely mounted thereon, Figs. 1 and 6. These rollers are adapted to ride on cams 123 secured to a longitudinal shaft 124 which is driven by shaft 19 through gears 125 and 126, Fig. 6, when the rollers 122 ride on the low portion of the cams the stops 113 and 114 are forced downward by their own weight due to the eccentric manner in which they are assembled. When the rollers 122 are on the high portion of the cams the stops are raised. When the stops are in the down position shown in Figs. 1 and 6 the magazine is halted temporarily while it is being printed. When the stops are in up position the magazine is free to be carried onward by the belts 74.

The selector means of this machine operates as more particularly set forth in the patents hereinbefore referred to to select some printing devices to be printed or not to be printed, as the case may be, and provision is made in this invention for skipping the feed of an article to be printed such as a magazine whenever a printing device is not fed to printing position and whenever a printing device is selected to be skipped so that a magazine will never pass through the machine without being printed.

The printing devices are fed one at a time to printing position and it is also important that a printing device to be printed shall be held in printing position in event of the failure of the feed of a magazine to printing position and until the magazine is fed to printing position so that no printing device to be printed will pass through the machine without printing.

Means have been provided to take care of this situation by providing a safety shown in Figs. 9, 10 and 11. Supported on the front of the machine is the longitudinal shaft 124 which was previously described and which is revolved as before mentioned; this is the shaft on which the cams 123 are arranged and which raise and lower the stops 113 and 114. A rod 127 is connected at one end to an arm 127' on a rod 127'' which extends transverse-

ly in the frame. The other end of the rod 127 is connected to an angle lever 227 pivoted at 227' on the frame and adapted to engage a pin 227'' on pawl 94 for releasing the pawl from pin 93 on sprocket 91. A spring 128' attached to the arm 127' and to the frame normally holds these parts in position with the pawl 94 out of operative relation to the pins 93 on the sprocket, but when a magazine 146 is fed to position preceding printing position it will depress a roller 129, which is mounted on the arm 128 and projects up through an opening 130 in the table 130' of the machine, and the rod 127 is thus shifted to the right, Fig. 9, and the pawl 94 is then permitted by the angle lever 227 to engage one of the pins 93 for operating the printing device feed. In the absence of a magazine for depressing the roller 129, the feed pawl 94 will be held in inoperative position so that the printing device feed will not operate and this is desirable because a printing device to be printed should not be discharged from printing position until an impression has been taken therefrom. For insuring proper engagement of the magazine with the release roller 129 a double roller 134, carried by a rod 133 on a support 132 on the frame, is arranged over the opening 130 in the table. When there is no magazine present under the rollers 134 the release roller 129 will be projected by the spring 128' through the opening 130 in the table and between the rollers 134, as shown in broken lines in Fig. 9, and the feed pawl 94 will then be in inoperative position; but when a magazine is fed beneath the rollers it will force the release roller down against the tension of its spring 128' and cause the printing device feed to operate. A handle arm 131 is connected to the arm 127', which is in the form of a casting mounted on the rod 127'' and forming a support for the arm 128 so that the printing device feed control may be operated manually when desired. This handle also functions as a counterweight to supplement the spring 128'.

The handle arm 131 has a roller 135 arranged thereon which rides on a cam 136 fastened on the shaft 124, Figs. 9 to 11. When the roller bears on the low portion of the cam 136 the wheel 129 is free to rise up through the slot 130; and when the roller is on the high portion of the cam 136 it keeps the wheel 129 down. This action permits the printing device to pass through to printing position where it is held for the printing operation.

A bar 137 is arranged on the left end of the machine, Fig. 2 and is similar in all respects to the stops 113 and 114. The purpose of this bar is to slow up the magazine on its way to the receiving table and to afford sufficient pressure on the magazine to allow it to be propelled by the belts 74. Rollers 137', Fig. 6, may be provided to keep the

belts 74 from riding on the top of the frame.

To prevent a magazine from being fed to printing position when a printing device is to be skipped a yoke 138 is pivoted to the frame, Fig. 5, and is operated by a rod 139 which connects with the selector pin bar 104. The selector pin bar is operated by the printing device to be skipped and causes the yoke 138 to reciprocate, Fig. 5. A bell crank 139' pivotally mounted on the frame carries a roller 140 which contacts with an edge of the yoke. During the reciprocation of the yoke the bell crank is moved sideways. An arm 141 of the bell crank is connected to a rod 142 communicating with the arm 69 of the pneumatic valve 66. Movement of the arm 141 to the left in Fig. 5, causes the rod 142 to move longitudinally to the left and prevents reciprocation of the arm 69, thereby shutting off the suction in the sucker bar 51 and also preventing the sucker bar from drawing a magazine into the machine. A rod 143 is connected to the arm 141 and is operated in the same manner as the rod 142 and prevents reciprocation of the finger bar. When the finger bar stops moving the fingers will be in the position shown in Fig. 8 and prevent magazines from being fed. This construction provides a double safe-guard to prevent magazines from being fed into the machine when a printing device is not to be printed.

The magazine travels in suitable guides 144, Fig. 3, which are fastened on the top of the frame to assure proper position of the magazine relative to the platen. The guides also assure that the magazine will be squared in printing position during the printing operation.

Downwardly disposed arms 145, against which the magazines are stacked, are arranged on the front of the casing and on the feeding end thereof. These arms keep the stack of magazines 146 in proper position relative to the feeding mechanism.

The sucker bar swings downward from the position shown in Fig. 7 to that shown in Fig. 8 and pulls down the forward marginal edge portion of the bottom magazine upon and partly around the feed roller. When the sucker bar is moved up to the stack the fingers 65 are swung away from the stack, Fig. 7, and when the sucker bar moves away from the stack the fingers are swung up to engage the bottom of the stack at the front thereof, Fig. 8, to prevent other magazines in the stack from being affected while the bottom magazine is being fed away from the stack. The gripper rollers are swung to clamp the magazine against the feed rollers and the latter feed the bottom magazine to the belts 74 which carry it forward first to the stops 113 and then to the place 114 where it is momentarily held during the printing operation. The guides 144 assure that the

magazine will be properly positioned relative to the platen in printing position. During the revolution of the cam and after the magazine has been printed the stops 114 raise and allow the magazine to be carried onward to a receptacle or table from which they are taken away.

It will be noted from the foregoing description that provision is made for printing every printing device intended to be printed and to prevent a magazine passing through the machine without printing. A magazine is fed to printing position for every printing device to be printed; if a printing device is to be skipped the magazine feed will not operate to feed a magazine to printing position; if for any reason there is a failure of the magazine feed and a printing device is to be printed this device will be held in printing position until a magazine is fed to printing position; if for any reason a printing device is not fed in a cycle of operation of the printing device feed the magazine feed will not operate.

While a magazine has been used throughout this description for the purpose of explaining the invention it is not to be construed as limiting the invention but as including a newspaper, folder or any other article adapted for use in this machine.

Changes in the form, construction and arrangement of parts of the invention may be made without departing from the spirit or sacrificing the advantages thereof and the right is hereby reserved to make all such changes as fairly fall within the scope of the following claims.

We claim:

1. A printing machine comprising a frame adapted to support a stack of magazines, a feed roller shaft and a gripper roller shaft, a feed roller and a gripper roller mounted on said shafts and supported in spaced relation at the front end of said stack, means movable past and between said shafts to engage the bottom magazine in the stack and to pull it down between said rollers for engagement thereby, and means for moving the gripper roller to press the magazine against the feed roller.

2. A printing machine comprising a frame adapted to support a stack of magazines, a feed roller shaft and a gripper roller shaft, a feed roller and a gripper roller mounted on said shafts and supported in spaced relation at the front end of said stack, pneumatic suction means movable past and between said shafts to engage the bottom magazine in the stack and to pull it down between said rollers for engagement thereby, and means for moving the gripper roller to press the magazine against the feed roller.

3. A printing machine comprising a frame adapted to support a stack of magazines, a feed roller shaft and a gripper roller shaft,

a feed roller and a gripper roller mounted on said shafts and supported in spaced relation at the front end of said stack, pneumatic suction means reciprocating past and between said shafts to engage the bottom magazine in the stack and to pull it down between said rollers for engagement thereby, and means for moving the gripper roller to press the magazine against the feed roller.

4. A printing machine comprising a frame adapted to support a stack of magazines, a feed roller shaft and a gripper roller shaft, a feed roller and a gripper roller mounted on said shafts and supported in spaced relation at the front end of said stack, pneumatic suction means reciprocating past and between said shafts and alongside the feed roller to engage the bottom magazine in the stack and to pull it down between said rollers for engagement thereby, and means for moving the gripper roller to press the magazine against the feed roller.

5. A printing machine comprising a frame adapted to support a stack of magazines, a feed roller shaft supported below the forward end of the stack, a feed roller on said shaft engaging the under side of the bottom magazine adjacent the forward edge thereof, a gripper roller shaft spaced from the feed roller shaft, a gripper roller on the gripper roller shaft, suction means movable past and between said shafts to engage the bottom magazine in the stack between its forward edge and the feed roller and to pull the forward marginal edge portion of the bottom magazine into position between the feed roller and the gripper roller, and means for moving the gripper roller to press the magazine against the feed roller.

6. A printing machine comprising a frame adapted to support a stack of magazines, a feed roller shaft supported below the forward end of the stack, a feed roller on said shaft engaging the under side of the bottom magazine adjacent the forward edge thereof, a gripper roller shaft movably supported in front of the stack, a gripper roller on the gripper roller shaft, suction means movable past and between said shafts to engage the bottom magazine in the stack between its forward edge and the feed roller and to pull the forward marginal edge portion of the bottom magazine into position between the feed roller and the gripper roller, and means for moving the gripper roller to press the magazine against the feed roller.

7. A printing machine comprising a frame adapted to support a stack of magazines, a feed roller shaft supported below the forward end of the stack, a feed roller on said shaft engaging the under side of the bottom magazine adjacent the forward edge thereof, a gripper roller shaft movably supported in front of the stack, a gripper roller on the gripper roller shaft, suction means movable

between said shafts to engage the bottom magazine in the stack between its forward edge and the feed roller and to pull the forward marginal edge portion of the bottom magazine into position between the feed roller and the gripper roller, and means for moving the gripper roller under the stack to press the magazine against the feed roller.

8. A printing machine comprising a frame adapted to support a stack of magazines, a feed roller shaft supported below the forward end of the stack, a feed roller on said shaft engaging the under side of the bottom magazine adjacent the forward edge thereof, a rocker supported in the machine in front of the stack, depending arms on said rocker, a gripper roller shaft supported in said arms, a gripper roller on said gripper roller shaft, suction means movable between said shafts to engage the bottom magazine of the stack and to pull it down between said rollers for engagement thereby, and means for moving the gripper roller to press the magazine against the feed roller.

9. A printing machine comprising a frame adapted to support a stack of magazines, a feed roller shaft supported below the forward end of the stack, a feed roller on said shaft engaging the under side of the bottom magazine adjacent the forward edge thereof, a gripper roller shaft, a gripper roller on said shaft, suction means movable between said shafts to engage the bottom magazine in front of the feed roller and to pull the forward marginal portion of the bottom magazine down against and partly around the feed roller, and means for moving the gripper roller to press the magazine against the feed roller for feeding said magazine from the stack.

10. A printing machine comprising a frame adapted to support a stack of magazines, a feed roller shaft supported below the forward end of the stack, a feed roller on said shaft engaging the under side of the bottom magazine adjacent the forward edge thereof, a gripper roller rocker supported in the machine in front of the stack, a gripper roller shaft carried by said rocker, a gripper roller on said gripper roller shaft, suction means operating between said shafts to engage the bottom magazine in the stack between its forward edge and the feed roller and to pull the forward marginal edge portion of the bottom magazine down and partly around the feed roller, and means for operating said rocker for moving the gripper roller to press the magazine against the feed roller for feeding the magazine from the stack.

11. A printing machine comprising a frame adapted to support a stack of magazines, a feed roller shaft supported below the forward end of the stack, a feed roller on said shaft engaging the under side of the

bottom magazine adjacent the forward edge thereof, a gripper roller shaft movably supported in front of the stack, a gripper roller on the gripper roller shaft, suction means 5 movable between said shafts to engage the bottom magazine in the stack between its forward edge and the feed roller and to pull the forward marginal edge portion of the bottom magazine down and partly around 10 the feed roller, means for moving the gripper roller to press the magazine against the feed roller for feeding the magazine away from the stack, a finger engaging the under side of the bottom magazine in front of the 15 feed roller and means for moving said finger away from the stack to permit the operation of the suction means and then to move the finger back into engagement with the stack to prevent feeding movement of another magazine while the bottom magazine is 20 being fed from the stack.

12. A printing machine comprising a frame adapted to support a stack of magazines, a feed roller shaft supported below 25 the forward end of the stack, a feed roller on said shaft engaging the under side of the bottom magazine adjacent the forward edge thereof, a finger bar pivotally mounted in the machine, a finger on said bar normally 30 engaging the under side of the bottom magazine in front of the feed roller, a gripper roller rocker mounted in the machine, a gripper roller shaft carried by said rocker, a gripper roller on said gripper roller shaft 35 spaced from the feed roller, suction means movable between said shafts to engage the bottom magazine of the stack between its forward edge and the feed roller and to pull the forward marginal edge portion of the bottom 40 magazine down and partly around the feed roller, a cam shaft, and independent means on said cam shaft for operating said finger, said suction means and said gripper roller to move the finger away from the stack 45 while the suction means is operating and to move said gripper roller into operative position and to return said finger into engagement with the stack whereby the bottom magazine is fed from the stack without disturbing the other magazines in the stack. 50

JOSEPH S. DUNCAN.
HENRY E. HUBBARD.