Feb. 5, 1935. E. J. BRASSEUR 1,989,911

PILE ELEVATING MECHANISM

Original Filed Oct. 3, 1928 7 Sheets-Sheet 1

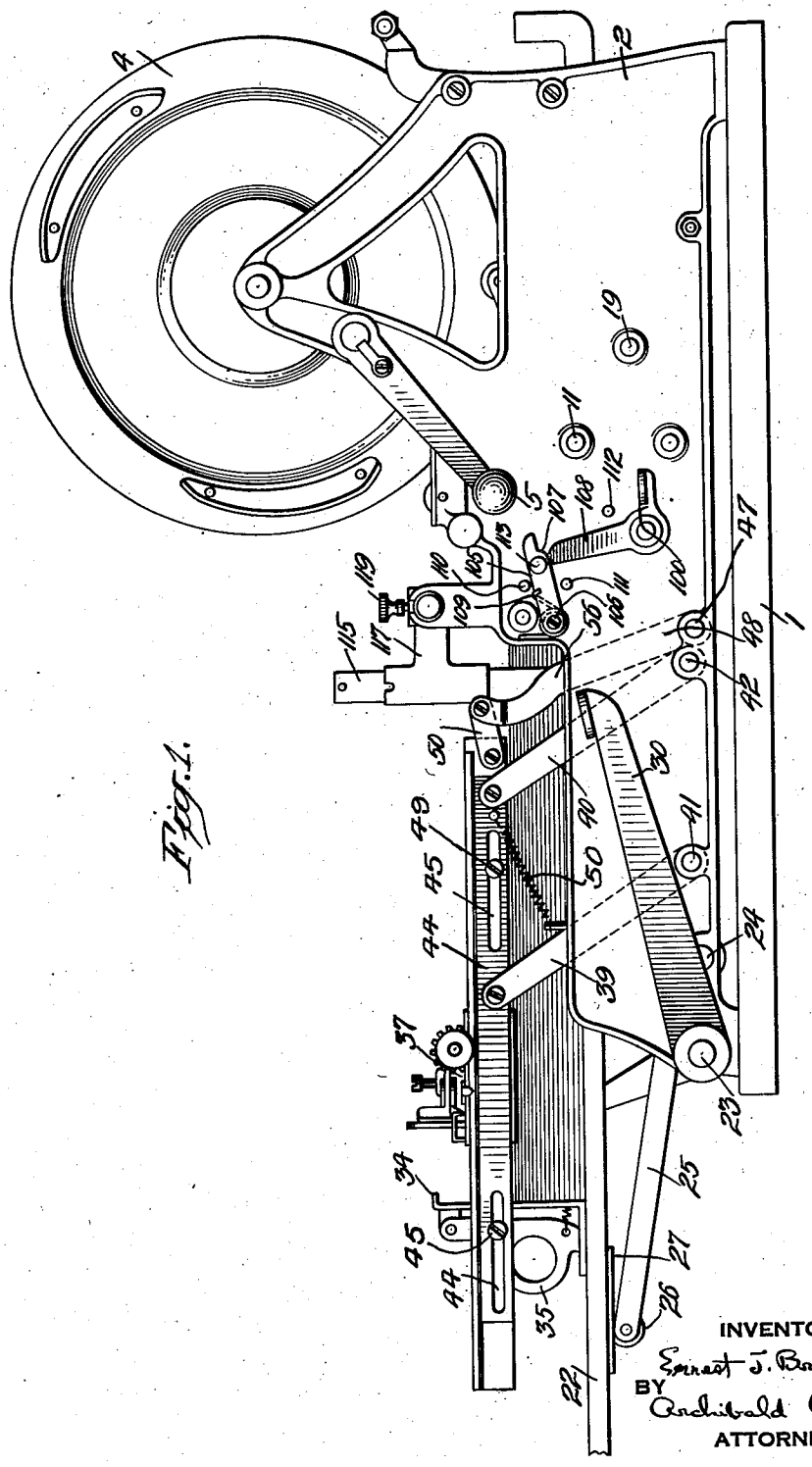


Fig. 1.

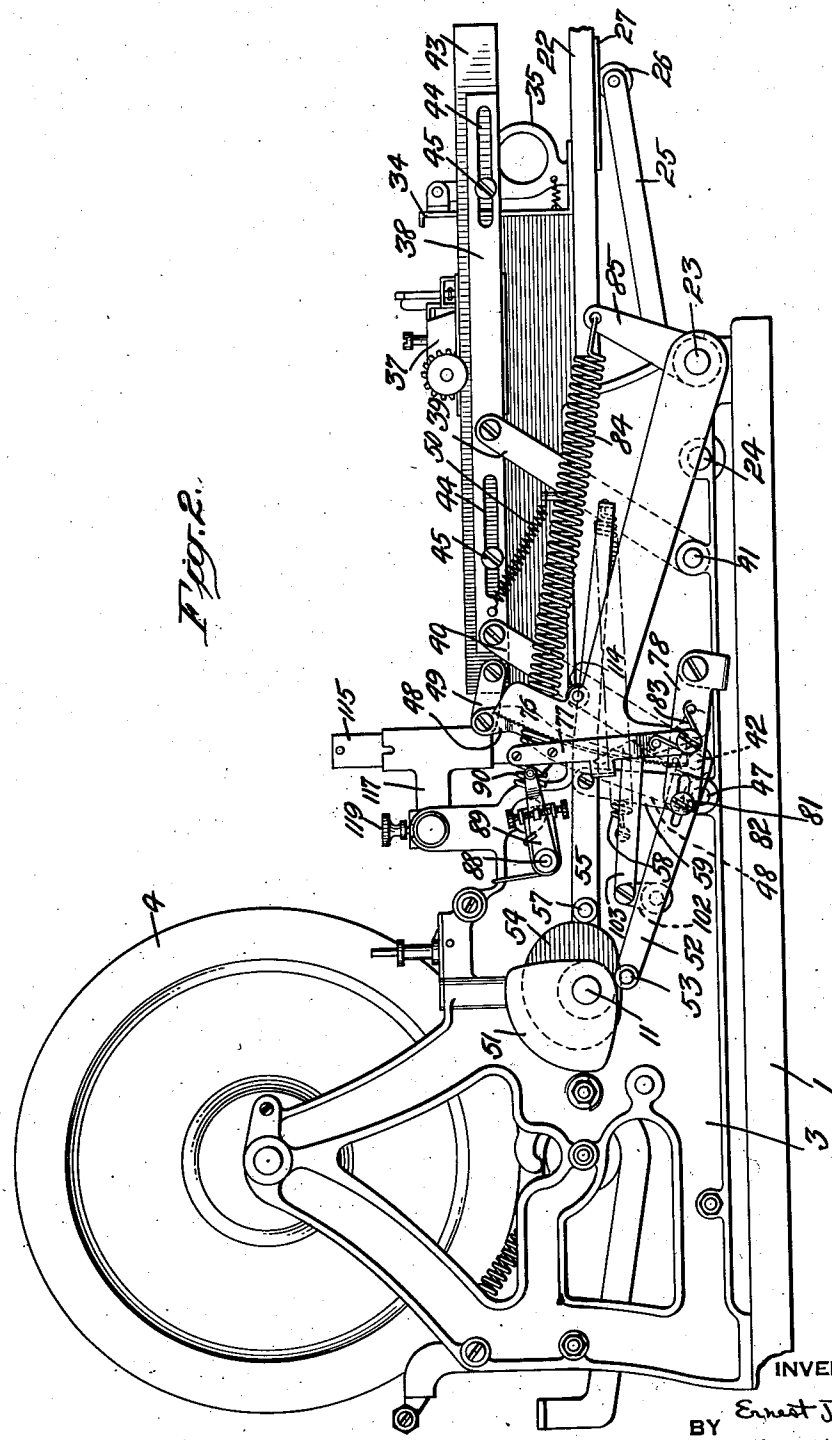
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PILE ELEVATING MECHANISM

Original Filed Oct. 3, 1928 7 Sheets-Sheet 2

Fig. 2.



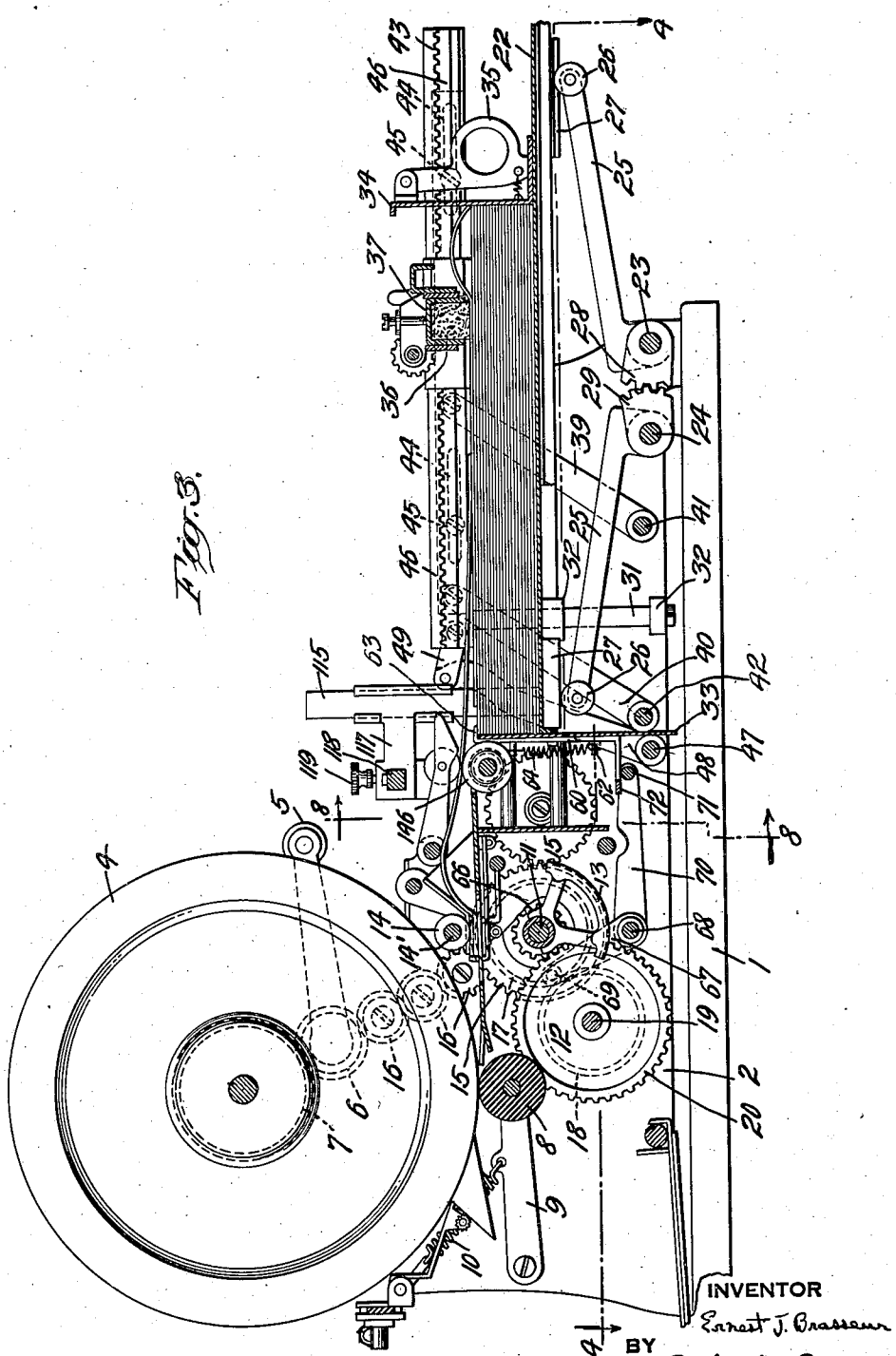
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Fig. 3.



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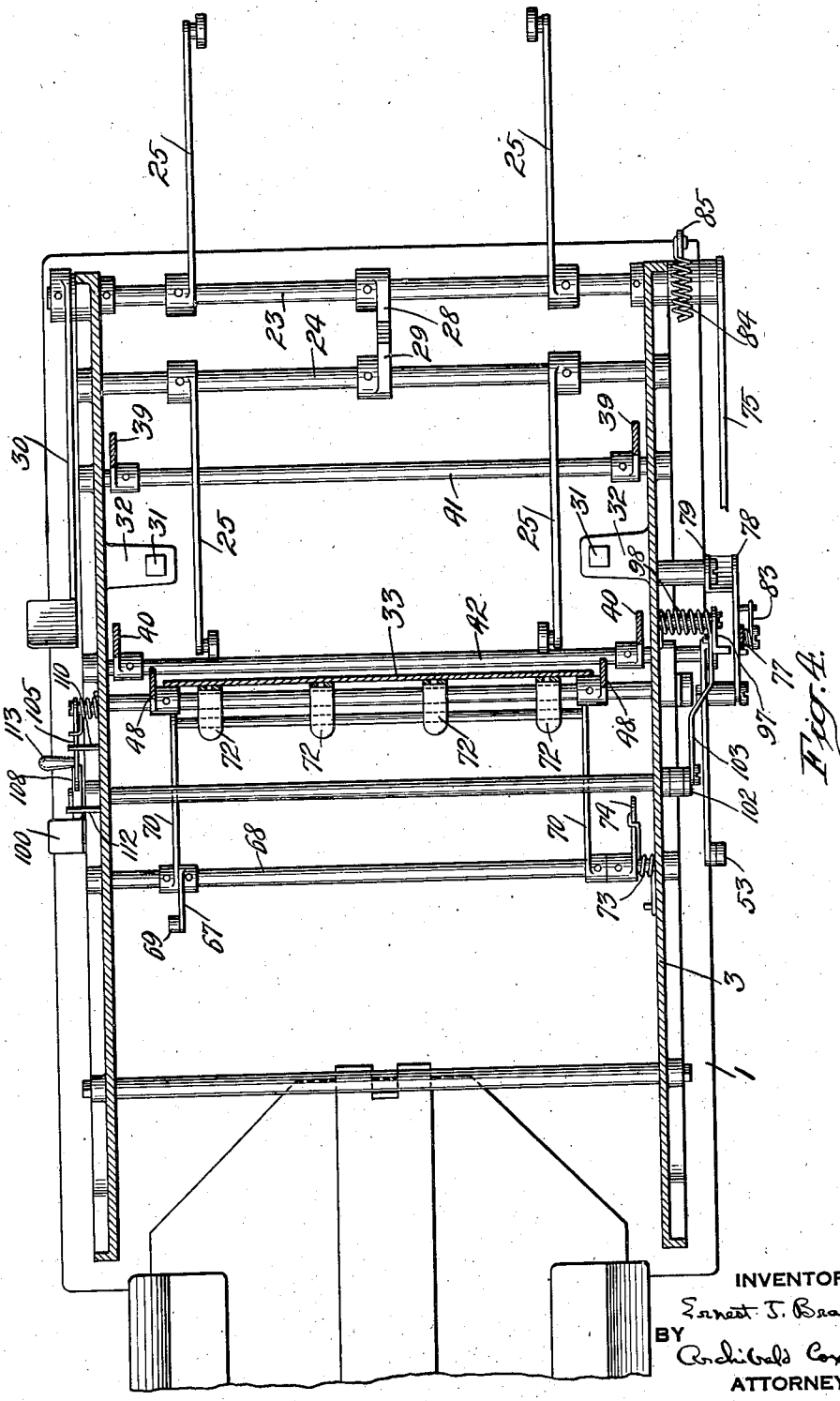


Fig. 4.

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PILE ELEVATING MECHANISM

Original Filed Oct. 3, 1928 7 Sheets-Sheet 5

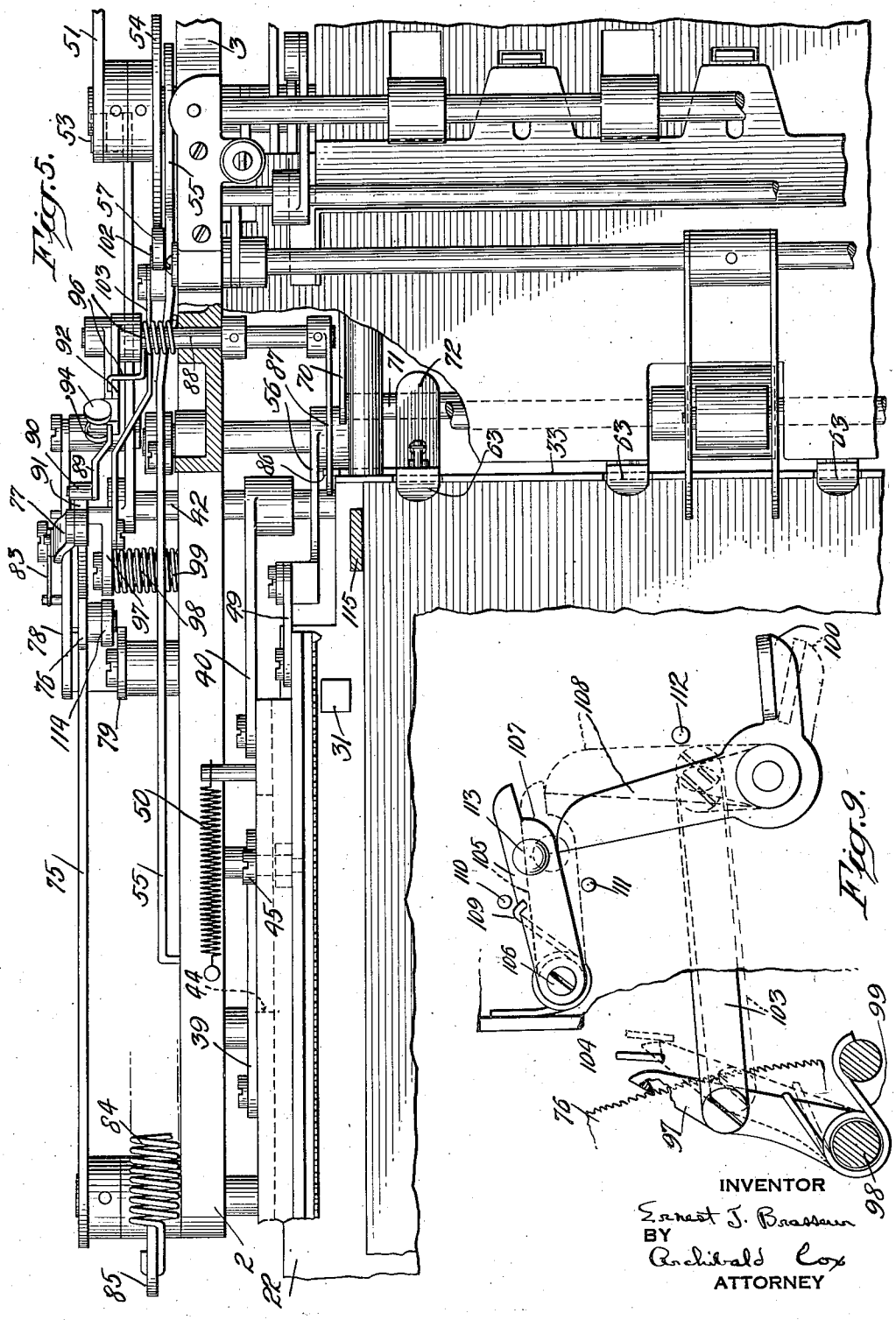


Fig. 5.

Fig. 9.

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PILE ELEVATING MECHANISM

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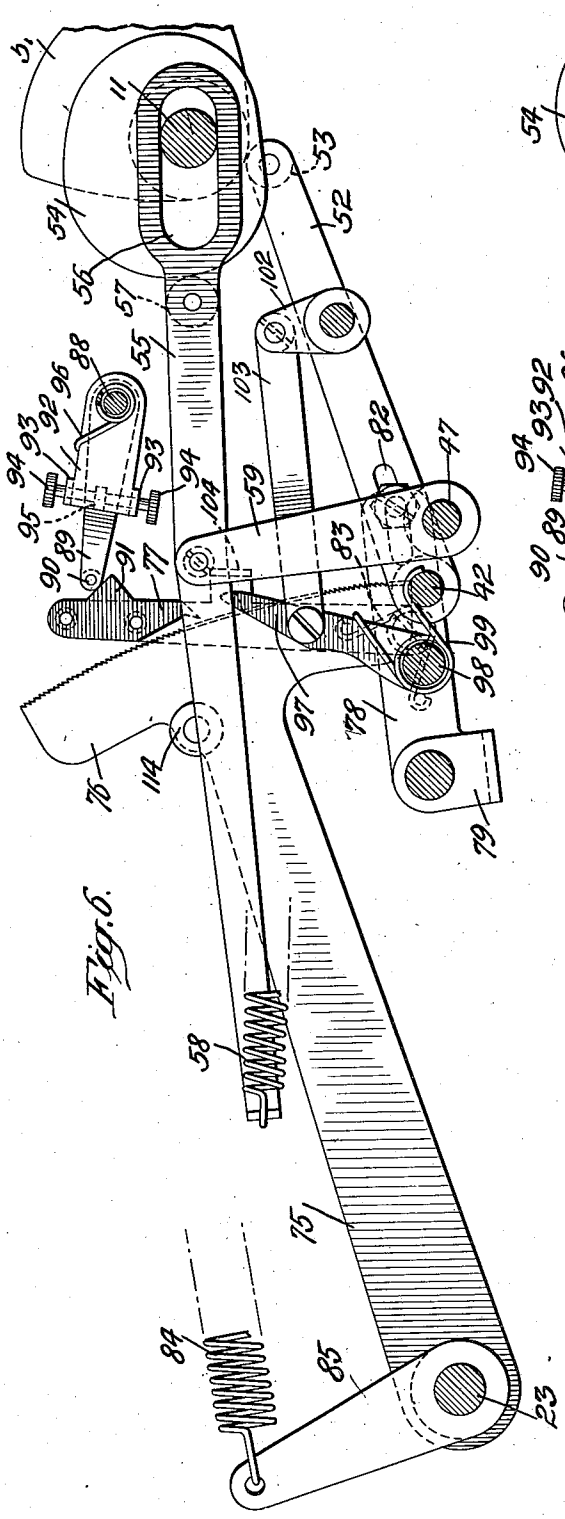


Fig. 6.

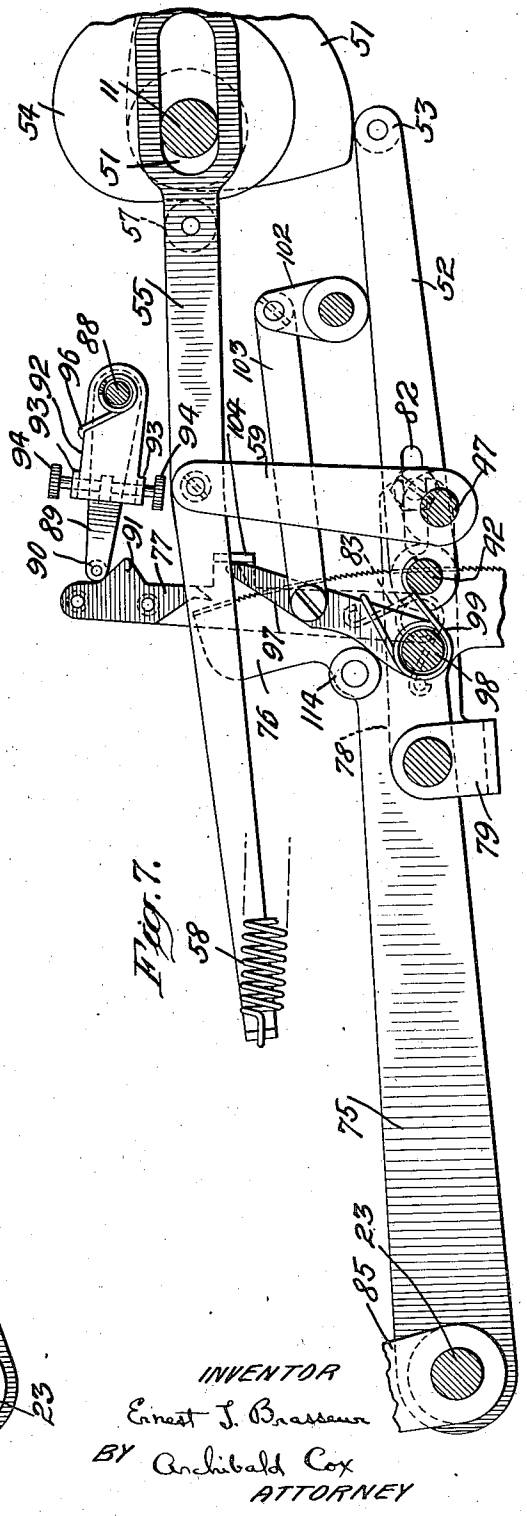


Fig. 7.

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PILE ELEVATING MECHANISM

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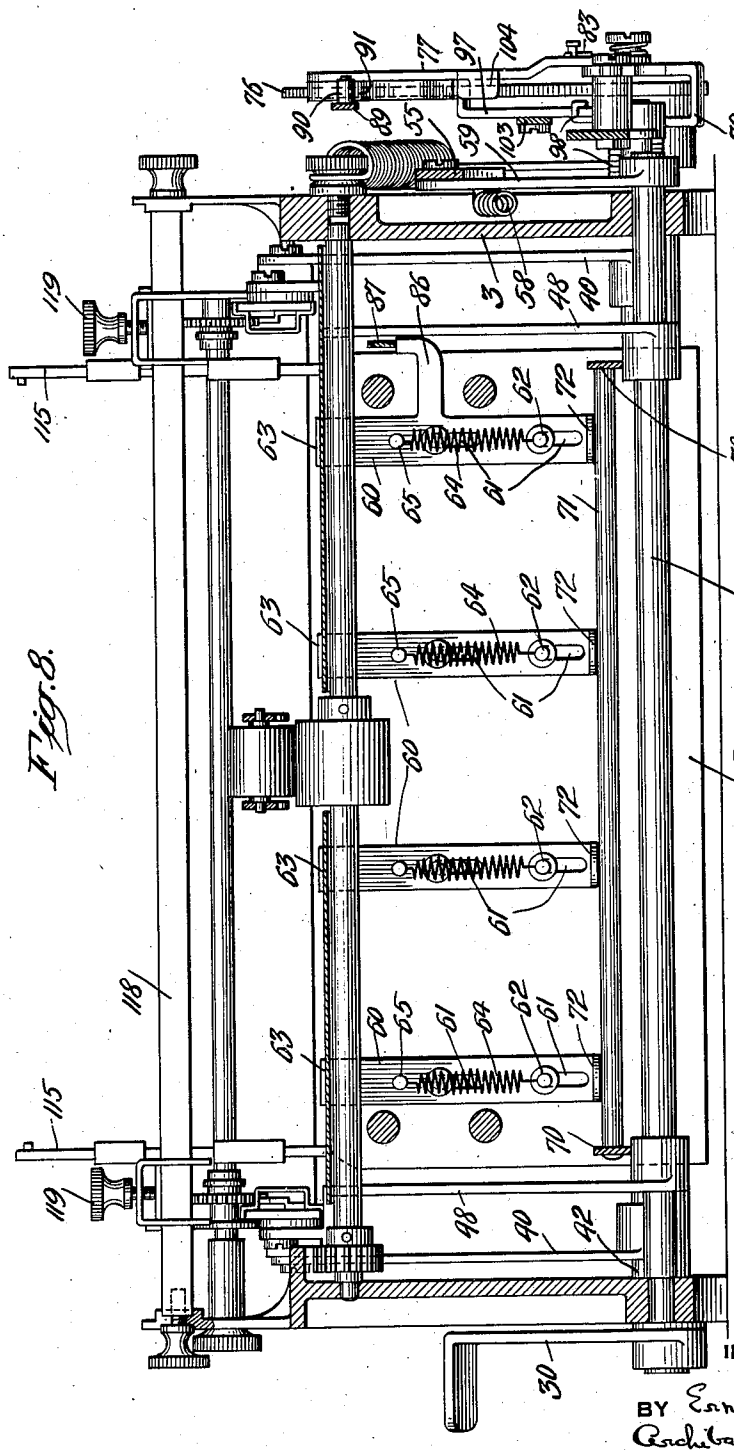


Fig. 8.

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Patented Feb. 5, 1935 1,989,911

UNITED STATES PATENT OFFICE

1,989,911

PILE ELEVATING MECHANISM

Ernest J. Brasseur, Chicago, Ill., assignor to A. B. Dick Company, Chicago, Ill., a corporation of Illinois

Original application October 3, 1928, Serial No. 309,941. Patent No. 1,843,118. Divided and this application April 19, 1930, Serial No. 445,797

4 Claims. (Cl 271—62)

This invention relates to pile elevating mechanism and particularly to apparatus of this character adapted for use in connection with stencil duplicating machines.

This application constitutes a division of my copending application Serial No. 309,941 entitled Improvements in sheet feeding apparatus, filed October 3, 1928.

This invention is concerned with the provision of mechanism adapted to automatically raise a platform structure so as to maintain sheets or other material supported thereon at a constant level during feeding or treating operations, and especially to the provision of such mechanism adapted for association with printing and stencil duplicating machines whereby greater speed, accuracy and positiveness of operation may be attained.

In order that the feeding device of a stencil duplicating machine may operate effectively it is necessary that the top of the sheet pile from which the sheets are consecutively removed be maintained at the proper feeding level at all times during operation. The feeding device used in connection with such machines generally move through a fixed orbit or path, and if the top sheet of the stack is not in exactly the proper position the feeding device will engage the sheet indifferently, and often feed the sheet improperly. This situation requires that the mechanism for elevating the sheet pile always maintain the top of the sheet pile at precisely a uniform level under all conditions of operation. Slow and unreliable stencil printing in the past has been largely attributable to the inaccurate, improper and untimely elevating of the top sheet of the sheet pile. Such mechanisms have furthermore lacked sensitiveness and alertness in responding to the requirements of the sheet feeding device. Delicate and complicated parts, which frequently break down and become out of repair, are further defects of prior mechanisms heretofore used.

An object of my invention is to produce an improved pile elevating mechanism adapted especially for use in connection with printing and duplicating machines, by means of which a greater output per unit of time can be obtained from the machine than heretofore and a better quality of work can be produced.

Another object of my invention is to provide an improved pile elevating mechanism adapted to be correlated with a feeding device moving along a predetermined path and so arranged that all sheets fed from the sheet pile are gripped or engaged by the feed device with an equal and uniform pressure, which is sensitive and alert in responding to the requirements of the feeding device, and which is furthermore provided with means for making various adjustments of the elevating mechanism to attain effective feeding of sheets of various qualities and characteristics.

A further object of my invention is to provide an improved table elevating mechanism especially adapted for stencil duplicating machines including a table adapted to support a sheet pile and an element sensitive to the top level of the sheet pile for throwing table raising means into operation when the sheet pile falls below a predetermined level, so that the top of the sheet pile is always maintained at the proper feeding level regardless of the number of sheets on the table.

A further object of my invention is to provide a pile elevating mechanism adapted for use in connection with stencil duplicating machines which is strong, sturdy and of few moving parts, which is positive and rapid in its operation, which will give a greater output of better work, and which is not apt to get out of order.

Other objects of this invention will be in part obvious and in part pointed out hereinafter.

The pile elevating mechanism forming the subject matter of this invention may be operatively associated with any machine which requires that the material operated upon be maintained at a uniform level. I, therefore, contemplate using my mechanism with any form of printing, cutting, trimming or scoring machine with which it may be adaptably associated. My mechanism, however, is especially adapted for use in connection with stencil duplicating machines of the type known as the "mimeograph".

For purposes of illustration only, I have shown my pile elevating mechanism as associated with a stencil duplicating machine. In accordance with this invention, my pile elevating mechanism comprises a table or platform adapted to support a sheet pile and is so positioned that sheets from the sheet pile are moved directly into engagement with the feed rollers of the duplicating machine. Mechanism is provided for raising the sheet pile supporting table both manually and automatically. The table rests upon two pairs of lever arms or legs, each pair fixed to a rotatable shaft. The shafts are geared together so that as one of the shafts is rotated the table platform may be raised or lowered. Manual movement of a hand lever attached to one of the shafts raises or lowers the table.

The table is automatically raised in easy stages as sheets are fed from the sheet pile. A ratchet

segment fixed to one of the table raising shafts is adapted to be engaged by a reciprocating pawl to move the gear segment downwardly, raising the table. Reciprocating movement is given to the pawl by a rotatable cam fixed to a moving shaft of the stencil duplicating machine, and a train of pivoted arms. The reciprocating pawl is normally spring-pressed out of engagement with the ratchet segment and is thrown into engagement with the ratchet segment only when the top of the sheet stack falls below a predetermined feeding level.

A device is provided for throwing the pawl into engagement with the table raising ratchet segment when the sheet pile falls below the predetermined feeding level. The pawl is sustained in ratchet engaging position until the table has been raised sufficiently to move the top of the sheet pile back to the predetermined feeding level. The parts are so interrelated and adjusted that the removal of a very few sheets from the sheet pile will cause the table raising mechanism to be thrown into operation. The top of the sheet pile is thus constantly maintained at practically a uniform level, with the result that the feed shoe grips each sheet with the same uniform pressure.

A releasable latch device automatically retains the table at any elevation to which it is raised. Release of the latch permits the table to drop of its own weight to its lowermost position.

In order that a clearer understanding of this invention may be had, attention is hereby directed to the accompanying drawings, forming a part of this application and illustrating certain possible embodiments of this invention.

Referring to the drawings, Figure 1 is a side elevation of my pile elevating mechanism associated with a stencil duplicating machine, showing the various control devices of the machine;

Figure 2 is a side elevation of my pile elevating mechanism and associated stencil duplicating machine, taken on the opposite side of the machine from that shown in Figure 1, showing certain working elements thereof;

Figure 3 is a vertical cross-sectional view taken longitudinally of the machine, showing certain working elements interior of the machine;

Figure 4 is a horizontal cross-sectional view of my mechanism and associated stencil duplicating machine, taken on line 4—4 of Figure 3 and illustrating more in detail certain operative elements thereof;

Figure 5 is an enlarged fragmentary plan view of the machine with certain parts broken away to illustrate more clearly certain operative elements thereof;

Figure 6 is an enlarged view of a part of the table raising mechanism illustrating the position of the parts at one stage of the raising operation;

Figure 7 is a similar view of a part of the table raising mechanism illustrating the position of the parts when the table is in lowermost position;

Figure 8 is a vertical cross-sectional view of the machine taken on line 8—8 of Figure 3, showing particularly the sheet pile clamping members and associated mechanism; and

Figure 9 is an operative detail of certain parts of my invention, showing the pawl means normally latching the sheet supporting table against downward descent and connecting mechanism for moving the pawl out of latching position to permit the table to descend.

Similar reference characters designate the same parts throughout the several views of the drawings.

Although my pile elevating mechanism is adapted for use with various kinds of machines as above noted, it is especially adapted for use in connection with stencil duplicating machines, and for purposes of illustration therefor, I have shown in the drawings my mechanism associated with such a machine.

Referring to the drawings, and more particularly to Figures 1, 2 and 3, the machine generally consists of a base 1 on which side frames 2 and 3 are erected. A stencil duplicating drum 4 is mounted for rotation in suitable bearings provided in the side frames 2 and 3. The drum is adapted to carry a stencil sheet secured about the cylindrical surface thereof in the usual manner. The drum is rotated by means of a crank 5 secured to a pinion 6 which meshes with a gear 7 fastened to one head of the drum. A pressure roller 8 is carried on pivoted arms 9 in the usual manner and drawn toward the drum by springs 10.

A shaft 11 is mounted for rotation in suitable bearings in the side frames. A sleeve 12 carrying sheet forwarding sectors 13 is loosely mounted on the shaft 11. Sectional rollers 14 are fixed to a shaft 14'. The ends of the shaft 14' are positioned in vertical guideways in the side frames 2 and 3, permitting a raising and lowering movement of the rollers. Sectors 13, coacting with sectional rollers 14 fixed to shaft 14', operate to forward sheets between them to the line of contact of the drum and pressure roller. The sectors 13 rotate at the same surface speed as that of the drum. The radius of the drum and the sectors is such that the sectors make three revolutions during one revolution of the drum. The sectors are driven by suitable gearing, comprising gear 15 secured to shaft 11, connected by a train of gears 16 to the pinion 6. The gear 15 is secured to a gear 17 which meshes with a gear 18 rotatable on a shaft 19. The gear 18 is connected to a gear 20 also rotatable on shaft 19. Gear 20 is adapted to mesh with a pinion 21 which is fastened to the sleeve 12 carrying the sectors 13. The sheet feeding apparatus is designed to feed single sheets successively to the sheet forwarding devices consisting of the sectors 13 and roller 14. The sheet forwarding devices then cooperate once during each revolution of the drum to forward the sheet so fed to the drum and pressure roller.

The pile of sheets is supported on a table or platform 22 adapted to be raised and lowered both manually and automatically. Two shafts 23 and 24, suitably journaled on the side frames 2 and 3, each have a pair of oppositely extending legs or lever arms 25 secured thereto. The free end of each lever arm is provided with a roller 26 adapted to roll along a track 27 on the under side of the table. The table platform rests upon the rollers 26 and is supported entirely by the two pairs of legs or lever arms 25. Segment gear 28 secured to shaft 23 meshes with segment gear 29 secured to shaft 24. A hand lever 30 is secured to one end of shaft 23. It is seen that by turning the hand lever both shafts will be rotated, thus manually raising or lowering the table supporting the sheet pile. The mechanism for automatically raising the table platform will be described hereinafter. A vertical post 31 on each side of the table platform guides the same in its vertical movement. Each post is secured to lugs 32 projecting from the side frame and extends through an aperture in the table platform.

A vertical wall member 33 forms an abutment for the sheet pile at one end of the table. A slidable abutment plate 34 at the other end of the table is provided, which may be moved into abutting relation with the other end of the sheet pile and locked in abutting position by means of a suitable latch 35. Sheets of various lengths can thus be accommodated.

Successive sheets are fed from the sheet pile by a reciprocating feed-shoe. The feed-shoe, comprising generally a sheet gripper element 36 and a supporting frame 37 therefor, is supported on a framework extending horizontally over the sheet pile. A pair of channel shaped supports or frame members 38, one positioned at each side of the table, extend approximately the full length thereof. Each channel support is carried by lever arms 39 and 40 pivotally secured thereto. Lever arms 39, one pivoted to each of the channel members, are secured to a shaft 41 journaled in the side frames 2 and 3. Lever arms 40, one pivoted to each of the channel members, are secured to shaft 42 journaled in the side frames 2 and 3. By rotating either one of these shafts it is now seen that the channel supports 44 will be given a raising and lowering movement in reference to the sheet pile, but will nevertheless always remain parallel thereto.

Each channel support carries a bar member or arm 43 provided with rollers adapted to roll within the channel support. A pair of elongated slots 44 are cut in each of the channel supports. Each bar member 43 carries a pair of headed studs 45, each of which extends through one of the slots of the associated channel support, thus slidably holding the bar member in position. Each bar member has a rack bar 46 secured thereto to which the feed-shoe can be adjustably secured. The bar members are given a reciprocating movement along the channel members by the to and fro rotation of a shaft 47 journaled in the side frames 2 and 3. This is effected by a pair of lever arms 48 secured to the shaft and connected to their respective bar members by means of a link 49. The feed-shoe may be locked in various positions along the bar member, and thus carried along therewith during the reciprocating movement. The feed-shoe is raised and lowered into and out of contact with the sheet pile by the raising and lowering movement of the channel supports.

A pair of coil springs 50, one secured to each of the channel members and one of the side frames, normally pull the channel members downwardly to carry the feed-shoe into contact with the top sheet of the sheet pile. The channel members are raised against the action of the springs by mechanism connected to a moving part of the machine. As shown in Figure 2, a cam member 51 is secured to shaft 11 and rotates therewith. A rider arm 52 secured to shaft 42 carries a roller 53 on the free end thereof, adapted to ride on the cam periphery of the cam member. Shaft 11 and cam member 51 make one revolution during one revolution of the duplicating drum. Rotation of the cam member raises the channel supports 38 and feed-shoe against the action of springs 50. The cam member is so shaped that the channel supports are held in maximum raised and maximum lowered position for an interval during each rotation of the cam. As is evident, the roller 53 is held in resilient contact with the cam periphery of the cam member 51 by the action of springs 50. Elasticity of operation is thus obtained and rattling of the parts eliminated.

Bar members 43 are also reciprocated by mechanism attached to a moving part of the machine. A second cam member 54 is secured to rotating shaft 11, and reciprocates a rider arm 55 associated therewith. As shown more clearly in Figures 6 and 7, the rider arm has an elongated aperture 56 in one end thereof, through which shaft 11 extends. A roller 57 is secured to the side of the rider arm and so arranged as to ride over the cam periphery of the cam member. A heavy coil spring 58, secured to the free end of the rider arm and to the side frame of the machine, holds the roller in constant contact with the cam periphery of the cam member. A lever arm 59 secured to shaft 47 is pivotally connected to the rider arm. Lever arms 48 connected to the bar members 43 are also secured to shaft 47, as heretofore explained. It is now seen that rotation of the cam member in one direction moves the bar members and feed-shoe rearwardly. The cam member is so shaped that the bar members are held in maximum rearward and maximum forward position for an interval during each rotation of the cam member. Coil spring 58 tends to draw the bar members forwardly. Thus by the coaction of rotating cam member 54 and coil spring 58 the bar members and feed-shoe are given a to and fro reciprocating movement. It is also seen that cam member 51 connected to the ascending and descending channel supports, and cam member 54 connected to the reciprocating bar members are secured to the same rotating shaft 11. The cam members are of such shape and so positioned in relation to each other as to attain the proper sequence of movements to move the feed-shoe generally along a predetermined fixed path.

During the feeding of the top sheet from the sheet pile, it is essential that the remaining sheets be held against movement or disturbance. To this end I provide a clamping mechanism which is movable off from the sheet pile to permit the withdrawal of the top sheet from out of its influence but movable into clamping engagement with the remaining sheets as the top sheet is moved forwardly off the sheet pile. Referring more particularly to Figures 3, 4 and 8, I provide a plurality of bar members 60 (four being shown in Figure 8, although I do not limit myself to this number), each having a pair of slots 61. A headed stud element 62, secured to the stop plate 33, extends through each slot, thus slidably retaining the bar members on the stop plate and permitting vertical movement of each in relation to the sheet pile. Each bar member is provided with a laterally projecting lip portion 63 adapted to overhang the forward edge of the sheet pile and rest upon the same, as clearly shown in Figures 5 and 6. A downward pull is exerted on each bar member by a coil spring 64 secured at one end to a pin 65 projecting from the bar member and at its other end to stud element 62, so that the lip portion thereof normally rests upon the sheet pile with resilient pressure.

Means are provided, synchronized with the movement of the feed-shoe, for raising lip portions 63 off the sheet pile. A cam member 66 is secured to shaft 11 and rotates therewith. A rider lever 67 secured to shaft 68 carries a roller 69 at its free end which is adapted to ride on the cam periphery of the cam member. A pair of lever arms 70, secured to shaft 68, carry a rod 71 secured to their free ends. Each bar member

60 is provided with a laterally extending foot portion 72 under which rod 71 extends. Cam member 66 is so shaped as to cause lever arms 70 to be swung upwardly to raise the bar members and move the lip portions 63 thereof off the sheet pile once during each rotation of the cam member. Roller 69 is held in resilient contact with the cam periphery of the cam member by the action of spring element 73 secured at one end to side frame 3 and at its other end to lever arm 74 secured to shaft 68. Cam member 66 secured to shaft 11 makes one rotation during one rotation of the stencil duplicating drum. Cam member 66 is so shaped as to raise the lip elements 63 off the sheet pile as the feed-shoe is being lowered into contact position with the top sheet. The lip elements remain in raised position during the sheet retracting operation. The lip elements 63 are then returned to clamping engagement with the remaining sheets of the sheet pile by the action of the springs 64. The front edge of the top sheet slides over the lip elements as the sheet is moved forward by the feed-shoe. Thus by the coaction of rotating cam 66 and coil springs 64 each bar member is given a vertical reciprocating movement as each sheet is fed, alternately raising the lip portions 63 off from and into clamping engagement with the sheet pile.

The automatic means for raising the table will now be described. A long lever arm 75, as shown in Figure 2, provided with a ratchet segment 76 on the end thereof, is secured to the table raising shaft 23. A pawl member 77, having a reciprocating movement, is adapted to engage the ratchet segment to move the same downwardly to raise the table. An arm 78, pivoted at one end to a lug 79 secured to the base of the machine, is provided with a slot 80 at its other end. A stud element 81 adjustably secured in a slot 82 in rider arm 52 extends through the slot in arm 78. Pawl member 77 is pivoted at its lower end to the midsection of arm 78. The pawl member is normally held out of contact with the ratchet segment by the action of spring element 83, for reasons which will hereafter appear. It is seen that as rider arm 52 is reciprocated by the rotation of cam member 51, arm 78 supported at one end by the arm 52, is also given a slight reciprocating movement, which in turn reciprocates the pawl. By manipulating stud element 81, the reciprocating distance traveled by the pawl arm can be adjusted and fixed, and thus vary the distance the table platform is raised by one stroke of the pawl.

It is desirable to lessen the effort required to raise the table as much as possible. With this end in view, I provide a heavy coil spring 84 secured at one end to side frame 3, and at its other end to lever arm 85 secured to table raising shaft 23. The action of coil spring 84, as is evident, tends to hold the table raised, and consequently little effort need be exerted by pawl member 77 to raise the table.

Since the raising and lowering and the to and fro reciprocating movement of the feed-shoe is fixed and uniform, it is essential for effective feeding that the top of the sheet pile always remain at the same uniform level during the feeding operation, so that each successive sheet will be gripped by the feed-shoe with the same equal regulated pressure. No automatic raising of the table platform normally takes place during the feeding operation, since the pawl member, although reciprocating, is held out of engagement with the platform raising ratchet segment 76 by the spring element 83. I have provided mechanism for throwing the pawl member into engagement with the ratchet segment when the top of the sheet pile falls below a predetermined level, and for holding the pawl in ratchet engagement until the predetermined level is restored. As shown in Figures 5 and 8, one of the bar members 60 is provided with a laterally projecting arm 86 on which the end of lever 87 secured to shaft 88 is adapted to rest. Shaft 88 may be suitably journaled in the side frame 3.

A rider arm 89 journaled on shaft 88 carries a roller 90 adapted to engage a cam element 91 secured to the pawl member 77. Rider arm 89 is supported in laterally extended position by a carrier arm 92 secured to shaft 88. The outer end of the carrier arm, as shown in Figure 2, is provided with a pair of ears 93 each carrying an adjusting screw 94. The rider arm extends between the ears 93 and is itself provided with a lug 95 with which the adjusting screws cooperate to vary the contact relationship between roller 90 and the cam element 91 of the pawl member. A coil spring 96, one end of which is secured to the carrier arm and the other end to the side frame 3, tends to force the roller on the rider arm 89 against the cam element 91 to swing the pawl member into engagement with the ratchet segment. This is prevented by lever 87 which rests on the laterally projecting portion 86 of the bar member 60. Only when the bar member is lowered by the withdrawal of a predetermined number of sheets from the sheet pile will lever arm 87 swing downwardly sufficiently to permit the rider arm 89 to actively engage the cam element so as to swing the pawl member into engagement with the ratchet segment. One or two reciprocating engagements of the pawl member with the ratchet segment is generally sufficient to raise the table platform so that the sheet pile is again at the predetermined proper feeding level. Lever arm 87 is then raised by the bar member 60 against the action of coil spring 96, also raising the rider arm 89 slightly so that spring element 83 can throw the pawl member out of operative engagement with the ratchet segment. The position of the roller 90 in relation to the cam element 91 can be delicately adjusted by screws 94 so that the removal of a very few sheets from the sheet pile will operate to cause the rider arm 89 to throw the pawl member 77 into operative engagement with the ratchet segment to raise the table. The teeth of ratchet segment 76 are preferably small and fine, so that with each reciprocating engagement of the pawl member 77 therewith, the table may be raised almost infinitesimal amounts. The top elevation of the sheet pile is thus maintained practically constant during the feeding of successive sheets therefrom. By means of this arrangement, the pressure grip of the feed-shoe on the successive sheets being fed is invariably the same.

Means are provided for releasably retaining the table at the elevation to which it has been manually or automatically raised. A pawl member 97 adapted to engage the teeth of ratchet segment 76, as shown in Figures 2, 6 and 7, is journaled on a stud screw 98 fixed to the side plate 3. Pawl member 97 is normally held in engagement with the teeth of the ratchet segment by the action of spring element 99, thus preventing the ratchet segment from swinging upwardly with resultant lowering of the table. It is now seen that pawl members 77 and 97 operate conjunctively to raise

the table and retain the table in the position to which it is raised.

Means are provided for moving pawl member 97 out of engagement with the ratchet segment to permit the table platform to drop or lower from its own weight. As shown in Figures 1 and 2, a thumb lever 100 is secured to one end of a shaft 101 journaled in the side plates 2 and 3. A small crank lever 102, secured to the other end of shaft 101, is operatively connected to pawl member 97 by connecting bar 103. Downward pressure on thumb lever 100 against the action of spring element 99 moves pawl member 97 out of engagement with the ratchet segment.

It may happen, for example, that when it is desired to lower the table platform, the top of the sheet pile is below the predetermined feeding level. The table raising pawl member 77 would then be in engagement with the teeth of the ratchet segment, preventing any lowering of the table platform. It would then be necessary to also swing pawl member 77 out of engagement with the teeth of the ratchet segment. Accordingly, I have provided the table raising pawl member 77 with a clip element 104, as shown in Figures 6 and 7. Clip element 104 overhangs the end of pawl member 97 and is adapted to be engaged thereby (as shown in Figure 7) when the pawl member is swung back sufficiently, thus carrying table raising pawl member with it and out of engagement with the ratchet segment. It is now seen that by simply manipulating thumb lever 100 both pawl members 77 and 97 can be swung out of engagement with the ratchet segment.

Means are provided for releasably holding retaining pawl member 97 out of engagement with the ratchet segment. I accordingly provide a latch member 105, shown in Figures 1 and 9, journaled to a stud screw 106 projecting from the side frame 2. The free end of latch member 105 is notched so as to provide an abutment portion 107. Thumb lever 100 is provided with an upwardly extending arm 108. The latch member normally rests on the end of arm 108 and is resiliently retained thereagainst by the action of spring element 109. By referring more particularly to Figure 9, it is seen that when latch 105 is disengaged from arm 108, as shown in full lines, retaining pawl member 97 is spring-pressed into engagement with the ratchet segment. By pressing downwardly on thumb lever 100, pawl member 97 may be swung out of ratchet engagement. Latch 105 will then drop down so that abutment portion 107 prevents the return of the pawl member into ratchet engagement. Further rotation of the thumb lever 100 swings the retaining pawl member 97 into contact with the clip element 104, as shown in dotted lines, Figure 9, moving table raising pawl member 77 with it and out of ratchet engagement. Pins 110 and 111, projecting from side frame 2, limit the movement of the latch member within proper bounds. Pin 112, also projecting from side frame 2, limits the rotation of thumb lever 100. The latch member may be provided with a knob 113 projecting therefrom, by means of which it may be raised. Thus by simply manipulating thumb lever 100, the table can be dropped down at will. The table platform can likewise be raised at will by manipulating hand lever 30. When the machine is in operation, the table is automatically raised by the reciprocating raising pawl 77 thrown into engagement with the table raising ratchet segment 76 when the call is made by the bar member 60 resting on the sheet pile.

When the table has been raised to a predetermined raised position, a roller 114 automatically operates to throw the retaining pawl 97 out of engagement with the ratchet segment, permitting the table to drop to lowermost position. As shown more clearly in Figure 7, the roller 114, carried by the ratchet segment, is adapted to roll against the cam surface of pawl 97 as the ratchet segment is moved downwardly and finally throws the pawl out of ratchet engagement. Arm 108 of thumb lever 100, as heretofore described, is then moved over sufficiently to permit abutment portion 107 of latch 105 to drop into engagement with the end of the arm, locking the pawl in out of ratchet engaging position. The table then drops by reason of its own weight to lowermost position. It is preferable to so position roller 114 in relation to the pawl that the pawl is moved out of ratchet engaging position permitting the table to drop while there are still a few sheets remaining on the table; thus protecting the feed-shoe and other operative parts from injury due to continued raising of the table.

Vertical guide bars 115, one disposed on each side of the sheet pile, retain the sheets in a vertical stack, and guide them to the feed roller 116 of the machine. The guide bars rest on the table platform and move vertically therewith. Each guide bar is slidably supported in a frame member 117 carried by a horizontal bar 118 attached to the side frames 2 and 3 of the machine. The supporting frames 117 may be moved to any position along the bar 118 and clamped thereto by clamping screw 119. By this arrangement, the guide bars may be moved to any position to accommodate therebetween sheets of various widths.

The operation of my pile raising mechanism and associated parts of the stencil duplicating machine will now be described. A stack of sheets is placed upon the table platform. Sliding plate 34 is then moved into abutment against one end of the sheet pile, the other end of the sheet pile abutting against the wall member 33. Guide bars 115 are then moved into abutment against the sides of the sheet pile. All the sheets are now retained in a vertical stack or pile, as shown in Figure 3. Hand lever 30 is then manipulated to raise the platform until the top of the sheet pile is raised to the approximate proper feeding level.

The entire sheet feeding mechanism and stenciling mechanism is driven by the turning of crank arm 5 or a motor (not shown) in place thereof. With the turning of crank arm 5 the table raising pawl 77 is reciprocated by the train of mechanism heretofore described. The stroke or the distance traveled by one reciprocation of the pawl member 77 is preferably slight so that the table is raised a very small amount only at each stroke. Pawl member 77 is pressed forwardly into engagement with the ratchet segment against the action of spring element 83 by rider arm 89 until the top of the sheet pile has been raised sufficiently to lift the bar member 60, carrying projecting element 86, a slight amount, sufficient to move adjustable rider arm 89 out of pressing contact against the pawl member. The pawl member then swings away from the ratchet segment and idles out of operative contact therewith.

When a very few sheets have been fed from the sheet pile the bar member carrying the operative projecting element 86 is lowered sufficiently to move adjustable rider arm 89 into pressing en-

gagement against cam element 91 to swing the reciprocating pawl 77 into operative engagement with the ratchet segment. The table platform is then raised by very gradual degrees until the lip elements have been raised by the sheet stack sufficiently to release the pressure of rider arm against the cam element 91 permitting spring element 83 to throw the pawl member out of ratchet engagement. The table platform is normally retained in raised position by the pawl member 97 and may be dropped or lowered at will by merely manipulating the thumb lever 100 and latch 105, as heretofore described.

While my pile elevating mechanism is especially adapted for use in connection with printing and stencil duplicating machines of the type known commercially as the "mimeograph", it is understood, however, that I do not limit my mechanism to this use alone, and that it may also be used in connection or association with any machine, receiver or device requiring that sheets or other material operated upon be maintained at a constant level. Further, this invention is not restricted to the precise construction which has been described above for the purpose only of illustrating the invention. Accordingly, as many changes could be made in the above construction and various different embodiments of this invention could be made without departing from the scope thereof, it is understood that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

What I claim is:

1. In combination with sheet feeding apparatus of the character described, a table support for a sheet pile, and means for raising the table support as successive sheets are fed from the sheet pile so as to maintain the sheet pile at the proper feeding level, said means including a ratchet segment operatively connected to the table support, a pawl having a reciprocating movement normally out of engagement with said ratchet segment, said pawl having a cam portion, a shaft, an arm fixed to said shaft, a rider element adjustably secured to said arm and adapted to engage said cam portion to move the pawl into operative engagement with the ratchet segment, and means operatively associated with the sheet pile to rotate said shaft when the sheet pile falls below a predetermined feeding level.

2. In combination with sheet feeding apparatus of the character described, a table support for a sheet pile, means for raising the table support as successive sheets are fed from the sheet pile, said means including a ratchet segment operatively connected to the table support, and reciprocating means for engaging said ratchet segment to raise the table support, a pawl member normally in engagement with the ratchet segment to hold the table support in successive raised positions and means on said ratchet segment for throwing the retaining pawl out of engagement therewith when the table support has reached a predetermined maximum level.

3. In sheet feeding apparatus, the combination with a table support for a sheet pile, automatic means for raising said table support including a ratchet segment operatively connected to the table support and reciprocating means adapted to engage said ratchet segment to raise the table support, a retaining pawl normally in engagement with the ratchet segment to hold the table support in successive raised positions, and a roller carried by said ratchet segment adapted to engage a cam surface of said retaining pawl to throw the same out of ratchet engagement when the table support has reached a predetermined maximum level.

4. In an apparatus for feeding successive sheets from a sheet pile, a table support for the sheet pile, means for raising the table support as successive sheets are fed from the sheet pile so as to maintain the sheet pile at the proper feeding level, and vertical guide bars resting on said table, said guide bars being laterally adjustable to accommodate the sheet pile positioned therebetween and to retain the sheets in a vertical stack.

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