

July 10, 1945.

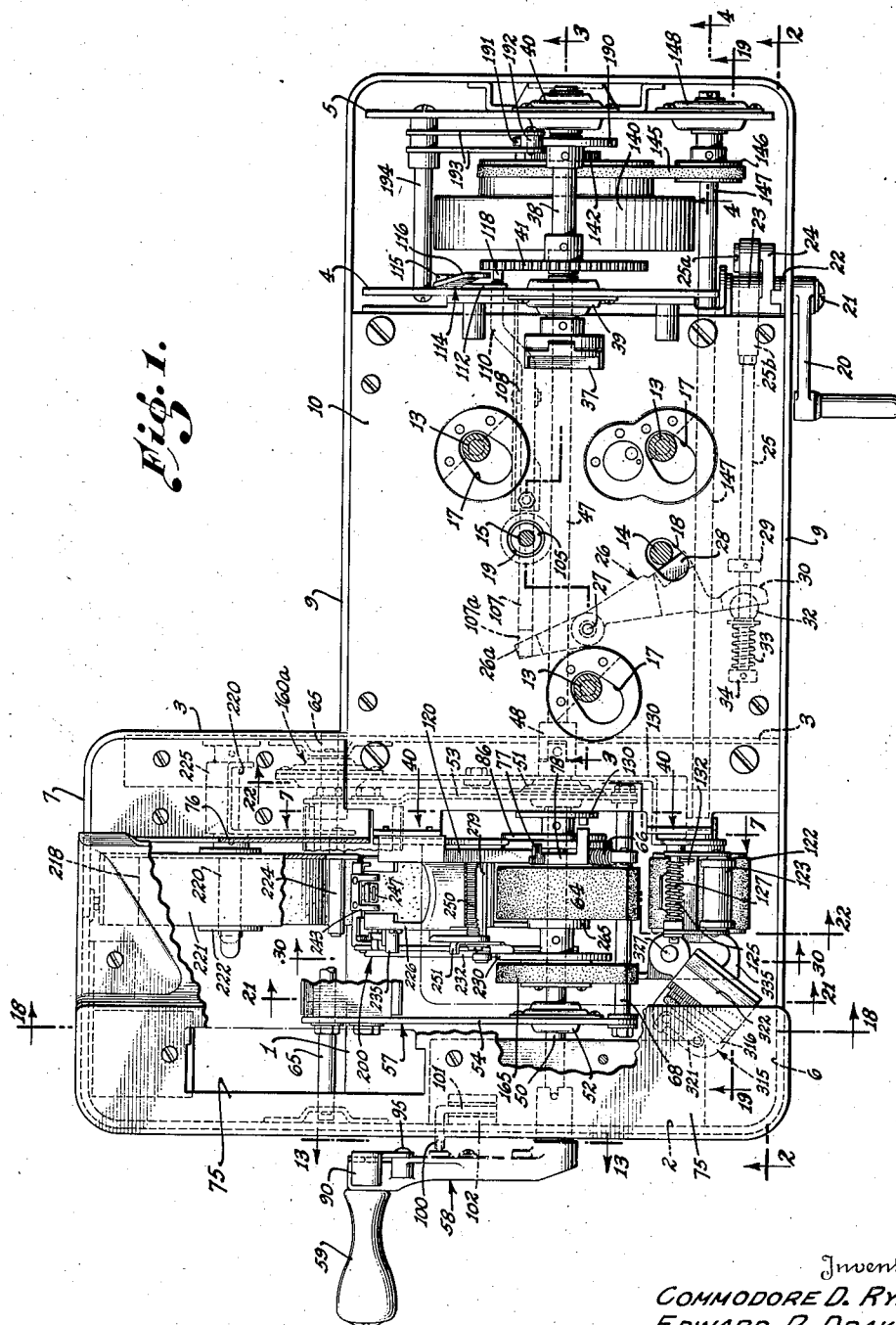
C. D. RYAN ET AL

2,380,331

PRINTING MACHINE

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23 Sheets-Sheet 1



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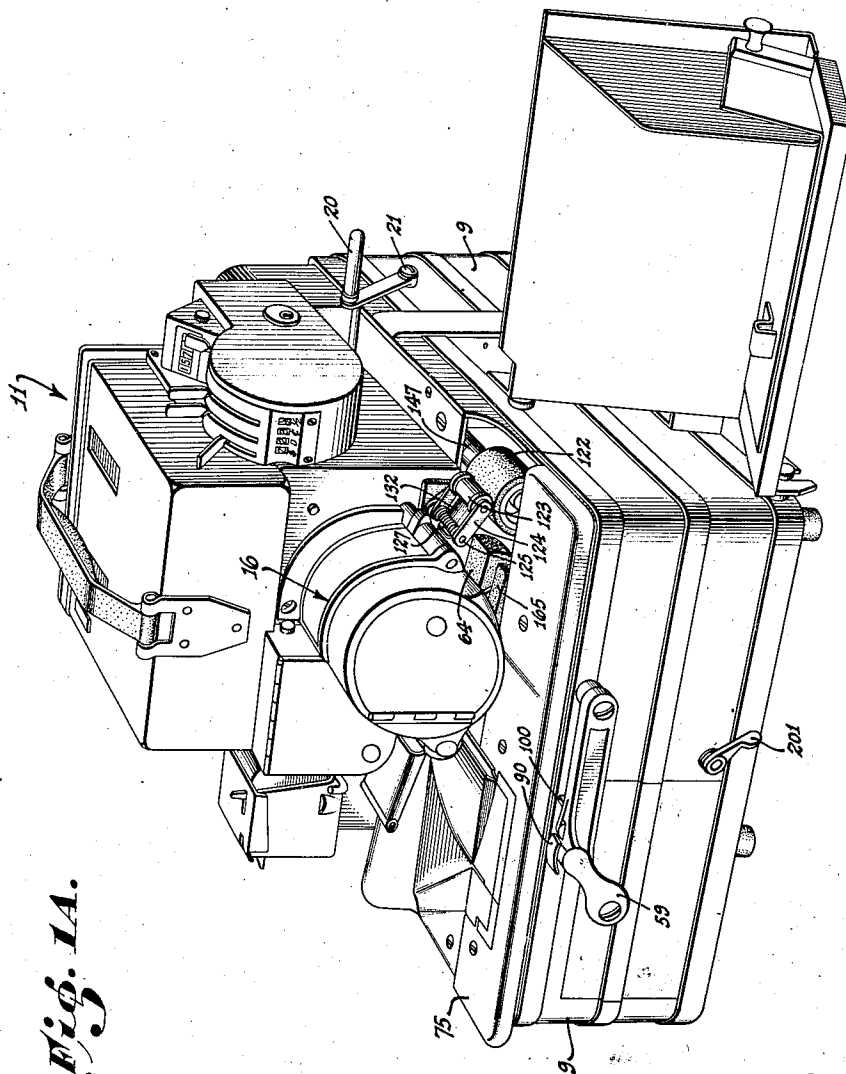


Fig. 1A.

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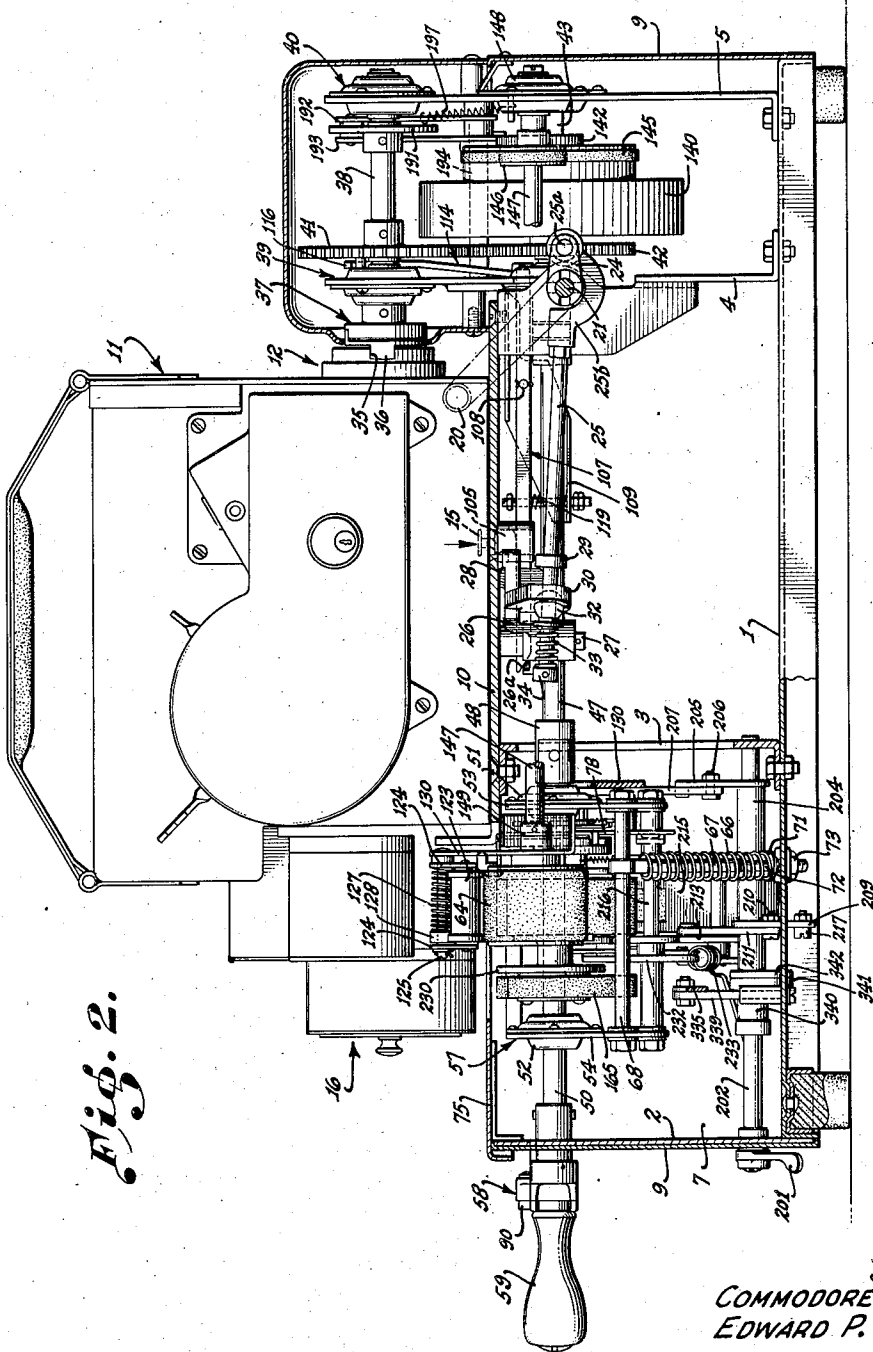
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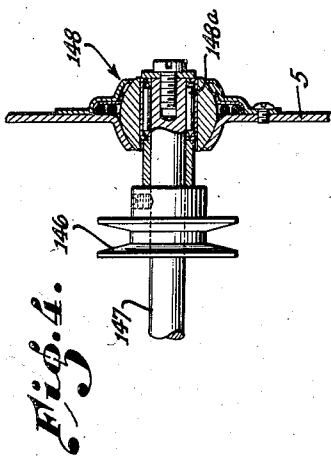
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Fig. 5.

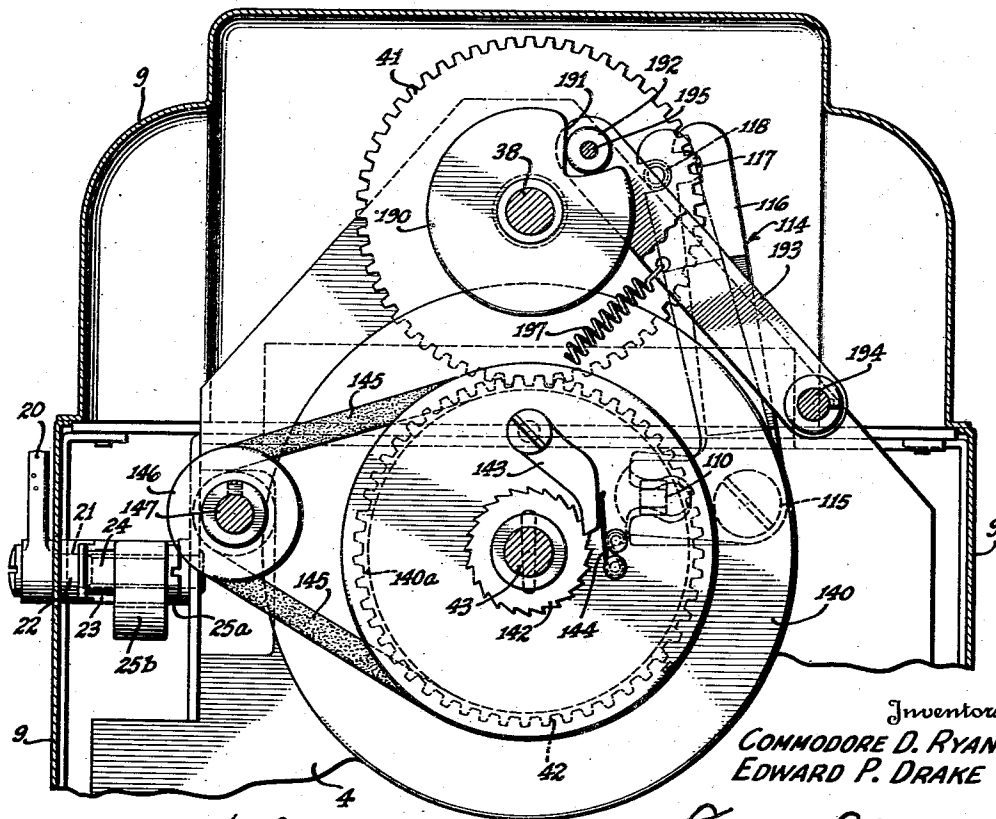
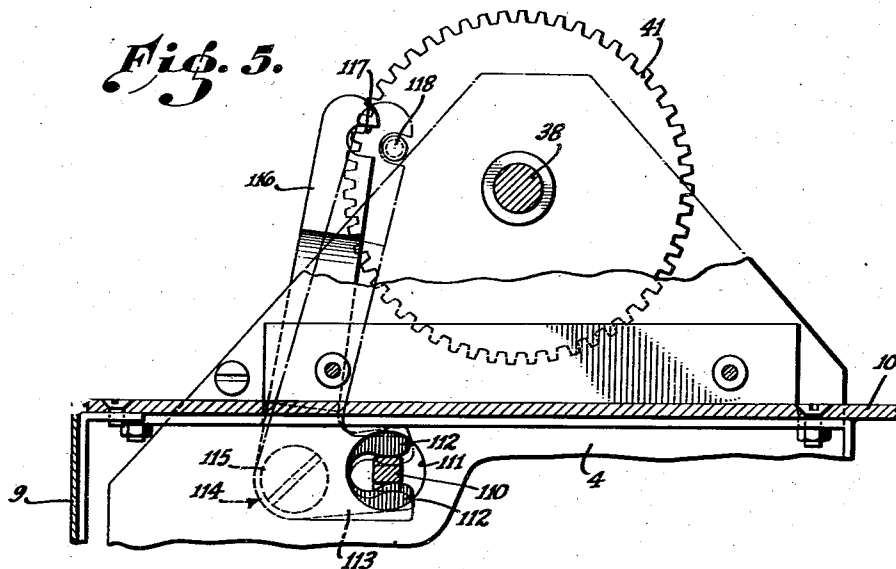


Fig. 6.

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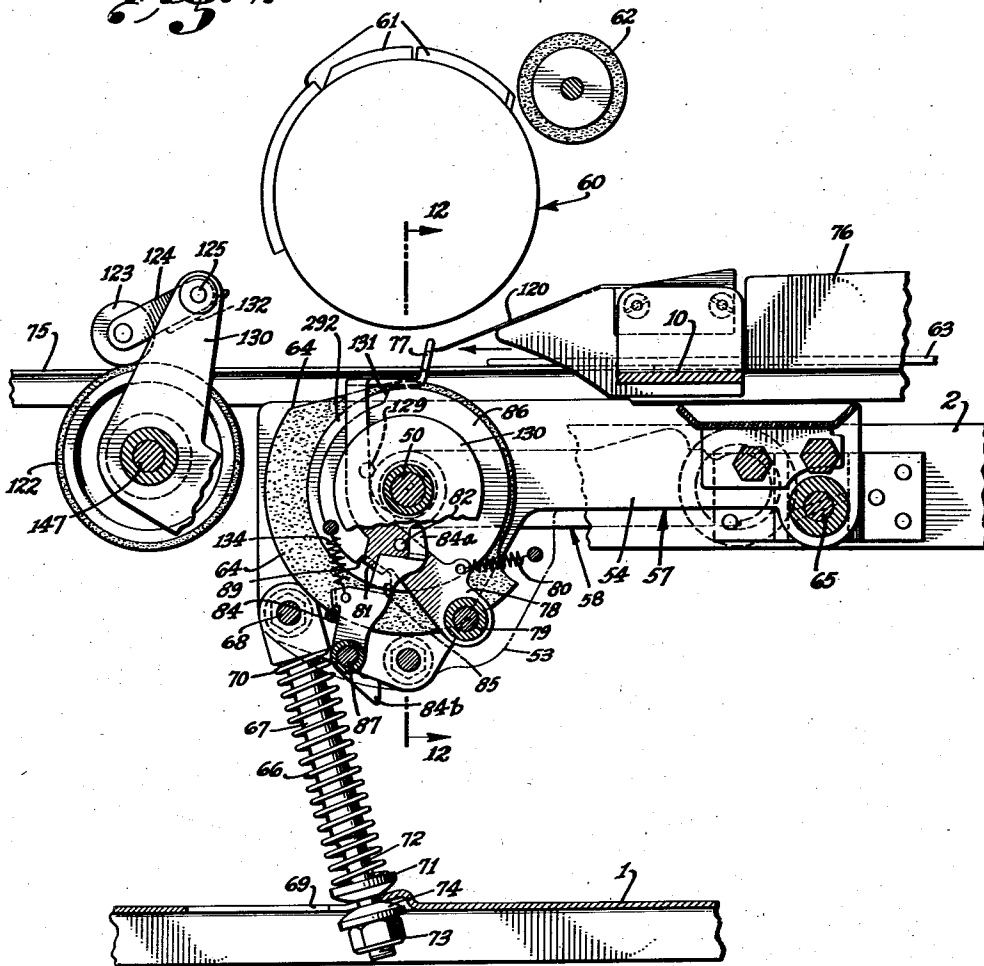
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Fig. 7.



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Fig. 8.

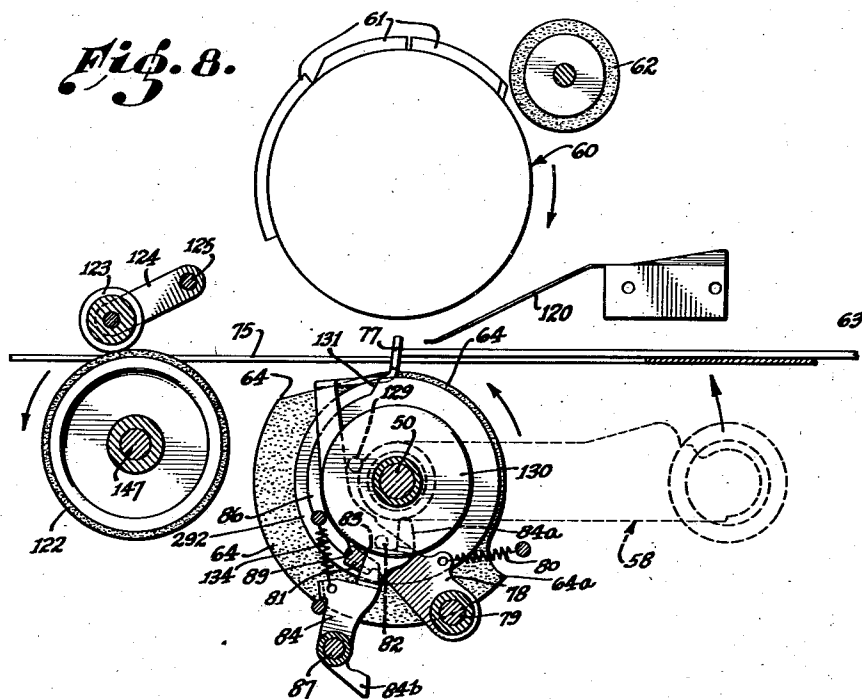
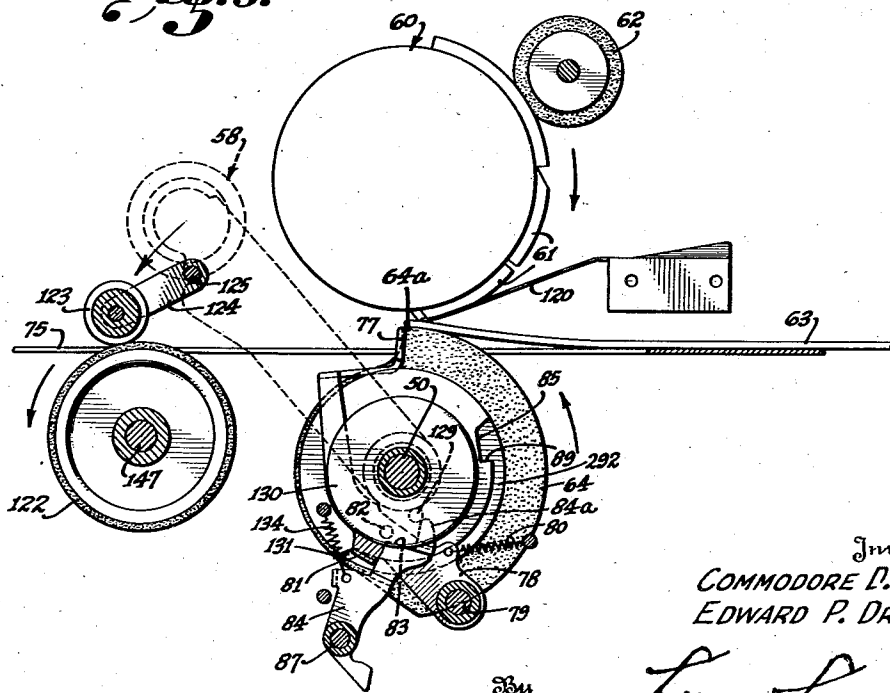


Fig. 9.



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Fig. 10.

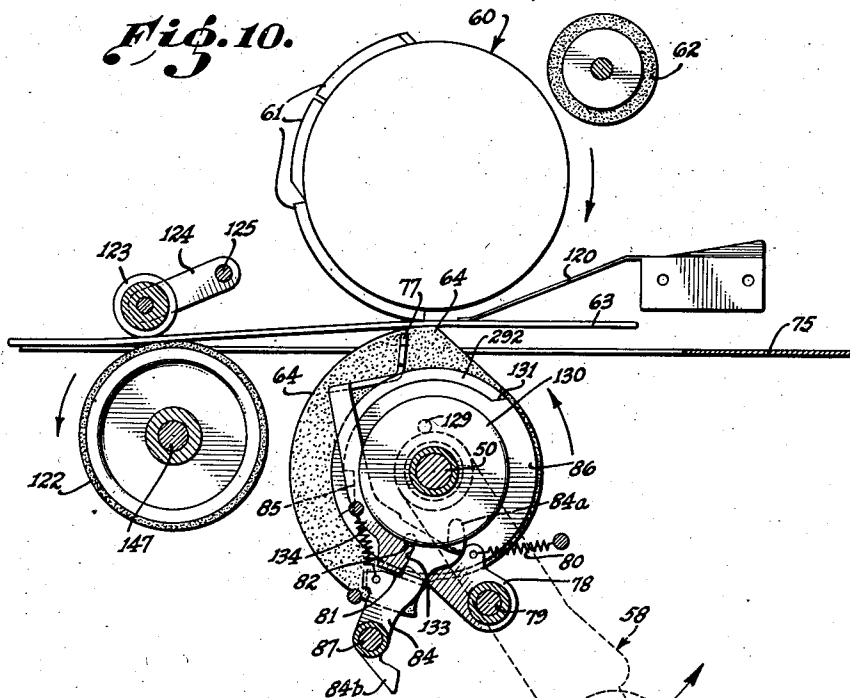
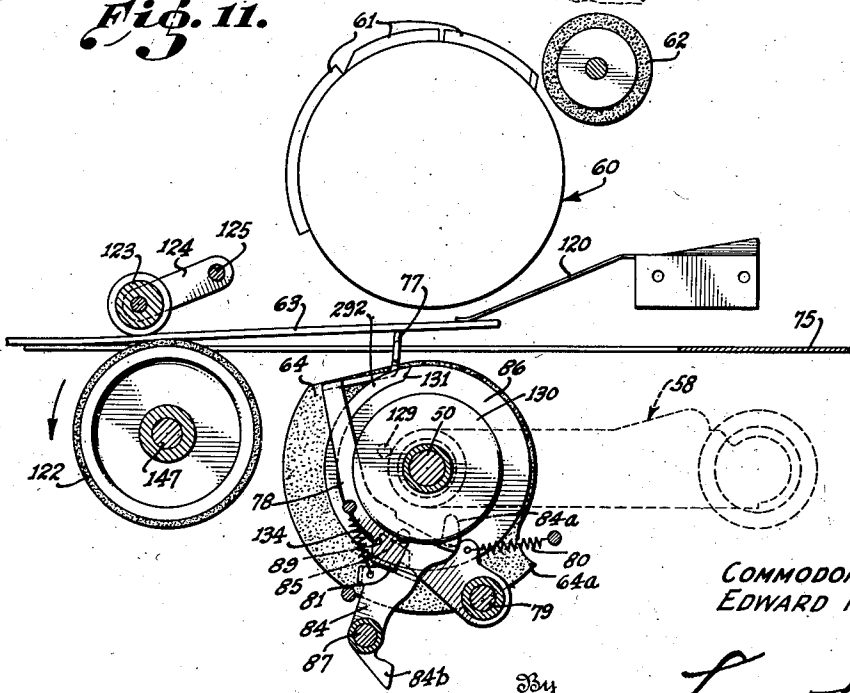


Fig. 11.



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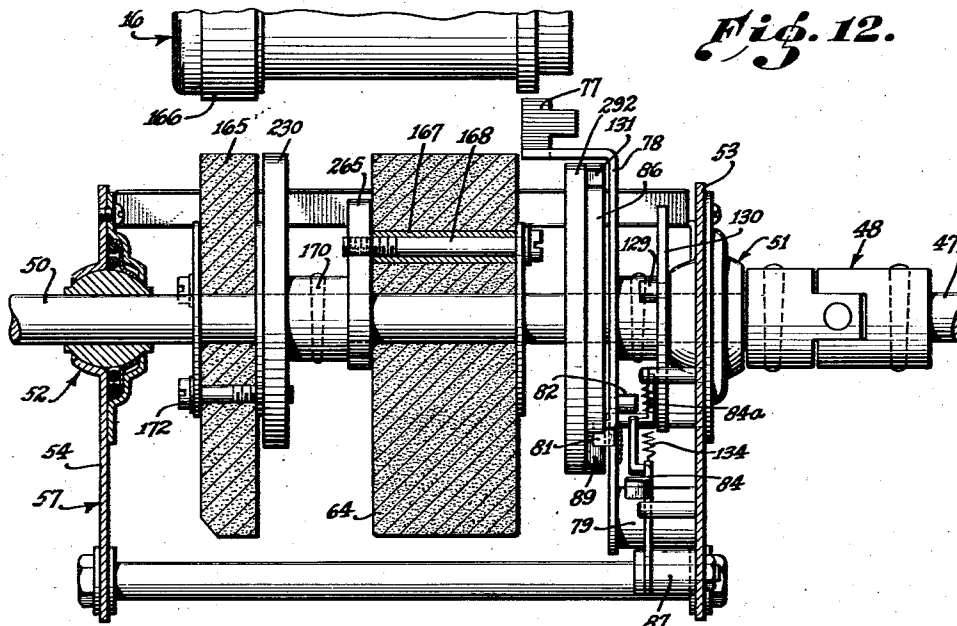


Fig. 12.

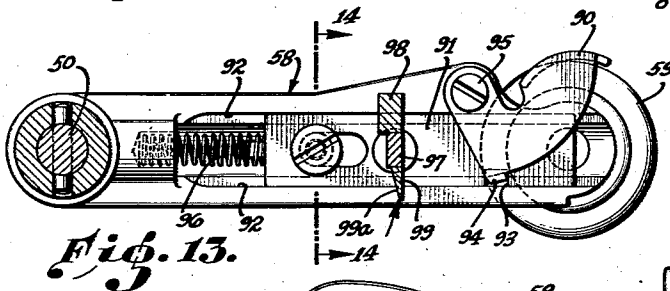


Fig. 13.

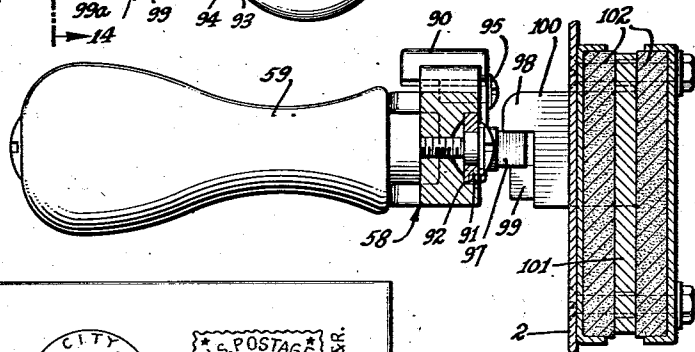


Fig. 14.

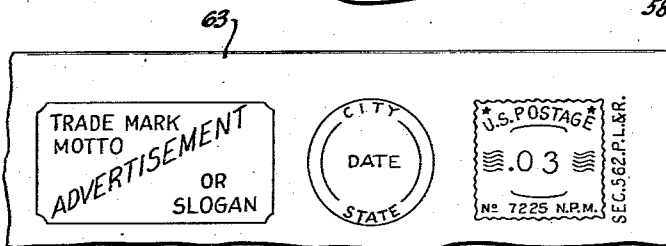


Fig. 15.

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Fig. 16.

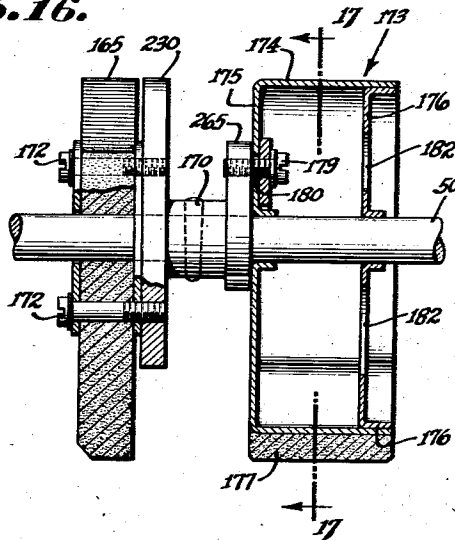
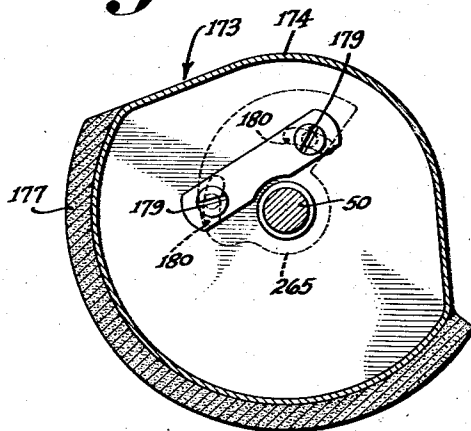


Fig. 17.



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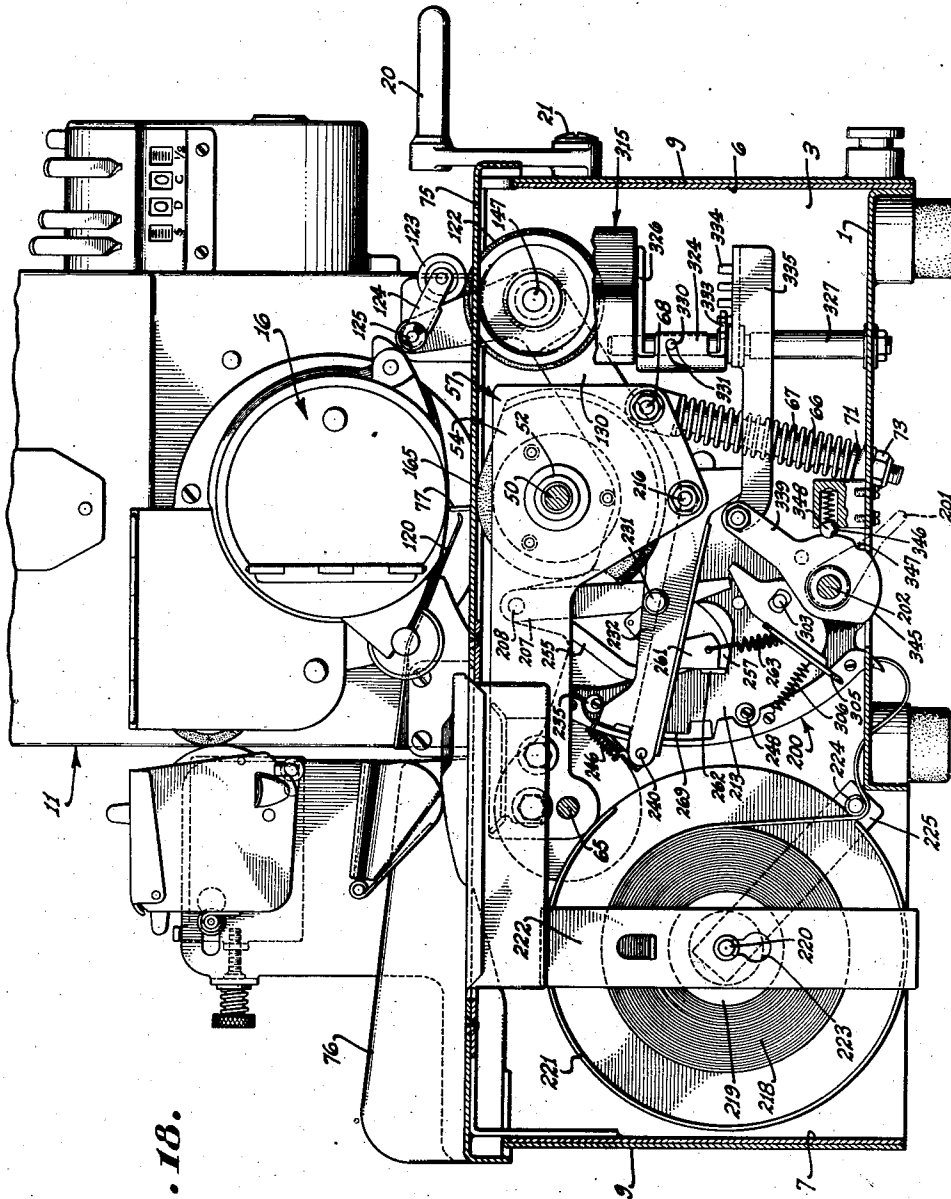


Fig. 18.

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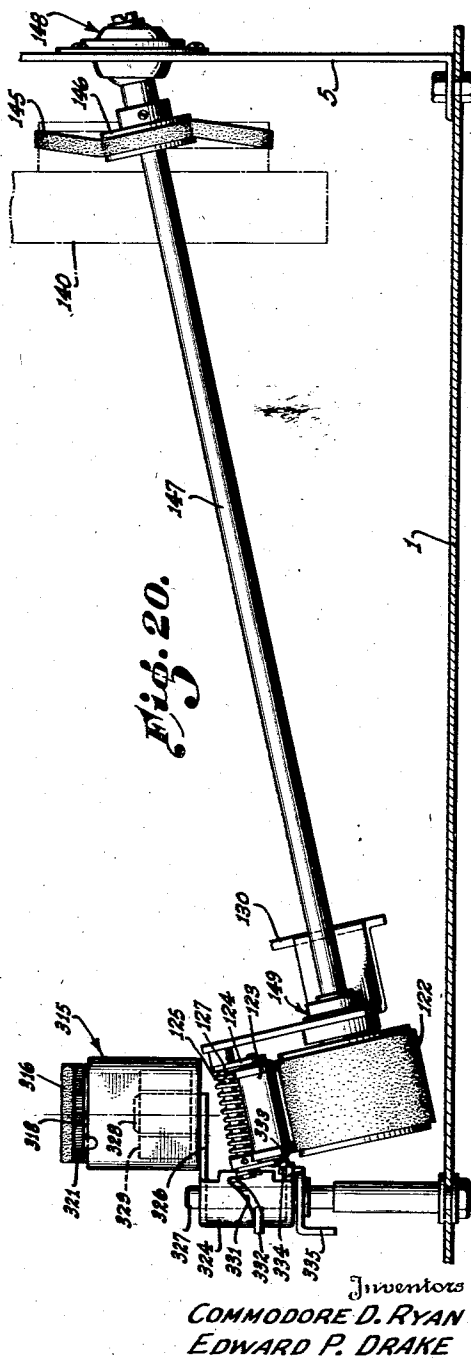
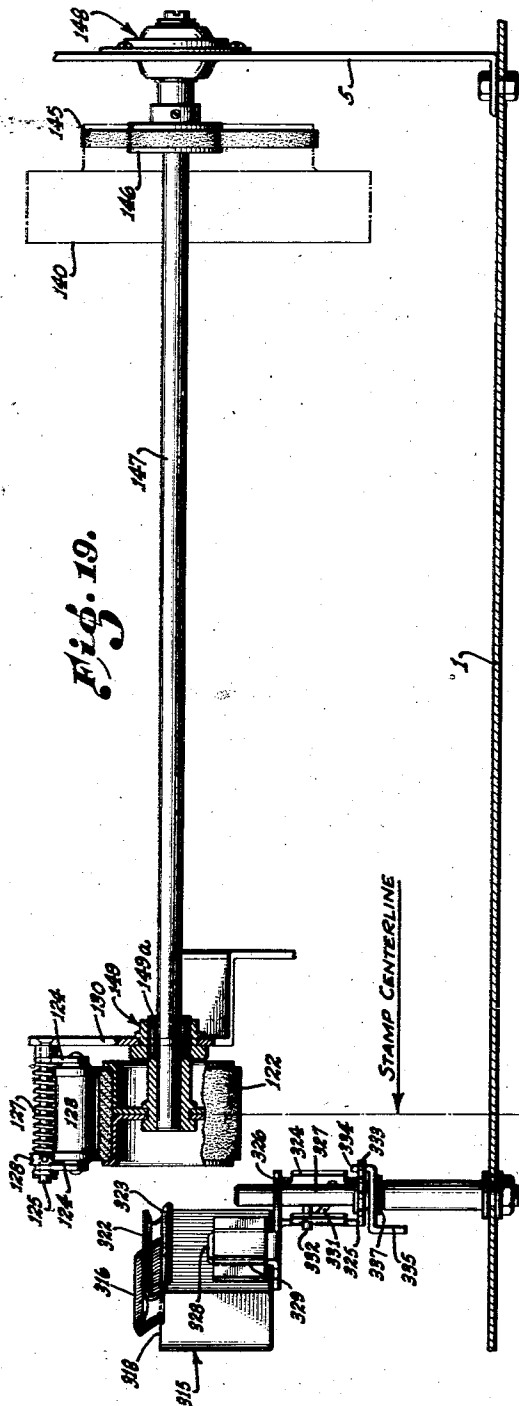
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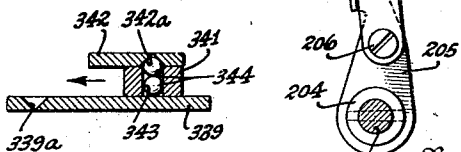
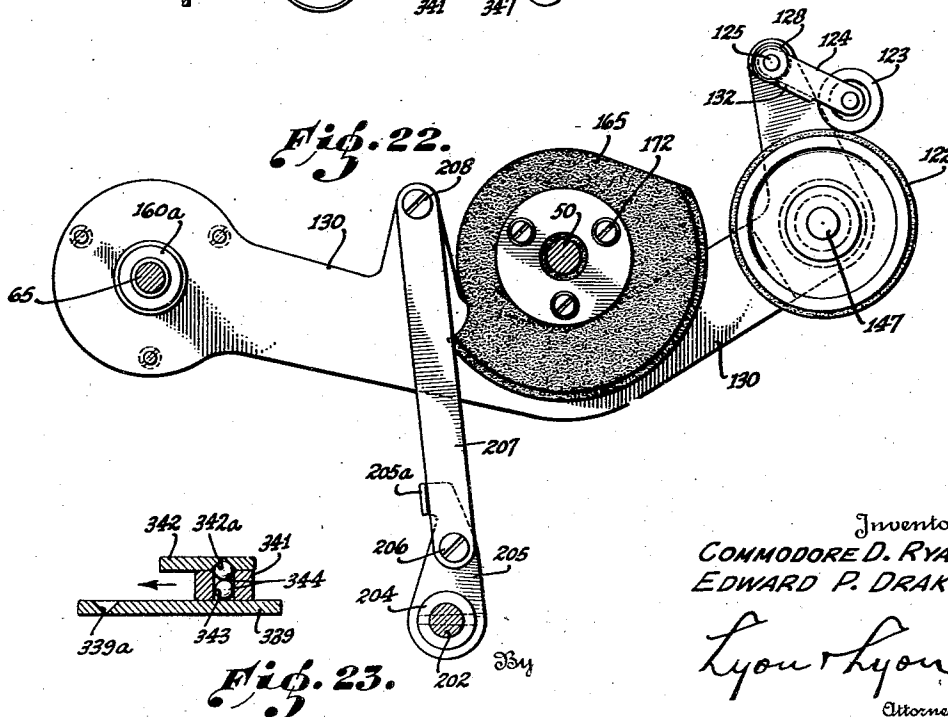
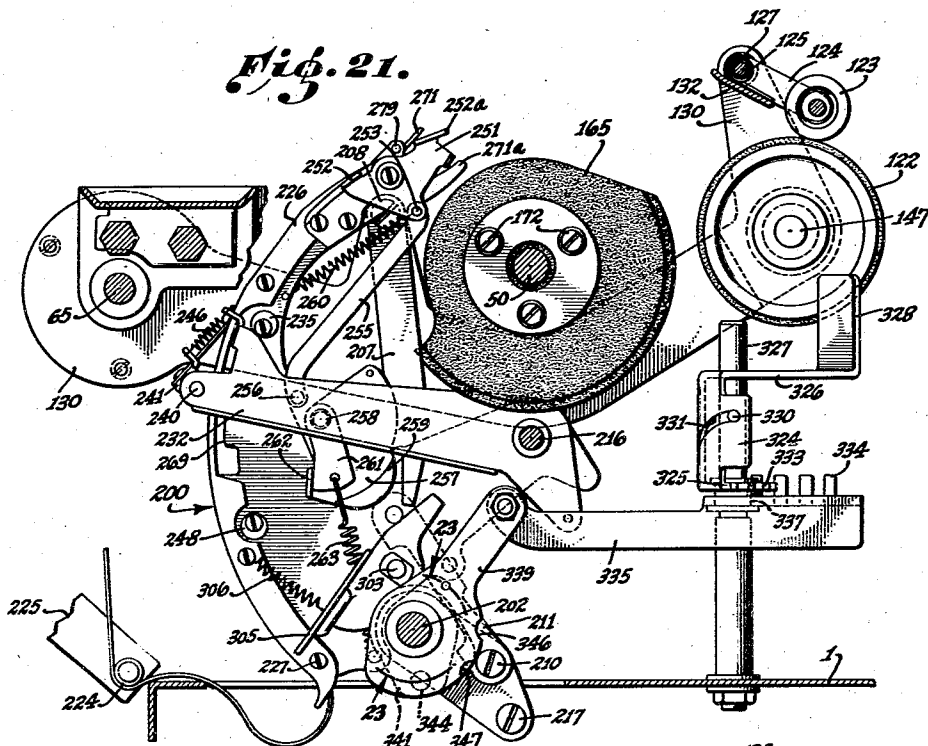
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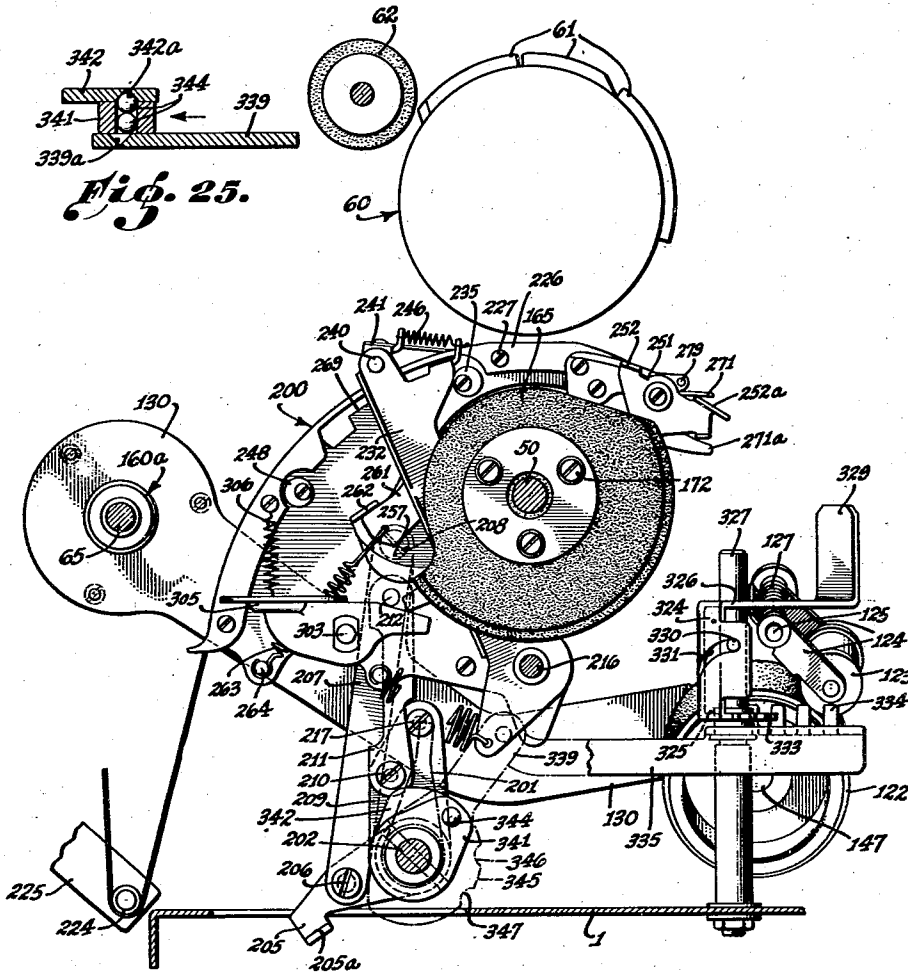
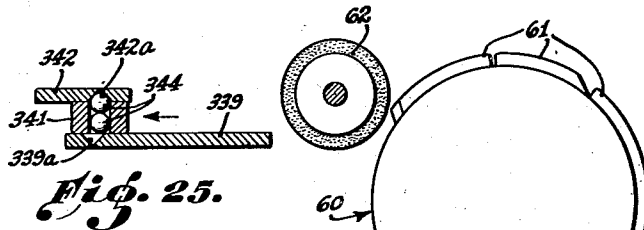
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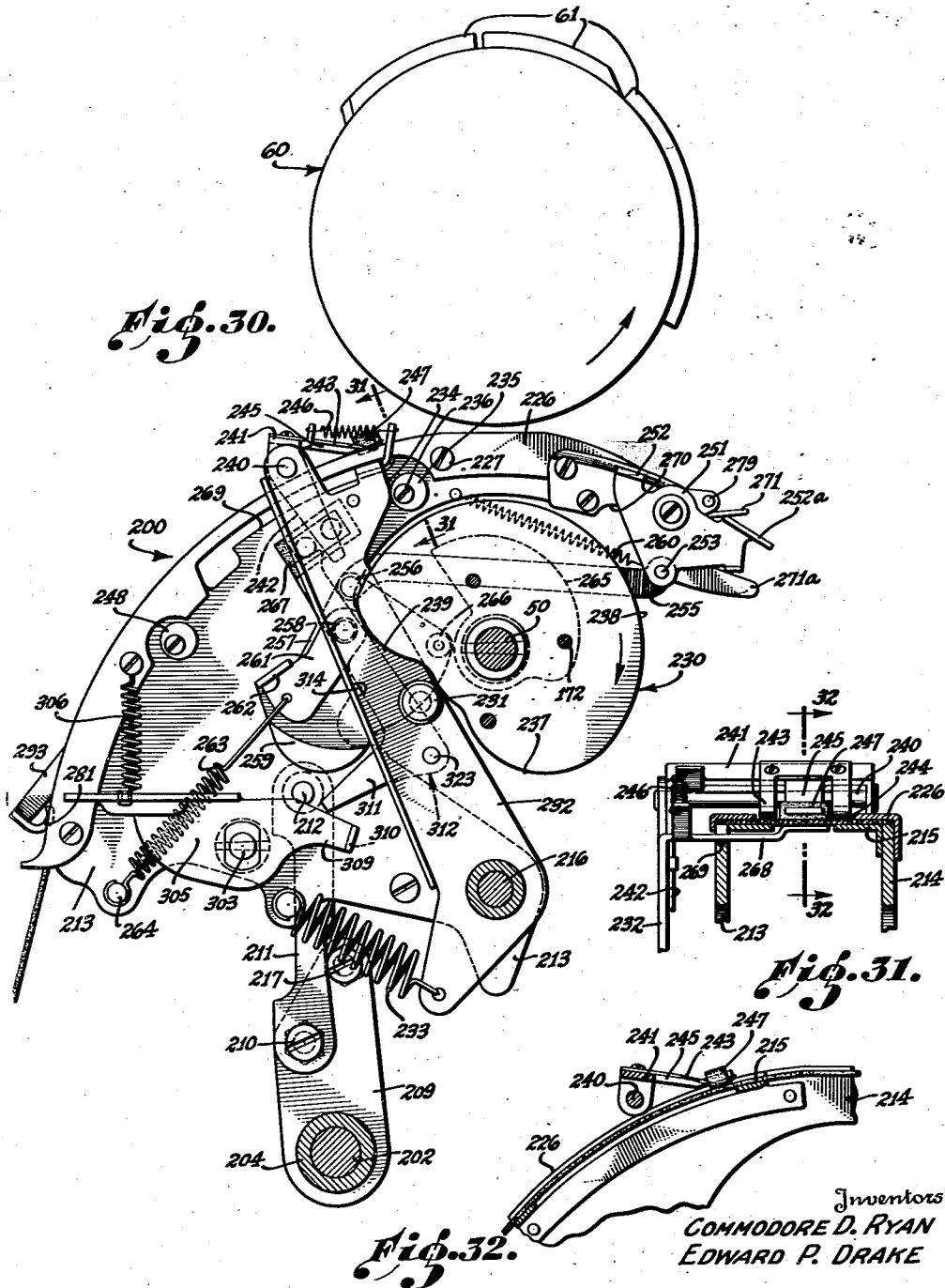
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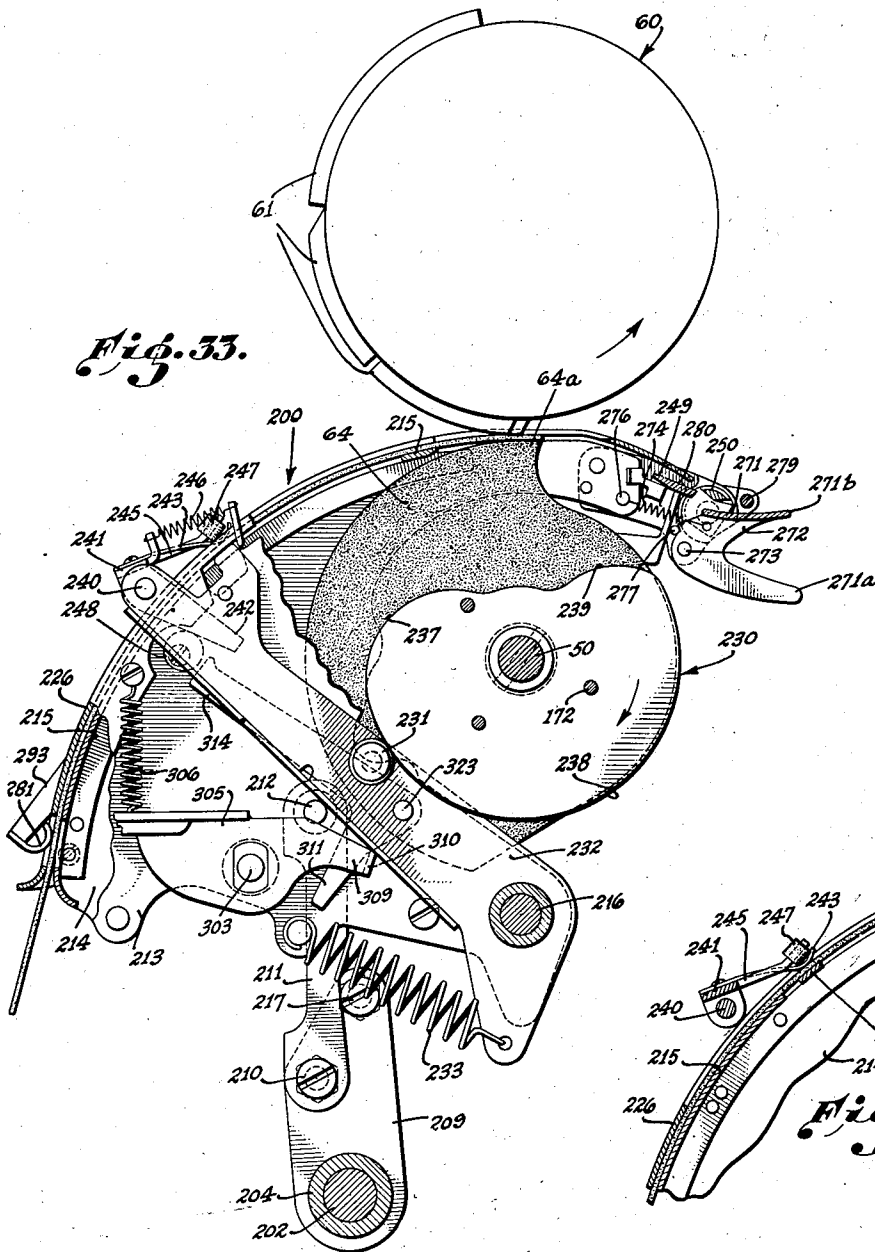


Fig. 54.

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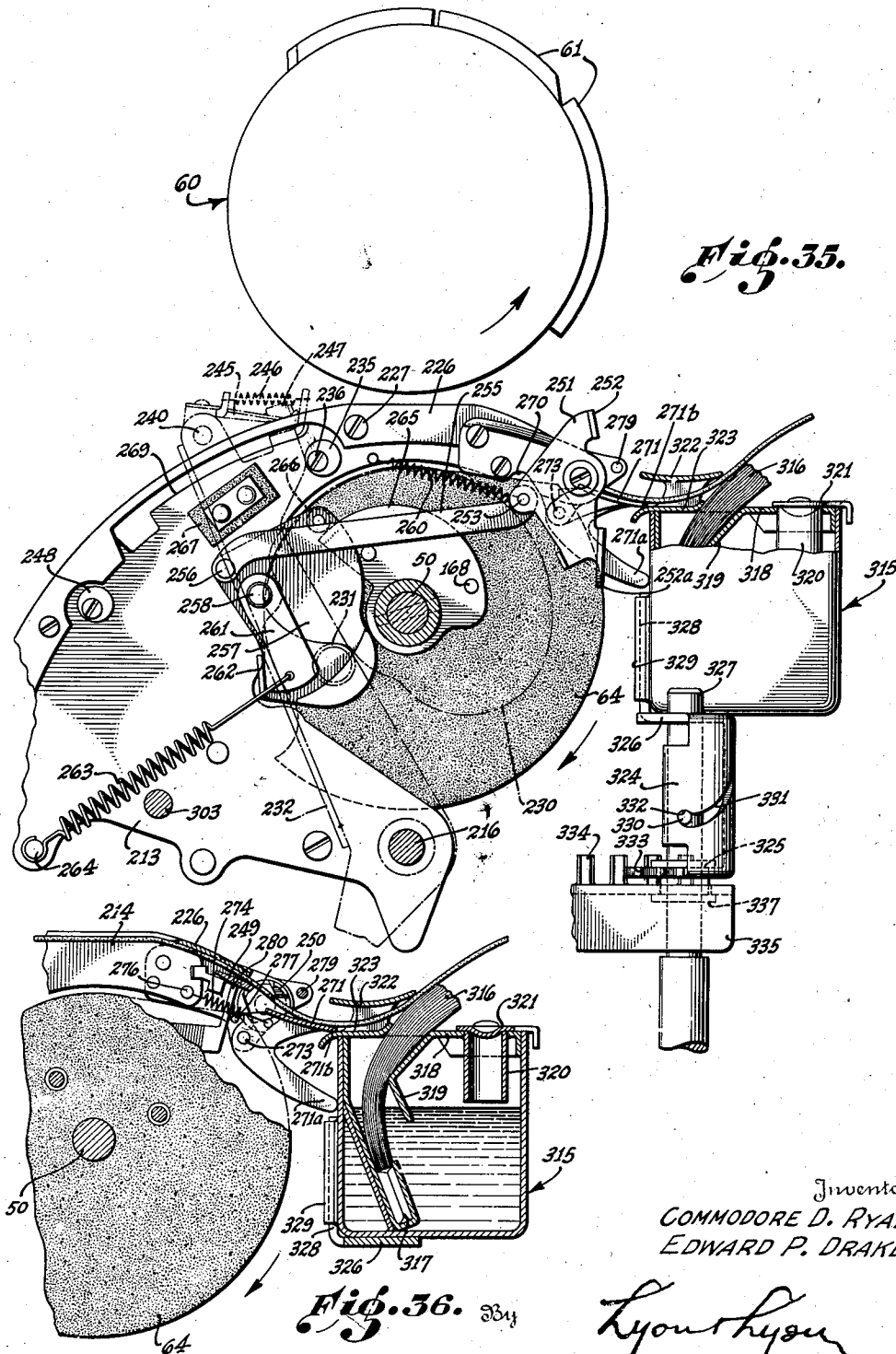
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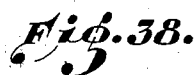
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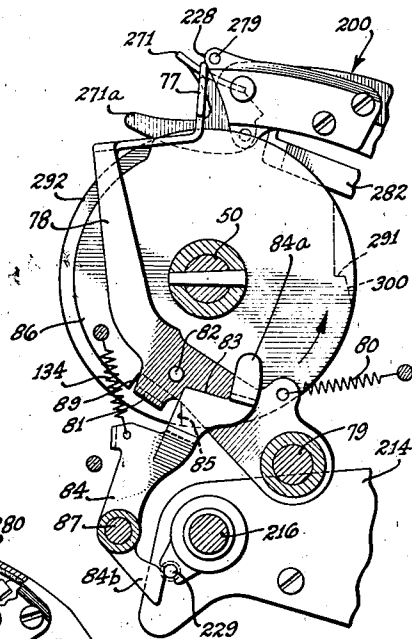
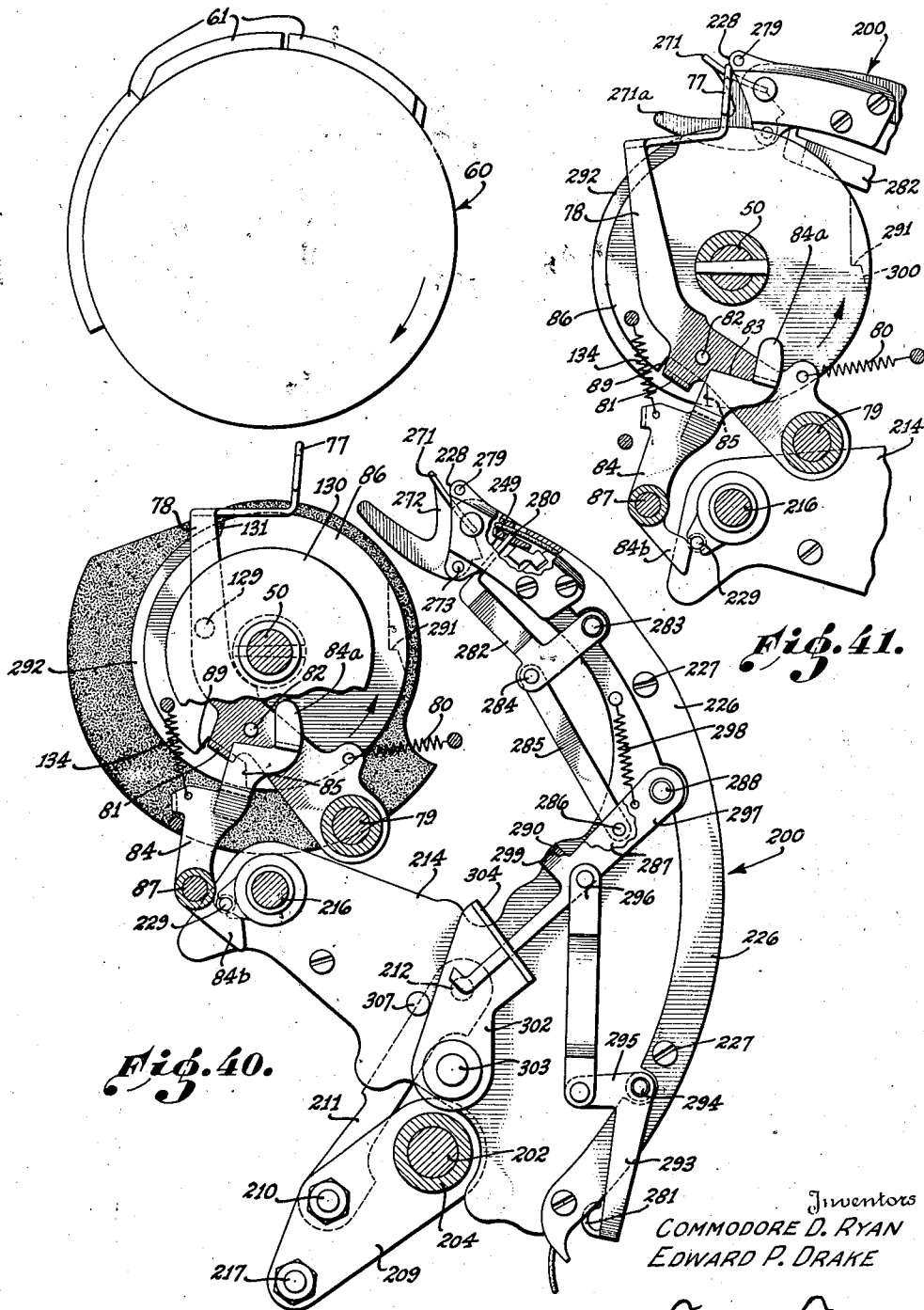
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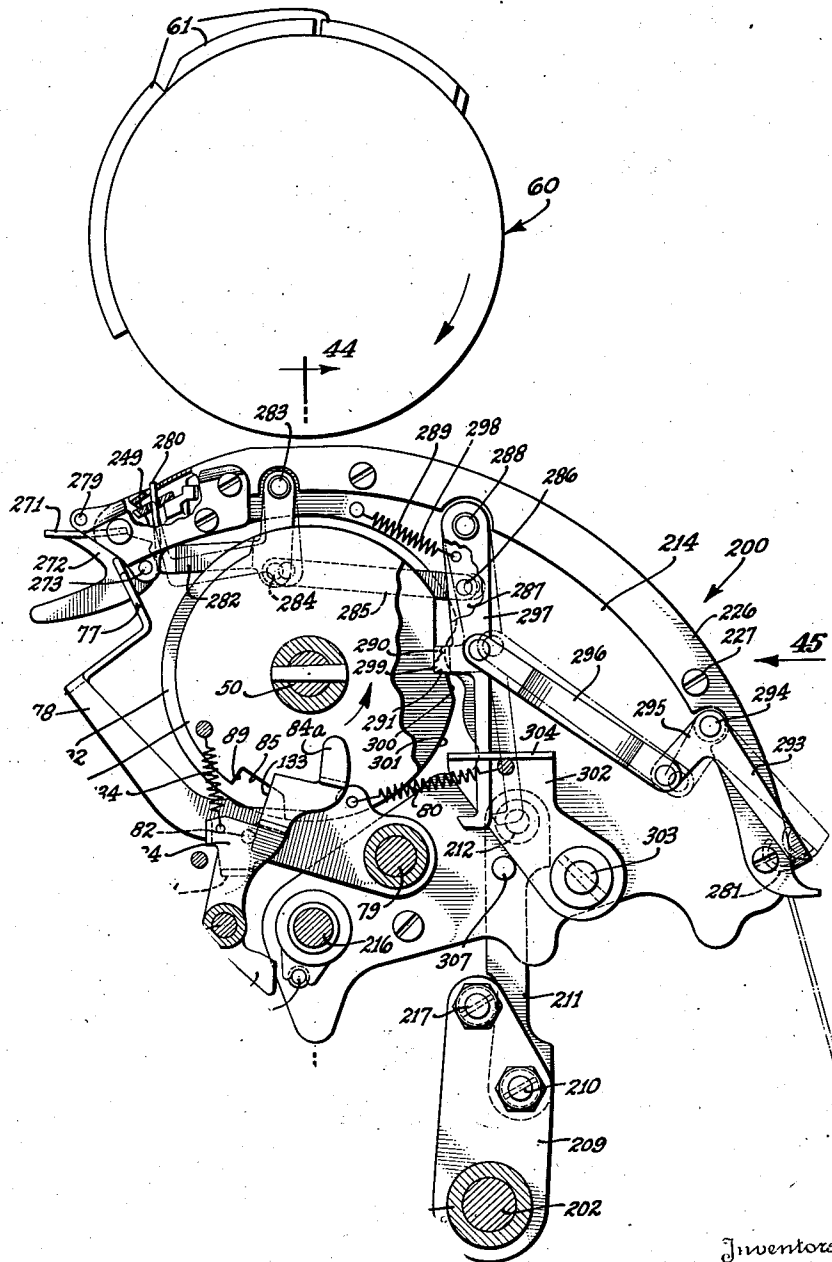
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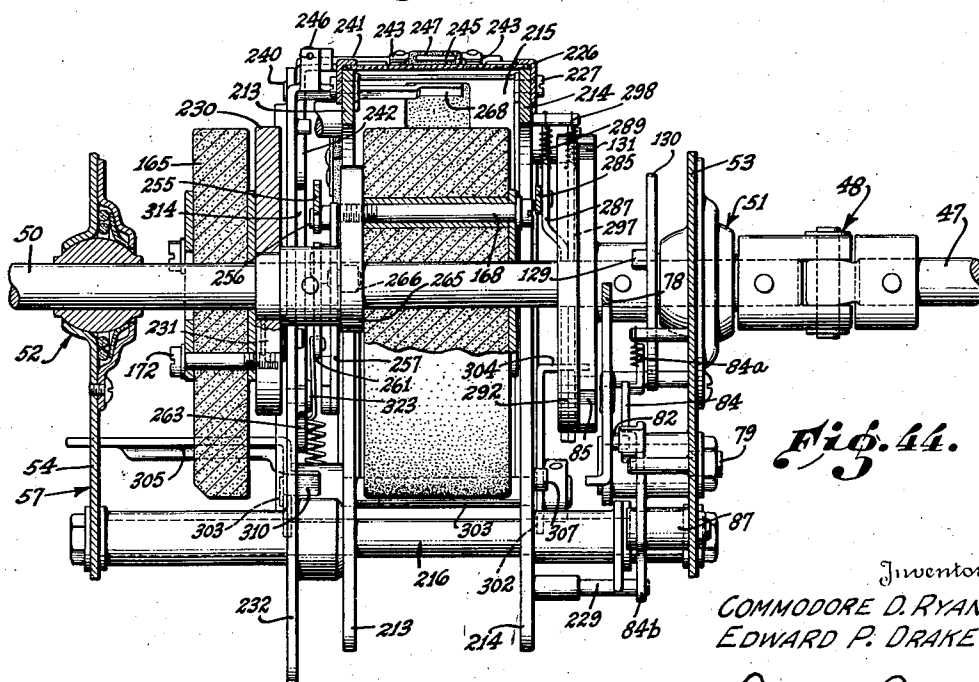
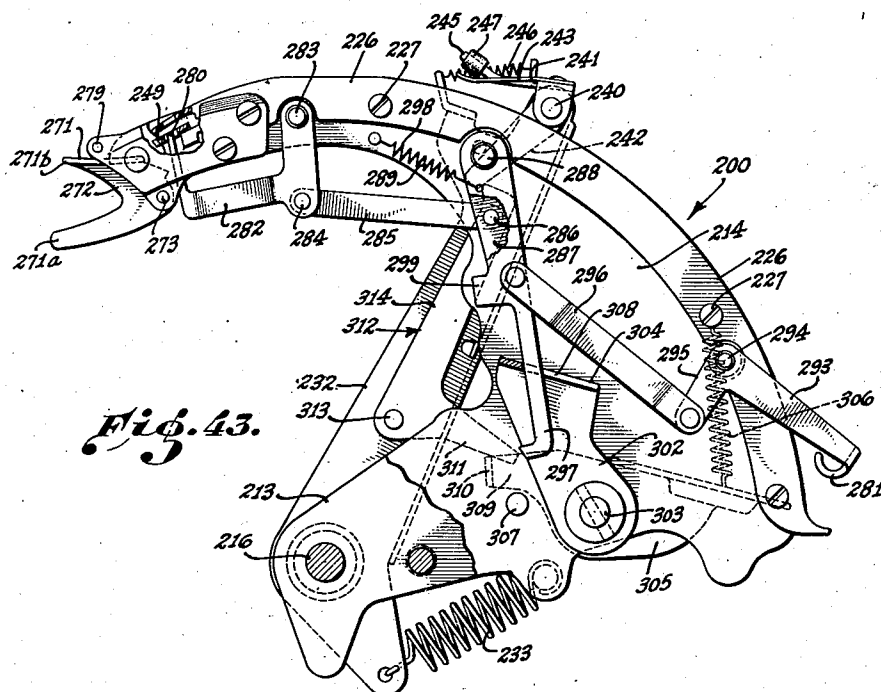
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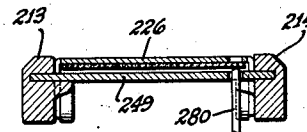
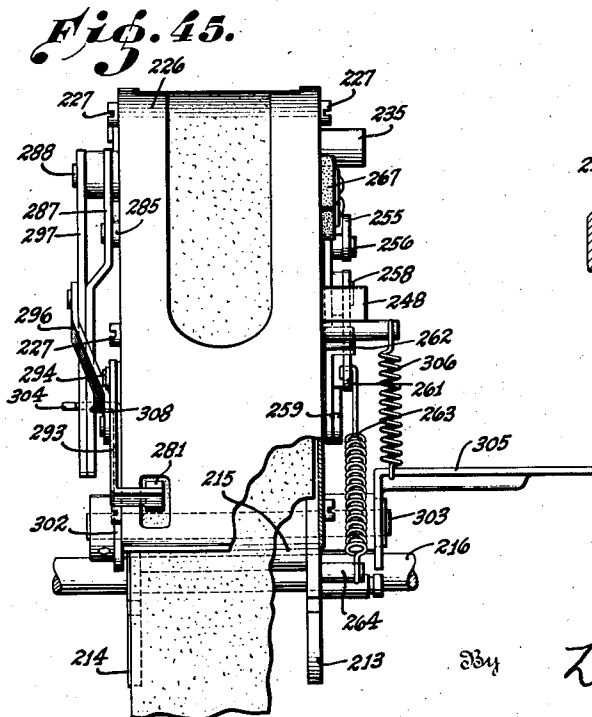
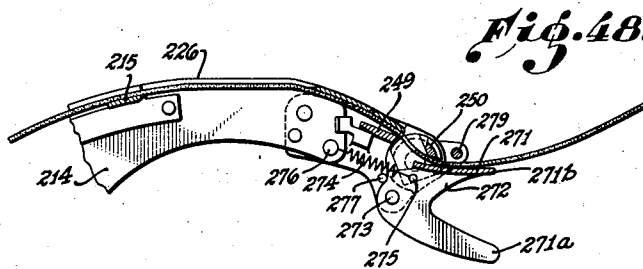
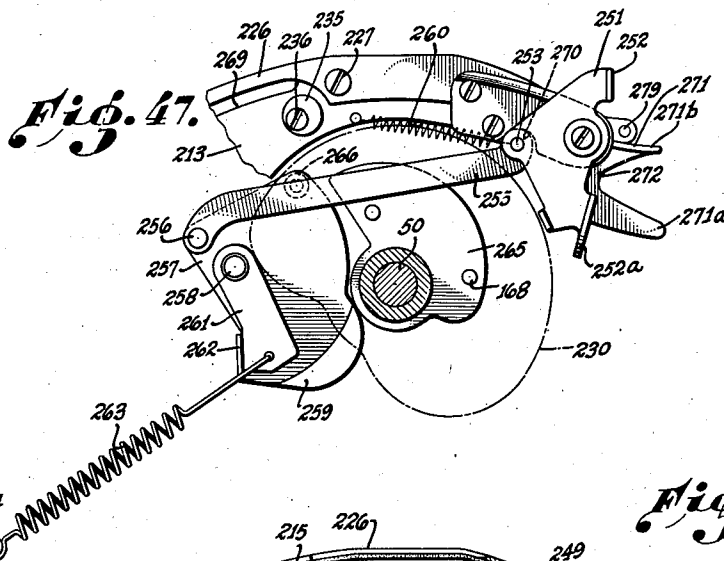


Fig. 46.

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UNITED STATES PATENT OFFICE

2,380,331

PRINTING MACHINE

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Application December 11, 1940, Serial No. 369,570

23 Claims. (Cl. 101—233)

This invention relates broadly to printing machines, and is particularly useful in connection with postage-printing machines for printing postage on envelopes, and the like.

An object of the invention is to provide a hand-operated printing machine of the type referred to, which is particularly rapid and reliable in operation, and simple and rugged in construction.

A more specific object is to provide a hand-operated printing machine which automatically ejects the printed matter.

Another object is to provide a printing machine for use with a postage meter in which the machine is positively locked against operation when the meter is not in operable condition.

Another object is to provide a postage printing machine in which the driving mechanism for the postage meter is always positioned in exact neutral position when the machine is stopped.

Another object of the invention is to provide a postage printing machine that accurately positions the printing on the envelope or other object printed.

Another object is to provide a printing machine which is readily adjustable to either print on objects, such as envelopes, or to print on a tape and feed the printed tape from the machine.

Another object is to provide a particularly simple and effective machine for printing postage, or the like, on a tape fed from a roll of tape in the machine, and discharged from the machine after being printed.

A more specific object is to provide a machine for printing postage, and the like, on a tape, having a particularly simple and effective interlock mechanism for preventing operation of the machine unless a tape is properly positioned therein to be printed on.

Another object is to provide a particularly simple and effective mechanism for cutting off tape in a machine for printing and feeding tape.

A feature of the invention is a hand-operated printing machine for printing postage, and the like, in which the envelopes or other objects printed are fed in a single direction through the machine.

Another feature of the invention is a postage printing machine of the rotary type particularly adapted for hand operation.

Another feature of the invention is an inertia-actuated ejecting mechanism for positively and rapidly ejecting printed matter from a hand-operated machine.

The manner in which the foregoing objects and features of the invention are accomplished, to-

gether with other features and objects, will be explained by describing in detail a particular embodiment of the invention as disclosed in the drawings.

In the drawings:

Fig. 1 is a horizontal view through a machine in accordance with the invention, as viewed partly in plan and partly in section, with portions of the upper cover broken away and showing the construction therebelow;

Fig. 1—A is a perspective view of the machine; Fig. 2 is a vertical section taken substantially in the plane 2—2 of Fig. 1;

Fig. 3 is a vertical section taken along the line 3—3 of Fig. 1;

Fig. 4 is a detail vertical section taken in the plane 4—4 of Fig. 1;

Fig. 5 is a vertical section taken along the line 5—5 of Fig. 3;

Fig. 6 is a vertical section taken substantially in the plane 6—6 of Fig. 3;

Fig. 7 is a vertical section taken substantially in the plane 7—7 of Fig. 1;

Figs. 8, 9, 10 and 11 are views similar to Fig. 7, but showing the apparatus in successive stages of a cycle of operation;

Fig. 12 is a vertical section taken substantially in the plane 12—12 of Fig. 7;

Fig. 13 is a vertical section taken along the line 13—13 of Fig. 1;

Fig. 14 is a detail section taken substantially in the plane 14—14 of Fig. 13;

Fig. 15 is a view of a portion of an envelope printed by the machine;

Fig. 16 is a view similar to Fig. 12, but showing an alternative platen construction;

Fig. 17 is a vertical section taken substantially in the plane 17—17 of Fig. 16;

Fig. 18 is a vertical section taken substantially in the plane 18—18 of Fig. 1;

Fig. 19 is a sectional skeleton view of certain parts taken substantially in the vertical plane 19—19 of Fig. 1;

Fig. 20 is a skeleton view similar to Fig. 19 but showing some of the parts in a different position;

Fig. 21 is a detail vertical section taken substantially in the plane 21—21 of Fig. 1;

Fig. 22 is a vertical skeleton view, taken substantially along the line 22—22 of Fig. 1;

Fig. 23 is a detail developed section, taken along the curved line 23—23 of Fig. 21;

Fig. 24 is a section taken in the same plane as Fig. 22, but showing some of the parts in different positions;

Fig. 25 is a developed section similar to Fig. 23, with the parts in the same position as shown in Fig. 24;

Fig. 26 is still another section, similar to Fig. 21, but showing the parts in still another position of operation;

Fig. 27 is a developed section, similar to Figs. 23 and 25, but showing the parts in the same position of operation as they occupy in Fig. 26;

Fig. 28 is a detail vertical section taken in the plane 28—28 of Fig. 26;

Fig. 29 is a detail horizontal section taken in the plane 29—29 of Fig. 26;

Fig. 30 is a skeleton view, taken substantially in the vertical plane 30—30 of Fig. 1;

Fig. 31 is a detail section, taken substantially in the plane 31—31 of Fig. 30;

Fig. 32 is a detail section, taken substantially in the plane 32—32 of Fig. 31;

Fig. 33 is a skeleton view, similar to Fig. 30, but showing the parts in a different position of operation;

Fig. 34 is a detail view, similar to Fig. 32, but showing the parts in a different position;

Fig. 34 is a detail view, similar to Fig. 32, but showing the parts in a different position;

Fig. 35 is still another view, similar to Fig. 33, but showing the parts in a different position of operation, and including some elements not shown in Fig. 33;

Fig. 36 is a detail section, taken in a plane parallel to the section of Fig. 35, but showing the moistening device and associated elements in section;

Fig. 37 is a skeleton view, generally similar to Fig. 30, but taken in a plane positioned slightly back of the plane of the section of Fig. 30;

Fig. 38 is a detail section, taken in the plane 38—38 of Fig. 39;

Fig. 39 is a developed plan view, taken along the curved line 39—39 of Fig. 38;

Fig. 40 is a skeleton view, taken substantially in the plane 40—40 of Fig. 1;

Fig. 41 is a detail section, similar to Fig. 40, but showing certain parts in a different position of operation;

Fig. 42 is a skeleton view similar to Fig. 40, but showing the parts in a different position of operation;

Fig. 43 is still another detail view taken in the same plane as Fig. 42, but showing some of the parts in a different position of operation;

Fig. 44 is a vertical section, taken substantially in the plane 44—44 of Fig. 42;

Fig. 45 is a detail elevation view with some parts broken away, the view being taken looking in the direction of the arrow 45 in Fig. 42;

Fig. 46 is a detail vertical section, taken in the plane 46—46 of Fig. 39;

Fig. 47 is a detail section taken substantially in the same plane as Fig. 37, but showing certain of the parts in different positions of operation; and

Fig. 48 is a detail vertical sectional view similar to Fig. 38, but showing certain of the parts in different positions of operation.

Referring, first, to Figs. 1, 1—A and 2, the machine of the present invention comprises a frame formed largely of sheet metal sections and including a bottom horizontal base plate 1 to which are fastened upwardly extending wall plates 2 (Fig. 2) 3, 4, and 5. The front wall member 2 which extends across one end of the machine is formed continuous with side wall members 6 and 7. The sides of the machine are

further enclosed by wall portions 9 of a suitable cover.

Secured to the top of the wall members 3 and 4, and supported thereby, is a horizontal mounting plate 10 for supporting a postage printing machine 11. This machine 11 may be of the type described in the copending application of Frank P. Sager, Ernest R. Bergmark, Commodore D. Ryan and Herschel L. Atherton, Serial No. 332,305, filed on April 29, 1940, for Mail treating machine. The details of the postage printing meter 11 do not constitute a part of the present invention. Suffice it to say that the meter has: a coupling member 12 whereby the meter mechanism is actuated; a plurality of downwardly extending locking pins 13; a downwardly extending positioning pin 14; a downwardly projecting interlock pin 15; and a printing head within a housing indicated generally at 16 in Figs. 1—A and 2.

The mounting plate 10 contains three tapered slots 17 for receiving the locking pins 13; a slot 18 for receiving the positioning pin 14; and a hole 19 (Figs. 1 and 3) for receiving the interlock pin 15.

The postage meter is attached to the mounting plate 10 by the following procedure: first a crankarm 20 (Fig. 1) is rocked clockwise (with reference to Fig. 2). This crank is rotatably supported by a screw 21 secured to the wall 4, and the hub of the crank 22 has a tongue engaging a groove in an adjacent hub 23, also rotatable on the screw 21, so that the two rock in unison. The hub 23 carries a crankarm 24 pivotally connected to a link 25, which link engages a slot in the end of a lever 26 fulcrumed by a pin 27 to the under side of the mounting plate 10. A shoulder 28 on lever 26 is movable into and out of position below the slot 18 in response to rocking movement of the crankarm 20. Movement of this crankarm into clockwise position, as previously described, causes a stop 29 on the link 25 to abut against a shoulder 30 on the lever 26 and rock the latter clockwise (with reference to Fig. 1) to carry the shoulder 28 clear of the slot 18. The postage meter is now set on the mounting plate 10 with the lockpins 13 in the large ends of the slots 17, this being permitted by the fact that the shoulder 28 is clear of the slot 18 into which the positioning pin 14 extends. The crankarm 20 is then rocked into counter-clockwise position, as shown in Fig. 2. This causes a spring-pressed ball 32 on the link 25 to rock the lever 26 counter-clockwise (with reference to Fig. 1), forcing the shoulder 28 against the positioning pin 14 and sliding the postage meter across the mounting plate 10 to carry the lockpins 13 into the narrow ends of the slots 17 in which they are snugly engaged to prevent movement of the postage meter. The movement of the link 25 is in excess of that necessary to shift the lever 26 as far as it will go, and a helical spring 33 mounted on the rod 25 between the slidable ball 32 and a shoulder 34 on the rear end of the rod is compressed to maintain a constant locking force on the lever 26.

The crankarm 20 is restrained in its locking position (as shown in Fig. 2) by virtue of the fact that the center line of the pivot 25a is carried slightly past dead-center position, the link 25 having a yoke portion 25b which receives the hub 23 and thereby permits movement of the crankarm 24 past dead-center position.

When the postage meter is in position, as

shown in Fig. 2, a groove 35 in the coupling member 12 is engaged by a tongue 36 (Fig. 1) on a coupling member 37, which is adapted to be rotated by a mechanism next to be described.

Thus the coupling 37 is pinned to a shaft 38, which shaft extends through and is supported in a bearing 39 in the wall member 4 and a bearing 40 in the wall member 5. There is also pinned to the shaft 38 a gear 41 which meshes with a gear 42 pinned to a shaft 43 (Fig. 3) which shaft also extends through and is supported in suitable journals 44 and 45, respectively, in the wall plates 4 and 5, respectively. Immediately to the left of the wall member 4 (Fig. 3) the end of the shaft 43 is connected by a conventional universal joint 46 to the right end of a drive shaft 47 which extends below the mounting plate 10 and is connected at its left end by a universal joint 48 (Fig. 1) to the right end of a shaft 50. This shaft 50 is supported in a pair of journals 51 and 52 in side plates 53 and 54, respectively, of a carriage 57. The left end of the shaft projects a substantial distance beyond the journal 52 and through an aperture provided therefor in the front wall 2 and has connected to its end a main actuating crankarm 58 having a handle 59 thereon. Each time the handle 59 is revolved, the shaft 50, the shaft 47, the shaft 43, the gears 42 and 41, the shaft 38, the coupling 37 and the coupling 12 (of the postage meter) are rotated to actuate the postage meter through an operating cycle.

As previously explained, the postage meter per se does not constitute a part of the present invention, and it is not necessary to disclose and describe the entire postage meter in detail. It will suffice to say that the postage meter includes a rotary printing head 60 (Fig. 7) which is rotated by the coupling 12 to carry a printing face 61 thereon first past an inking roller 62 and then into contact with an envelope 63 which moves through the machine, as shown in Figs. 8, 9, 10 and 11, respectively.

It will also be observed from Fig. 9 that as the leading end of the printing face 61 (Which may print matter on an envelope as indicated in Fig. 15) moves into contact with the envelope 63, the latter is supported by a rotary platen 64, which rotary platen rotates in synchronism with but in opposite direction to the printing head 60 to carry the envelope between the printing head and platen exactly as it would be carried between the rolls of a clotheswringer.

This platen 64 is mounted upon the shaft 50 to which the main crank 58 is secured and is directly rotated thereby. It is preferably made of yieldable material, such as rubber, and is of arcuate extent substantially equivalent to the arcuate extent of the printing face 61 on the printing head 60.

Machines of the present type are intended to handle envelopes and other mailing matter of varying thickness and for this reason either the printing head 60 or the platen 64 must be yieldably supported to permit separation between the printing head and the platen when thick objects are fed therebetween. This separation is provided for by rotatably supporting the shaft 50 on the carriage 57, as previously described, and in turn supporting the carriage for yieldable swinging movement. Thus the carriage 57 is rotatably supported on a shaft 65 (Fig. 1 and Fig. 7), which shaft extends between and is supported by the wall members 2 and 3, respectively. The carriage is constantly urged

upwardly (with respect to Fig. 7) by a helical spring 66 surrounding a rod 67 extending from a cross-shaft 68 on the carriage 57 down through a slot 69 in the bottom plate 1 of the machine, the spring 66 being compressed between a shoulder 70 on the rod 67 and a washer 71 slidable on a reduced end section 72 of the rod 67. The normal uppermost position of the carriage can be accurately adjusted by a nut 73 on a threaded lower end of the rod 67, which nut bears against a washer 74 which in turn bears against the under edges of the slot 69. In response to the separating force exerted by a piece of thick mailing matter between the printing head and the printing platen, the spring 66 compresses to permit the carriage and the platen to rock downwardly; the extent of movement may be limited to a predetermined value by properly proportioning the length of the reduced section 72 of the rod 67.

In operation, an envelope, or the like that is to be stamped, is slid along a table 75 (Figs. 1 and 1—A), with one edge of the envelope against a vertical guide wall 76, until the leading edge of the envelope abuts against a stop 77 (Fig. 7). This stop is movable from the position shown in Fig. 7 into the position shown in Fig. 8 by pressure of the leading edge of the envelope thereagainst. Thus this stop 77 is constituted by the upper end of a bent lever 78 which extends downwardly past the side of the platen 64 and the platen-supporting shaft 50, and is fulcrumed on a stub shaft 79, the latter being supported on the side frame member 53 of the carriage 57. The lever 78 is urged clockwise (with reference to Fig. 7) into its inactive position by a tension spring 80. The neutral or inactive position of the lever is determined by contact of a lip 81 on the lever 78 against a recessed portion 85 of a cam 86 secured to the shaft 50 for rotation with the platen 64.

As has been previously indicated, an envelope 63 is pressed against the stop 77, which moves the latter against the force exerted by the tension spring 80, into the position shown in Fig. 8. Further movement of the stop is prevented by contact of a pin 82 on the lever 78 against a shoulder 83 on a lever 84 fulcrumed on a stub shaft 87 secured to the carriage plate 53.

The lip 81 (Fig. 7) cooperates with the cam 86 to form an interlock, preventing rotation of the cam 86 when the stop 77 is in neutral position, since under these conditions the edge of the lip 81 rests against a shoulder 89 on the cam 86. However, when the stop 77 is pushed into the position shown in Fig. 8 by contact of an envelope thereagainst, the lip 81 is carried clear of the shoulder 89.

It will be apparent from the foregoing that the stop 77 and the lever 78 constitute a trip finger which is actuated, by the leading end of the mail matter inserted into the machine, to unlock the platen shaft for rotation and at the same time, by virtue of the stop pin 82 and shoulder 83, limit the positions to which the envelope may be inserted, thereby insuring a uniform margin between the printed impression and the leading end of the mail matter.

After the envelope 63 has been pressed against the stop 77 to move it into the position shown in Fig. 8, the handle 59 is swung through a complete revolution to complete the operation of stamping the envelope and discharging it from the machine.

However, before the crank 58 can be revolved,

a thumbpiece 90 thereon must be depressed to release an interlock. This interlock comprises a slide 91 (Fig. 13) mounted for longitudinal movement in guides 92 in the crankarm 58 and having a notch 93 engaged by an ear 94 on the thumbpiece 90, which is pivotally supported by a screw 95 on the crankarm 58. The slide 91 is urged outwardly by a compression spring 96, but can be moved inwardly toward the shaft 50 by depression of the thumbpiece 90.

Secured to and projecting forwardly (with reference to Fig. 13) from the slide 91 is a latch bolt 97 adapted to be engaged between two stationary latch members 98 and 99, respectively, which are anchored to the wall member 2. Thus referring to Fig. 14, the latch members 99 and 98 are constituted by the bifurcated end of a bent-over portion 100 of a plate 101 (Fig. 14), which plate is clamped between two rubber pads 102 to reduce the shock and noise of impact.

It will be apparent from an inspection of Fig. 13 that normally the crankarm 58 is firmly locked against rotation in either direction by engagement of the latch bolt 97 between the latch members 98 and 99. However, by depressing the thumbpiece 90 and thereby moving the slide 91 toward the shaft 50 (against the force of spring 96), the latch bolt 97 can be moved clear of the latch member 98, permitting normal movement (in counterclockwise relation with respect to Fig. 13) of the crank 58. The thumbpiece 90 need be depressed only momentarily at the beginning of the movement of the crankarm 58. Thereafter it is released, and near the completion of the revolution, the latch bolt 97 encounters a beveled edge 99a on the latch member 99 which forces the latch bolt 97 inwardly against the force of the spring 96 until the crankarm reaches neutral position, when the latch bolt 97 snaps into position as shown in Fig. 13, preventing further rotation of the crankarm until the thumbpiece 90 is again depressed.

The thumbpiece 90 is so designed that it automatically releases by sliding from under the operator's thumb during the rotation of the crank so that the bolt 97 is in position for engagement with latch members 98 and 99. Thus an unintentional overtravel into another cycle of operation is prevented.

The interlocks so far described prevent revolution of the crank handle 59 to actuate the machine unless an envelope is pressed against the stop member 77 and the thumbpiece 90 is depressed. However, it is also desirable to prevent any movement of the crank handle out of normal position unless the postage meter is in position and in operative condition. To this end, an additional, third, interlock is provided, which includes the interlock pin 15 (Fig. 1) previously referred to. This interlock pin 15 is a part of the postage meter described in detail in the application of Sager, et al., Serial No. 332,305, previously referred to. It will suffice to say at this time that when the postage meter is in operative condition the pin 15 projects a substantial distance below the bottom of the postage meter, whereas when the meter is rendered inoperable, as by consumption of all the postage for which the meter is set, the interlock pin 15 is released for upward movement. Therefore when the meter 11 is in position as shown in Fig. 2, and is in operative condition, the pin 15 is held in a lower position as shown in Fig. 3, in which position it holds down a plunger 105 positioned in the hole 19. This plunger is of spool shape and

has its movement limited by a stop screw 106.

When the plunger 105 is in lowermost position, as shown in Fig. 3, it bears against and holds down the left end of a lever 107 which lever is fulcrumed by a pin 108 to a supporting plate 109, the latter being secured to and extending downwardly from the mounting plate 10. The portion of lever 107 to the right (with reference to Fig. 3) of the fulcrum pin 108 is bent in a horizontal plane, as indicated at 110 in Fig. 1 and its right end projects through an aperture 111 (Fig. 5) in the wall plate 4 and between the prongs 112 of a bifurcated arm 113 of a bellcrank lever 114, which is fulcrumed by a screw 115 on the wall plate 4. The bellcrank lever 114 also has an upwardly extending arm 116 having a notch 117 adapted to normally engage a pin 118 projecting from the gear 41, and thereby lock the gear against rotation. However, when the left end (Fig. 3) of lever 107 is depressed by the plunger 105, the right end 110 of this lever is elevated to rock the bellcrank lever 114 counterclockwise (with reference to Fig. 5), and carry the notch 117 clear of the pin 118, thereby releasing the gear for rotation.

Should the pin 15 in the postage meter be released by the creation of an inoperable condition within the meter, or should the entire meter be removed from the mounting plate 10, then the lever 107 is restored to locking position by a compression spring 119 (Fig. 3), re-engaging the notch 117 with the pin 118 and restraining the gear 41 against rotation.

Apparatus is also provided for preventing operation of the machine, even though the postage meter is in operative condition and is resting upon the mounting plate 10, unless the crankarm 20 has been rocked into position to lock the postage meter on the mounting plate. Thus it will be observed from Fig. 3 that the left end of the lever 107 is beveled, as indicated at 107a and overlies the complementary beveled end 26a of the rear end of the lever 26. When the crank 20 is in locking position, as shown in Figs. 1 and 3, the bevel face 26a on the lever 26 is so positioned as to permit depression of the lever 107 by the plunger 105, to disengage the notch 117 (Fig. 5) from the pin 118. However when the crankarm 20 (Fig. 1) is rocked to the left, (the position in which the postage meter is released) the link 25 is moved to the left (with reference to Fig. 1), rocking the lever 26 clockwise and causing the bevel face 26a (Fig. 3) to bear against the bevel face 107a on the left end of lever 107 and cam the left end of the lever upwardly. This rocks the bellcrank lever 114 (Fig. 5), as previously described, to engage the notch 117 with the pin 118 and prevent rotation of the gear 41.

Assume that the postage printer is in operative condition on the mounting plate 10 and the crankarm 20 is in normal position, as shown. Also assume that an envelope has been moved against the stop member 77 to carry the latter into the position shown in Fig. 8, in which the lip 81 is disengaged from the shoulder 89 on the cam 86, and that the operator has depressed the thumbpiece 90 (Fig. 13) to disengage the latch member 97 from the stationary latch member 98 and moves the main operating handle 59 through a revolution. Movement of the handle through an angle of approximately 135° carries the printing head 60 of the postage meter, and the platen 64, from the positions shown in Fig. 8 to the position shown in Fig. 9, in which the leading end 64a

of the platen 64 has elevated the leading end of the envelope 63 nearly to the top of the stop 77. This upward movement of the leading end of the envelope is yieldably resisted by a spring finger 120 anchored to the guide plate 76 (Fig. 1). At the same time, the leading edge of the printing face 61 on the printing head 60 just begins to contact the envelope 63. It will be observed, therefore, that the stop 77 functions to retain the envelope 63 in a predetermined position until it is contacted by the leading end of the printing face 61, thereby assuring that the postage will always be printed in a position accurately spaced longitudinally on the envelope.

It is desirable, however, to retract the stop 77 out of the path of the envelope 63 at the time the envelope is engaged between the printing face 61 and the platen 64. To this end the cam 86 is so shaped as to rock the lever 78 further counter-clockwise as the machine leaves the position of Fig. 9, and the lever 84 is rocked to carry its shoulder 83 clear of the path of the pin 82 on lever 78, to permit the counter-clockwise rocking movement of lever 78. Thus, as shown in Fig. 9, a pin 129 on a disc 130 on shaft 50 has engaged a tip 84a on the arm 84 and rocked the latter to carry the shoulder 83 clear of the pin 82 on lever 78. It will also be observed from Fig. 9 that the lip 81 on lever 78 is lying against a sharp rise 131 on the cam 86 so that in response to further movement, the lip 81 will be carried outwardly by the rise 131, rocking the lever 78 further counter-clockwise, as shown in Fig. 10, in which the upper end of the stop 77 lies radially within the projected surface of the platen 64 so that it cannot interfere with the passage of the envelope.

As the handle 59 continues to revolve, the envelope 63 is fed through the machine by frictional engagement between the printing face 61 and the platen 64, as shown in Fig. 10. This movement of the envelope delivers its leading edge between a discharge roller 122 and an idler roller 123 which is supported for rocking movement toward and away from the roller 122 on arms 124 that are pivotally supported on a shaft 125. The discharge roller 122 is rotated rapidly to frictionally engage and discharge the envelope 63, after it is released from the printing face and platen, which occurs immediately following movement of the machine past the position shown in Fig. 10. The mechanism for rotating the discharge roller 122 will be described later.

The lever 78 is maintained in the extreme counter-clockwise position shown in Fig. 10 until the completion of the cycle, when the ear 81 drops back into the recessed portion 135 of the cam, as shown in Fig. 7. This restores the stop member 77 back into starting position, in which it functions as an interlock to prevent rotation of the mechanism until it is contacted and moved by an envelope, as already described with reference to Fig. 8.

The tip 84a on the lever 84 is engaged only momentarily by the pin 129 and is released long before the mechanism reaches the position shown in Fig. 10. However, full return of the lever 84 is prevented by contact of a shoulder 133 thereon against the pin 82 on the lever 78 so long as the latter is held in full counter-clockwise position by the lip 81 riding on the high portion of the cam 86. Fig. 11 shows the apparatus at the completion of the cycle, but before the lever 78 has returned to normal position, it being retained in retracted position by the envelope 63, which has not yet

been moved clear of the stop member. It will be observed that the pin 82 of lever 78 is still holding the arm 84 out of normal position. However, the action of the spring 80 will retract the lever 78 into the position shown in Fig. 7 as soon as the envelope moves past the stop 77, in which position the lip 81 moves into the recess 85 in the cam 86. At the same time the pin 82 on lever 78 will be carried clear of the shoulder 133 on the arm 84, permitting it to be restored to normal position by its associated tension spring 134.

The discharge roller 122 is rotated at a peripheral speed more rapid than the speed imparted to the envelope 63 by the printing head and the platen, so that as soon as the platen and printing head disengage the envelope (immediately following the position shown in Fig. 10), the roller 122 "snatches" the envelope away from the platen and ejects it out of the machine.

The roller 123 is urged toward the roller 122 by gravity and also by the action of a torsion spring 127 (Fig. 1). One end of the torsion spring 127 is anchored to a stationary collar 128 on the shaft 125 and the shaft in turn is supported against rotation on an arm 130, which arm is pivotally mounted on the shaft 65 by a universal bearing 160a and is normally maintained in the position shown in Fig. 22. The other end of the spring bears against a connecting plate 132 which interconnects the arms 124 which support the roller 123.

It is desirable that the discharge roller 122 not only rotate rapidly regardless of whether the main actuating handle 59 is moved rapidly or slowly, but it is also important that this roller 122 continue to rotate long enough following completion of a revolution of the handle 59 to insure the discharge from the machine of a long envelope or other object that might be used in the machine. Thus, although as shown in Fig. 11 the platen and printing head have completed their movement, the envelope 63 still has some distance to travel before it can be discharged from the machine and the roller 122 must continue to rotate until the trailing end of the envelope has passed thereover.

To insure the continued rotation of the discharge roller 122, it is driven by an inertia mechanism which stores up energy and continues to deliver the energy to the discharge roller after the main crank handle 59 has stopped. This inertia mechanism includes as a main element a flywheel 140 (Fig. 3) which is mounted by antifriction bearings 141 for free rotation on the shaft 43 and is adapted to be driven by the shaft through an over-running clutch mechanism consisting of a ratchet wheel 142 (Fig. 6) on the shaft 43 and a pawl 143 pivotally supported on the end of the flywheel 140 for engagement with the ratchet wheel 142. The pawl 143 is yieldably urged toward the ratchet wheel by a spring 144. When the shaft 43 is rotated in counter-clockwise direction (with reference to Fig. 6) the ratchet wheel 142 drives the flywheel 140 in the same direction. However, when the shaft 43 stops at the end of a revolution (which completes its cycle) the flywheel 140 continues to rotate by its own inertia and the pawl 143 clicks over the ratchet wheel 142.

The flywheel 140 has a belt groove 140a therein which drives a V-belt 145 and the V-belt in turn drives a relatively small pulley 146 secured (Fig. 1) to the right end of the shaft 147 on which the discharge roller 122 is mounted. This

shaft 147 is supported at its right end (Fig. 2) in a universal bearing 148 in the wall 5 and at its left end in a bearing 149 in the arm 130, previously referred to. As shown in the detailed views of Figs. 4 and 19, the bearings 148 and 149 are of the antifriction type having rollers 148a and 149a, respectively, to reduce friction to a low value so that they will not absorb an excessive amount of power from the flywheel 140. As shown to best advantage in Fig. 6, the pulley 146 has a diameter much smaller than the diameter of the belt groove on the flywheel 140, so that the shaft 147 and the discharge roller 122 rotate at a relatively high speed to "snatch" an envelope away from the platen and printing head as soon as the envelope is released thereby.

In addition to the printing platen 64 (Fig. 12) the machine includes an auxiliary platen 165 which is similar in circumferential dimensions to the platen 64 but is of lesser thickness and is juxtaposed to a rim 166 on the printing head. The platen 165 and the rim 166 provide additional frictional contact with the envelopes to aid in feeding them through the machine in a straight line.

As shown in Fig. 12, the platen 64 is provided with reinforcing sleeves 167 imbedded therein, which receive screws 168, these screws clamping the platen to a cam 265 of a spool-shaped collar 170 pinned to the shaft 50. The auxiliary platen 165 is secured to the other cam 230 of the collar 170 by screws 172.

The construction shown in Fig. 12 does not permit of rotational adjustment of the platen 64 on the shaft 50. However, such adjustment is sometimes desirable because it is found that after extensive use the leading end or shoulder 64a (Fig. 9) of the platen 64 wears away so that the platen may fail to press the envelope against the printing face 61 at the proper instant. Correction can be made for such wear by advancing the platen counter-clockwise through a small angle with respect to the shaft 50 and a construction permitting such adjustment is shown in Figs. 16 and 17, in which it will be observed that the platen 173, corresponding to the platen 64 of Fig. 12, is constructed quite differently. Thus, whereas the platen 64 of Fig. 12 is made substantially solid, the platen 173 of Figs. 16 and 17 comprise a thin peripheral shell 174 formed integrally with an end wall 175 of sheet metal with an auxiliary end wall 176 pressed into the other end of the peripheral section 174. A relatively thin tire 177 of rubber, or the like is stuck to the cylindrical portion of the peripheral wall 174 to form the working surface of the platen. The end walls 175 and 176 have central apertures which fit snugly on the shaft 50 and properly center the platen thereon. The platen is secured against rotation relative to the shaft 50 by screws 179 which extend through arcuate slots 180 in the end wall 175 into the cam 265 of the collar 170 pinned to the shaft. Suitable apertures 182 are provided in the end wall 176 juxtaposed to the screws 179 to permit those screws to be reached with a screw driver. Obviously, the platen 173 can be rotated on the shaft 50 to compensate for wear of the leading end of the platen by simply loosening these screws 179, rotating the platen and then retightening the screws.

In a machine of the general type described, in which the actuating handle is moved through

a single revolution during each cycle of operation, and locked in the position of rest until the next cycle of operation, it is desirable to provide some means for insuring that the machine will continue through its full cyclical movement and not stop slightly short of full movement. To this end, we provide a centralizing mechanism which insures the stoppage of the driving mechanism exactly in the same position of rest at the completion of each cycle. Referring to Fig. 6, this mechanism includes a disc 190 secured to the shaft 38 and having a V-shaped notch 191 in its periphery, which is normally engaged by a roller 192 rotatably supported on a shaft 195 extending between the ends of a pair of arms 193 (Fig. 1) which arms are pivotally supported on a shaft 194 extending between and secured to the wall members 4 and 5. A tension spring 197 forces the roller 192 against the periphery of the centralizing disc 190 at all times so that if, near the end of a cycle, the disc is rotated sufficiently to start the roller 192 into the V-shaped notch 191, the spring 197 will force the roller fully into the notch and rotate the apparatus exactly into the position of rest.

The construction and operation of the machine for printing directly on envelopes or other such objects fed through the machine, has been described. As previously indicated, the machine is also equipped to print postage on a strip of gummed tape, which tape can then be stuck to mailing matter. This feature is particularly useful for attaching postage to objects of such size or shape that they cannot be fed through the machine.

To adapt the machine for printing and delivering tape, a tape-handling mechanism 200 (Fig. 18) is swung into position to feel tape between the printing head and the platen (Fig. 24).

The discharge mechanism including the roller 122 and the roller 123 are not necessary when printing tape, and would be in the way. Hence when the machine is adjusted to print postage on tape, this discharge roller assembly is swung downwardly out of the way by the operation of rotating a control handle 201 (Fig. 1—A) in counter-clockwise direction through an angle of approximately 120°. The handle 201 is secured to the end of a shaft 202 which is journaled in the two wall members 2 and 3 (Fig. 28). This initial rotation of the shaft 202 is transmitted through a ball clutch mechanism 203, to be described later, to a sleeve 204 rotatable on the shaft 202. The sleeve 204 has secured thereto an arm 205 (Fig. 22) which has pivotally connected thereto, as by a pivot screw 206, the lower end of a link 207, the upper end of which is pivotally connected by a screw 208 to the arm 130 on which the rollers 122 and 123 are mounted. When the handle 201 is in its lower position, as shown in Fig. 1—A, the sleeve 204 is oriented as shown in Fig. 22, and the arm 205 extends almost vertically, holding the arm 130 in its upper position for the discharge of envelopes. Clockwise rotation of the sleeve 204 is limited by the fact that as the pivot screw 206 moves clockwise (with reference to Fig. 22), slightly past dead-center position, a lip 205a on the arm 205 engages against the link 207 and prevents further movement.

The over-center position of the arm 205 makes the mechanism irreversible; i. e., it is impossible to rotate the arm 205 by force applied to the arm 130. It will be apparent from inspection of Fig.

22 that the counter-clockwise rotation of the sleeve 204 and arm 205 through substantially 120° lowers the right end of the arm 130 and the rollers 122 and 123, as shown in the two views of Figs. 19 and 20, respectively. It will also be apparent from Fig. 20 that the rollers not only swing about the shaft 65 on which the arm 130 is pivotally supported, but also about the bearing 148, this movement being permitted by the fact that both the bearings 160a and 148 are of the universal type.

Movement of the handle 201 as described for shifting the discharge rollers out of the way, also functions to rock the tape-handling mechanism 200 from the inactive position shown in Fig. 21 into the active position shown in Fig. 24, this movement also being effected by rotation of the sleeve 204. Thus the sleeve has secured thereto an arm 209 which is in the position shown in Fig. 40 when the control handle 201 is in the lower position, shown in Fig. 1—A. This arm 209 is connected by a pivot screw 210 to the lower end of a link 211, the upper end of which is connected by a pivot screw 212 to a front frame plate 213 of the tape-handling mechanism 200. This mechanism includes, in addition to the front frame plate 213, a rear frame plate 214, these two frame plates being interconnected by a peripheral bridge 215. The front and rear frame plates 213 and 214 are pivotally supported on a shaft 216 extending between and supported by the side members 53 and 54 of the carriage 57. When the control handle 201 is rotated as described, the arm 209 is swung from the position shown in Fig. 40 into the position shown in Fig. 42, in which it extends almost straight upwardly, rocking the tape-handling mechanism into upper operating position through the link 211. The tape-handling mechanism is positively retained in upper position by virtue of the fact that the pivot screw 210 is carried past the dead-center position and the link 211 abuts against a stop pin 217 mounted on the end of the arm 209. In this upper position the tape-handling mechanism delivers tape between the platen 64 and the printing head 60 of the postage meter and in response to revolution of the main actuating handle 59 the machine prints postage on the tape and at the same time feeds the tape through the supporting mechanism so that at the completion of the revolution a section of tape having postage printed thereon is protruded from the mechanism 200.

The tape is supplied from a roll 218 (Fig. 18) wound on a core 219. This core 219 has a central hole extending therethrough, which receives a stud 220 (Fig. 1) which extends forwardly from the wall 3 on which it is mounted. A housing 221 is mounted on the stud 220 for partially enclosing the roll of tape 218. The core 219 and the roll 218 are retained on the stud 220 by a retainer plate 222 which has a keyhole slot 223 therein for engaging an annular groove near the free end of the stud 220. The end of the tape leaving the roll 218 extends downwardly and under a loop-forming roller 224 supported on a pin extending from an arm 225 which is pivotally supported on the stud 220 (Fig. 1). Thus the arm 225 consists of a metal strip bent in the form of a U at its upper end and both arms of the U-shaped portion are apertured to receive the stud 220.

After leaving the roller 224 the tape extends into the tape-handling mechanism 200 passing between the peripheral bridge member 215 (Fig.

44) and an overlying peripheral shield 226 which is spaced radially outwardly from the bridge member 215 a sufficient distance to freely pass the gummed paper tape therebetween. The peripheral shield 226 may be bent down at its side edges, as indicated in the sectional view of Fig. 44 and secured to the side walls 213 and 214 of the tape-handling mechanism, as by screws 227. With the machine in its normal position of rest, the tape extends between the peripheral members 215 and 226 for their entire length, these members constituting an arcuate guide or chute for supporting the tape in a desired path of travel, extending between the platen 64 and the printing head.

It will be recalled that when the machine is adjusted for printing on envelopes, the platen is locked against rotation by the ear 81 (Fig. 7) engaging against the shoulder 89 until the stop member 77 is advanced into the position shown in Fig. 8 by pressure of an envelope thereagainst. However, when printing on tape, the interlock mechanism, including the stop member 77, is not used and is incapacitated by rocking the lever 78 into extreme counter-clockwise position (with reference to Fig. 7). This movement is effected by contact of the leading end 228 of the tape-handling mechanism 200 (Fig. 40) against the stop 77. Fig. 41 shows the end 228 contacting the stop 77 and swinging it counter-clockwise.

It will be recalled, in connection with Fig. 8, that counter-clockwise rocking movement of the lever 78 was initially limited by contact of a pin 82 on the lever against the shoulder 83 of the arm 84, and in order to swing the lever 78 into full counter-clockwise position, it is necessary to rock the arm 84 clockwise to carry the shoulder 83 out of the path of the pin 82, when converting the machine for tape operation; this movement is effected by a pin 229 (Fig. 40) on the rear frame plate 214 of the tape-handling mechanism 200 which engages against a tail 84b on the lever 84 and rocks the lever 84 clockwise (Fig. 41) sufficiently to carry the lever 83 clear of the pin 82 so that the lever 78 can continue to be rocked by the tape-handling mechanism into the position shown in Fig. 42, in which it is completely inoperative to perform the interlock functions it performs when printing directly on envelopes.

When the machine is adjusted to print on tape and the handle 59 is in neutral position, the end of the tape is flush with the forward end of the tape-handling mechanism, having been cut off at this point by a cutting device to be described later. However, it will be observed from inspection of Fig. 24 that the leading end of the tape chute is spaced a substantial distance beyond the center line between the printing head 60 and the platen 64. Hence it is necessary to retract the tape before the printing head and platen reach the relative positions shown in Fig. 33, if the postage is to be printed close to the end of the tape, a condition which is desirable, if not absolutely necessary, in practice. We provide for the retraction of the tape during the initial rotation of the handle 59, and prior to the commencement of actual printing, by mechanism now to be described:

Referring to Fig. 1, there is secured to the shaft 50, alongside the auxiliary platen 165, a cam 230, which cam cooperates with a follower roller 231 (Fig. 30), on a lever 232, which is fulcrumed on the shaft 216. A tension spring 233 urges the lever 232 clockwise and the extreme clockwise

position is limited by abutment of a shoulder 234 on the lever against an eccentric stop 235 secured to the front frame member of the tape-handling mechanism by a screw 236. By loosening the screw 236, rotating the eccentric stop 235 and again tightening the screw 236, the normal position of the lever 232 can be accurately adjusted. This permits accurate control of the extent to which the tape is retracted.

The roller 231 is normally juxtaposed to a low portion on the cam 230, which low portion merges into a rise 237, the latter in turn merging into a relatively long concentric portion 238 which in turn merges into a dropping portion 239. Shortly following initial rotation of the handle 59, the rise 237 on the cam bears against the follower roller 231 and rocks the lever 232 counter-clockwise into the position shown in Fig. 33, and during this rearward rocking movement of the lever, a mechanism thereon engages and retracts the tape to bring the leading edge thereof closely adjacent the line of contact between the printing head and the printing platen.

Thus there extends rearwardly from the upper end of the lever 232 (Fig. 31), a stud 240 which oscillatably supports a yoke 241 having an arm 242 which extends downwardly alongside the rear surface of the lever 232 for a purpose to be described later. The yoke 241 (Fig. 31) has secured thereto a pair of leaf spring members 243, which extend through an elongated slot 244 in the outer peripheral wall 226 of the tape chute and bear against the tape. There is also provided on the yoke 241, intermediate the two leaf spring members 243, a relatively stiff arm 245 having a rubber band 247 thereon adapted to firmly, frictionally engage the tape. The yoke 241 is urged clockwise (with reference to Fig. 30) by a tension spring 246. During the retractive movement of the lever 232 (as the follower roller 231 rides up on the cam rise 237), the spring 246 presses the rubber band 247 firmly against the tape and clamps the tape against a finger 268 which extends at right angles from the lever 232 through an arcuate slot 269 in the front wall of the tape-handling mechanism 200 and below the tape in the tape chute. The inner end of the finger 268 is offset upwardly as indicated in Fig. 31, so that its upper surface is substantially flush with the outer surface of the inner peripheral member 215 of the tape-handling mechanism, and the tape is retracted in the chute to bring the end of the tape substantially to the line of contact between the printing head and the printing platen. The exact extent to which the tape is retracted can be adjusted by rotating the eccentric stop roller 235 in the manner previously described. Final retractive movement of the lever 232 carries the arm 242 against an eccentric stop roller 248 on the front plate of the tape-handling mechanism, rocking the yoke 241 sufficiently to carry the rubber band 247 on the pressure arm 245 just clear of frictional engagement with the tape, but leaving the leaf spring members 243 lightly engaging the tape (Figs. 33 and 34).

While the arm 245 is lifted out of frictional engagement with the tape, the two leaf spring members 243 exert sufficient restraining force on the tape to prevent it from slipping rearwardly in the tape chute by virtue of its own weight, but they do not prevent the feeding of the tape through the chute by the printing head and platen. Rearward, or retractive, movement of the lever 232 is completed slightly before the time in the cycle when the printing

surface on the printing head and the pressure surface of the platen engage the upper and lower surfaces of the tape. Thereafter the tape is carried through the chute by frictional engagement therewith of the printing head and the platen. The beginning of the printing phase of the cycle is shown in Fig. 33. During the printing phase, the follower roller 231 rides on the concentric portion 238 of the cam 230 maintaining the lever 232 in its fully retracted position, in which the rubber band 247 is held clear of the tape to permit its movement through the chute. However, as the trailing ends of the printing face and the platen leave the tape, the follower roller 231 passes off the concentric portion 238 of the cam onto the steep drop 239, permitting the lever 232 to be advanced by its spring 233 back into normal position against the eccentric stop roller 235. This movement advances the tape a sufficient distance to carry the printed portion of the tape past the end of the tape chute since the pressure arm 245 engages the rubber band 247 against the tape as soon as the lever 232 leaves its fully retracted position in which the arm 242 was deflected by the eccentric stop roller 248.

A mechanism is provided for cutting off the printed section of tape discharged from the tape chute at the completion of the cycle. The cutting mechanism includes a stationary shear plate 249 (Figs. 39, 46) on the forward end of the tape chute over which the tape passes as it leaves the chute and a cooperating oscillatable shear member 250 pivotally supported in the side members of the chute and adapted to be rocked downward by a lever plate 251 secured to the front end thereof. This lever plate 251 has a pair of tabs 252 and 252a which constitute handles for manual operation of the shearing mechanism and a pin 253, which pivotally connect the plate 251 to the forward end of a link 255, which link is pivotally connected by a pin 256 at its rear end to an inertia plate 257 which itself is pivotally supported by a pin 258 on the front plate of the tape-handling mechanism 200. To increase the moment of inertia of the plate 257, it may have a lower weighted portion 259 of added thickness. The oscillatable shear member 250 is normally maintained in raised position by a tension spring 260 stretched between the pin 254 and the frame of the tape chute. The inertia plate 257 is normally maintained in the position shown in Fig. 30 by a spring-actuated arm 261 which is also pivoted on the pin 258 immediately in front of the inertia plate 257 and bears against a lip 262 on the inertia plate. The spring-actuated arm 261 is yieldably retained in the position described by a tension spring 263, one end of which hooks into a hole provided in the end of the spring-actuated arm 261 and the other end of which hooks over a pin 264 on the front frame plate of the tape-handling mechanism.

The shearing mechanism can be actuated manually to cut off a section of tape at any time by pressing down on the handle 252 of the lever plate 251, to rock the latter into the position shown in Fig. 37, in which the oscillatable shear member 250 is moved past the stationary shear plate 249, as shown in Fig. 38.

The tape-cutting mechanism is normally actuated automatically at the end of each cycle of operation as follows:

Mounted on the main operating shaft 50 immediately in front of the platen 64 is a cam 265

which cooperates with a follower roller 266 pinned to the rear side of the inertia plate 257. Early in the cycle of operation, the cam 265 bears against the follower roller 266 and rocks the inertia plate 257 counter-clockwise, this movement of the inertia plate being transmitted through the lip 262 to the spring-actuated arm 261 and tensioning the latter spring which is relatively stiff, as shown in Fig. 35. This movement also retracts the link 255 slightly, permitting the oscillatable shear plate 250 to move slightly further toward open position, but this movement is of no importance. Just before the handle 59 reaches the end of its revolution, the follower roller 266 drops off the high portion of the cam 265, permitting the tension spring 263 to snap the arm 261 back into normal position. This snap movement of the arm 261 is transmitted through the lip 262 to the inertia plate 267, imparting substantial momentum thereto so that the inertia plate continues its movement beyond the normal position of rest and in fact until the lip 262 encounters a rubber bumper plate 267 on the front plate of the tape-handling mechanism. This movement of the inertia plate rocks the oscillatable shear member 250 down past the stationary shear plate 249 to cut off the tape. The oscillatable shear member and the inertia plate 257 are thereafter restored to their normal position by the spring 260.

The mechanism when adjusted as last described functions to cut off the tape at the end of each cycle of operation of the machine so that each section of tape bearing a postage imprint thereon is cut off. However, it is at times desirable to print a series of stamps on a continuous strip of tape. The apparatus can be adjusted to feed a continuous strip of tape during a succession of cycles of operation by rocking the lever plate 251 (by pressure on the handle 252a) from the normal position shown in Fig. 30 into the position shown in Fig. 47. In this position the pivot pin 253 is carried above the line interconnecting the pivot pin 256 and the axis of rotation of the lever plate 251 and the forward end of the link 255 rests against a stop surface 270 on the front wall member of the tape-handling mechanism to limit further clockwise rotation of the lever plate 251. This movement rocks the inertia plate 257 and the spring-actuated arm 261 against tension of the spring 263 and the force applied to the link 255 from the spring 263 yieldably retains the lever plate 251 in the position shown in Fig. 47 by virtue of the fact that the pivot pin 253 is past dead-center position. With the lever plate 251 in the position shown in Fig. 47, the oscillatable shear member 250 is in the position shown in Fig. 48 and the tape feeds thereunder and out over a deflecting shelf 271. After the desired number of impressions have been printed on the continuous strip of tape, the tape is cut by pressing against the handle 252 and rocking the lever plate 251 sufficiently to carry the pivot pin 253 below dead-center position, whereupon the strong spring 263 takes control and snaps the spring-actuated arm 261, the inertia plate 257 and the oscillatable shear member to cut the tape in the manner previously described.

When the shearing mechanism is disabled by rocking the lever plate 251 into the position shown in Fig. 47, the follower roller 266 on the inertia 257 is clear of the cam 265 so that it is not actuated thereby.

The shelf 271 is constituted by the base of a yoke member having flanged portions 272 which are pivotally supported on pins 273 into the side members of the tape-handling mechanism. A tension spring 274, stretched between a pin 275 on one of the flanges 272 and a pin 276 on the corresponding side frame of the tape-handling mechanism normally maintains the shelf 271 in the position shown in Fig. 48, in which one of the flanges rests against a stop pin 277. Positioned immediately above the shelf 271 when the latter is in its normal position (Fig. 48), is a cross pin 279 supported between the extended side members of the tape-handling mechanism, and the tape feeds between the shelf 271 and the pin 279, as clearly illustrated in Fig. 48.

The shelf 271 is slightly curved to direct the tape upwardly so that it may be easily grasped and removed from the machine after printing and cutting off (Fig. 38). The pin 279 is located centrally between the edges of the shelf and is positioned so that the bottom side of the pin is about flush or even a little below the upturned edges of the shelf 271, so that as the tape is projected between the pin 279 and the curved shelf 271, it will curve upwardly as shown in Fig. 38. Due to the fact that the fibers in the tape have been oppositely stressed, by winding on the roll, the tape has a tendency to bend in the opposite direction to that of the curved shelf 271. Thus the tape is frictionally held between the pin 279 and shelf 271, after cutting, as shown in Fig. 38, until removed.

As has been explained, the interlock involving the stop member 77 (Fig. 7) is disabled when printing on tape. However, a separate interlock is provided for preventing movement of the mechanism out of neutral position when the tape-handling mechanism 200 is shifted into fully operative position unless the tape chute is filled with tape. This mechanism includes two feeler fingers 280 and 281, respectively (Fig. 42), which project through suitable apertures in the peripheral walls of the tape chute at opposite ends thereof and under normal operation rest against and are stopped by the tape.

The finger 280 is constituted by the end of a lever 282 fulcrumed by a pin 283 on the rear wall member 214 of the tape-handling mechanism. This lever is pivotally connected by a pin 284 to one end of a link 285, which link is pivotally connected at its other end by a pin 286 to an arm 287 which is pivotally supported at its upper end on a pin 288 extending from the rear wall member 214 of the tape-handling mechanism. This arm 287 is urged clockwise (with reference to Fig. 42) by a tension spring 289 and when there is no tape in the forward end of the tape chute to restrain upward movement of the finger 280, the arm 287 is rocked clockwise (into the position shown in full lines in Fig. 42) by its spring 289 to carry a lug 290 into the path of the shoulder 291 on a cam 292 secured to the main shaft 50, this cam 292 being positioned immediately in front of the cam 86 which cooperates with the stop member 77, previously described in connection with the envelope printing mechanism. When the lug 290 lies against the shoulder 291 it obviously prevents rotation of the cam and the shaft. However, when upward movement of the finger 290 is limited by contact of the finger with tape in the chute, then the lug 290 is held clear of the path of the shoulder 291 and does not restrain rotation of the cam.

The rear finger 281 is constituted by the end of a bellcrank lever 293 fulcrumed to the side of

the tape-handling mechanism by a pin 294 and having an arm 295 pivotally connected to one end of a link 296, the other end of which link is pivotally connected to an arm 297, which arm is substantially identical with the arm 287, is pivotally mounted on the same pin 288, and has a tension spring 298 exactly the same as the spring 289. The arm 297 has a lug 299 exactly the same as the lug 290 and adapted to engage the same shoulder 291 on the cam 292 when the arm 297 is in full clockwise position (the position it occupies when the finger 281 is not held up by tape in the chute). However when there is tape in that end of the chute below the finger 281, the lug 299 is held clear of the shoulder 291 exactly the same as the lug 290 is.

It will be observed from inspection of Fig. 42 that the shoulder 291 merges into a short rise 300 which in turn merges into a concentric portion 301 of the cam. When the fingers 280 and 281 are restrained by tape in the tape chute, the lugs 290 and 299 just clear the shoulder 291 on the cam, and as the cam rotates the rise 300 thereon bears against the lugs and rocks the arms 287 and 297 through a slight angle counter-clockwise, which movement slightly retracts the fingers 280 and 281 so that they do not bear against the tape. This reduces the frictional resistance to feeding movement of the tape through the chute.

It will be apparent from the foregoing description that if for any reason the forward end of the tape does not extend clear to the forward end of the chute, the finger 280 will be elevated and will cause the lug 290 to engage against the shoulder 291 and prevent operation of the mechanism. Likewise, when the tape roll 218 (Fig. 18) is exhausted and the rear end of the tape has fed past the finger 281, it permits actuation of the lug 299 into engagement with the shoulder 291, to prevent actuation of the mechanism. The arcuate length of the tape chute is such that if at the beginning of a cycle of operation there is tape under the finger 281, then there will be sufficient tape to receive a full impression for the printing head during that cycle. Wastage of postage as the result of exhaustion of the tape supply is thereby prevented.

When the machine is adjusted for the printing of envelopes, the interlock involving the lugs 290 and 299 and the cam shoulder 291 is automatically incapacitated by virtue of the fact that the tape-handling mechanism rocks about the shaft 216, which is positioned below the shaft 50 on which the cam 292 is mounted, so that when the tape-handling mechanism is rocked into inactive position, as shown in Fig. 40, the lugs 290 and 299 are far removed from the cam 292.

To facilitate threading the tape into the tape chute, a retracting mechanism is provided for conveniently holding the feeler fingers 280 and 281 and the arm 245 clear of the path of the tape in the chute. This mechanism includes an arm 302 (Fig. 40) secured to a shaft 303 extending through and journaled in the side plates of the tape-handling mechanism, and having at its upper free end an outwardly turned lug 304 containing a slot 308 into which extends the lower ends of the arms 287 and 297. The sides of the slot serve as guides to keep the arms 287 and 297 in alignment with the cam 292.

Referring now to Fig. 30, the opposite end of the shaft 303, which projects through the front plate member 213 of the tape-handling mechanism,

has secured thereto a handle 305. A tension spring 306, stretched between the handle 305 and a pin on the tape-handling mechanism, urges the handle and the shaft into an inactive position, shown in Fig. 42, in which the arm 302 rests against a stop pin 307. With the arm 302 in this position, the bottom of the slot 308 in the lug 304, does not prevent rocking movement of the arms 287 and 297 sufficient to move the feeler fingers 280 and 281 into the path of the tape. However, the bottom of the slot 308 limits movement of the arms 287 and 297 when the tape-handling mechanism is swung into inactive position, away from the cam 292.

When it is desired to thread the tape into the tape chute, the handle 305 (Fig. 30) is depressed to rock the shaft 303 and the arm 302, and carry the feeler fingers 280 and 281 clear of the path of the tape, as shown in Fig. 43. The handle 305 has a tail 309 thereon, the end of which is turned out to form a lug 310, and when the handle 305 is depressed to retract the feeler fingers, the lug 310 is carried against an arm 311 of a bellcrank lever 312 pivoted by a pin 313 on the lever 232, rocking the bellcrank lever. This rocking movement of the bellcrank lever carries a second arm 314 thereon against the downwardly depending arm 242 on the yoke 241, rocking the latter to carry the arm 205 thereon clear of the path of the tape in the tape chute.

The machine is adapted to deliver the gummed tape in either dry or moistened condition. When the tape is to be delivered dry, it is discharged directly from the machine after passing over the shelf 271, as previously described with reference to Figs. 38 and 43. On the other hand, when the tape is to be delivered from the machine in moistened condition, it is delivered from the shelf 271 through a moistening device now to be described.

Referring to Figs. 35 and 36, the moistening device comprises a water pot 315 having a brush 316 which is supported by a brush holder 317 positioned in the lower part of the pot, the brush extending upwardly from the holder 317 and out of an aperture provided therefor in the top wall 318 of the water pot. A portion of the top wall 318 is extended downwardly alongside the brush, to form a baffle 319 to prevent water being splashed out through the brush aperture when the pot is swung into and out of moistening position, as will be described later. The pot is provided with a filler tube 320 which extends down into the pot from a filler opening adapted to be closed by a swinging lid 321. The tube 320 functions to prevent splashing of the water out through the filler opening when the pot is swung. The pot is equipped with a guide plate 322 spaced above the top portion 323 of the pot, to define a chute for guiding the tape across the brush 316, as clearly shown in Figs. 35 and 36. Water rises through the brush by capillary action to keep the upper portion of the brush sufficiently wet to properly moisten the tape as the latter feeds across the brush.

When the pot 315 is swung into the tape-moistening position shown in Fig. 35, the pot engages against an arm 271—*a* on the shelf 271 and rocks the shelf forwardly and downwardly to bring the outer edge 271*b* of the shelf against the top wall 323 of the pot, to direct the tape to the brush.

To support the water pot, a movable pot holder is provided, this holder consisting of a partial cylindrical wall member 324 formed integrally with a bottom plate 325 and a top plate 326.

Plates 325 and 326 are apertured to receive a stationary supporting post 327 which is supported on the bottom plate 1 of the machine. The upper plate 326 is extended to form a supporting shelf upon which the water pot sets and has an upward extension 328 which is received within a slot defined by a strap member 329 secured to one side of the water pot. It will be apparent that the water pot can be placed on or removed from the holder by simply sliding it onto or off of the extension 328.

When out of use, the moistening device is swung from the position shown in Fig. 35, downwardly and forwardly into the position shown in Fig. 1, in which it is out of the way of the discharge roller and below the envelope-supporting table.

The pot holder is slidable vertically on the post 327 and is supported vertically by a pin 330 extending radially from the post, which pin projects into a helical slot 331 in the cylindrical wall member 324 so that the holder and the pot thereon is raised or lowered in response to rotation of the holder on the post 327. As shown in Fig. 27, the lower end of the helical slot 331 is provided with a detent notch 332 to receive the pin 330 and maintain the pot in uppermost position after it has been moved into that position. The detent notch 332 provides sufficient resistance to rotation of the pot to prevent the latter from rotating in response to the frictional drag of the moving tape against the brush.

A mechanism is provided for rotating the pot holder to swing it into and out of tape-moistening position, in response to actuation of the handle 201. Thus the bottom plate 325 of the holder is provided with gear teeth 333 constituting a gear segment which meshes with a rack 334 on one edge of a link member 335 which link member has a slot 336 through which extends the post member 327. The post 327 has slidably mounted thereon a spool-shaped bushing 337 which has a hub section slidably fitting in the slot 336, and lower and upper flanges which engage the under side of the link member 335 and the upper side of the bottom plate 325, respectively, to maintain the rack 334 in mesh with the segment 333 during the vertical movement of the mechanism on the post 327.

The link 335 is pivotally connected at its left end (with reference to Fig. 27) to the upper end of an arm 339, which arm is secured to a hub 340 rotatable on the shaft 202 (Fig. 28).

A ball clutch mechanism is provided for selectively coupling the shaft 202 to the arm 339 during a portion of its movement, and to the sleeve 204 during another portion of its movement. The arm was previously described in connection with the mechanism for shifting the tape-handling mechanism into and out of operating position. This ball clutch mechanism is so arranged that during counter-clockwise rocking of the handle 201 from the position indicated in broken lines in Fig. 18, through about 120°, into the position indicated in broken lines in Fig. 24, the shaft 202 is coupled to the sleeve 204 so that the latter is rocked to swing the tape-handling mechanism from the inactive position into the active position and simultaneously shift the discharge roller mechanism from active position into inactive position, all as shown in Fig. 24. The mechanism is so arranged that if the handle 201 is then rocked an additional distance counter-clockwise into the position shown in broken lines in Fig. 27, the shaft 202 is uncoupled from the sleeve 204 and

is coupled to the arm 339 so as to shift the water pot from inactive to active position. It should be noted that it is possible to swing the water pot into active position only after the discharge roller mechanism has been swung into inactive position, as may be observed from inspection of Figs. 19 and 20.

The ball clutch mechanism comprises an arm member 341 pinned to the shaft 202 and having parallel end faces which abut against the arm 339 and against a flange 342 on the end of sleeve 204, respectively. The arm member 341 has a hole 343 therein of diameter to contain a pair of balls 344. It will be observed from inspection of Fig. 28 that the thickness of the arm 341 is less than twice the diameter of the balls 344, so that they cannot be completely contained within the hole 343 but must protrude from one end or the other of the hole.

With the handle 201 in the position shown in broken lines in Fig. 18, with the tape-moving mechanism in inactive position, and with the water pot in inactive position, the parts of the ball clutch occupy the relative positions shown in Fig. 23, in which it will be observed that the arm member 341 rests against a flat portion of the arm 339 and is juxtaposed to a recess 342a in the flange 342 so that the flange 342 is constrained to rock with the arm 341. This condition prevails during rocking movement of the arm 341 in the direction of the arrow in Fig. 8 until the handle 201 reaches the intermediate position indicated in broken lines in Fig. 24, at which time the hole 343 in the arm 341 moves into registration with a recess 339a in the arm 339, as indicated in Fig. 25. At this time the tape-handling mechanism has been moved into active position and further movement of the sleeve 204 is prevented. Therefore when the handle 201 is rocked further counter-clockwise from the position shown in Fig. 24 into the position shown in Fig. 26, the upper ball (Fig. 25) is forced out of the recess 342a and the lower ball is simultaneously forced into the recess 339a so that the further movement of the arm 341 shifts the arm 339, as shown in Fig. 27. This rocks the arm 339 to shift the water pot from inactive to active position, as shown in Fig. 27.

To facilitate proper operation of the ball clutch mechanism, as described, the arm 339 (Fig. 27) is provided with an arcuate surface 345 concentric with the shaft 202 and having a pair of recesses 346 and 347 which receive a spring-pressed ball detent 348, when the water pot is in its two positions of operation. Thus as shown in Fig. 27, when the water pot is in active position, the detent 348 is in the recess 347 which tends to retain the mechanism in the position shown. On the other hand, when the handle 201 is in the intermediate position shown in Fig. 24, then the ball detent 348 is in the recess 346 and properly centers the arm 339 while the water pot is in inactive position. The detent mechanism is desirable because there is substantial lost motion in the gear rack and segment connection to the water pot, and the limiting positions of the pot mechanism alone do not accurately fix the limit positions of the arm 339. It is desirable that the limit positions of the arm 339 be accurately fixed in order to insure proper operation of the ball clutch mechanism.

It is to be understood that although for the purpose of explaining the invention a particular embodiment thereof has been described in con-

siderable detail, many variations from the exact construction disclosed will occur to those skilled in the art, and the invention is to be limited only as set forth in the appended claims.

We claim:

1. Printing apparatus comprising: a rotary printing head and a rotary platen for engaging matter to be printed, and feeding it therebetween while printing on it, means for rotating said platen and printing head to print matter engaged therebetween, said platen and printing head releasing said matter at the completion of the printing thereon, rotary means for engaging the printed matter and discharging it, means for rotating said discharging means following termination of rotation of said printing head, rotary means having substantial inertia coupled to said discharge member for rotating the latter, driving means for rotating said printing head and platen, and over-running clutch means coupling said driving means to said inertia means for driving the latter, said over-running clutch permitting said inertia means to continue rotating independently of said driving means.

2. Printing apparatus comprising: a rotary printing head and a rotary platen for engaging matter to be printed, and feeding it therebetween while printing on it, means for rotating said platen and printing head to print matter engaged therebetween, said platen and printing head releasing said matter at the completion of the printing thereon, rotary means for engaging the printed matter and discharging it, means for rotating said discharging means following termination of rotation of said printing head, a rotary means having substantial inertia coupled to said discharge member for rotating the latter, driving means for rotating said printing head and platen, an over-running clutch means coupling said driving means and said inertia means for driving the latter, said over-running clutch permitting said inertia means to continue rotating independently of said driving means, said discharge means rotating at a higher speed than said printing head, whereby it accelerates matter moving past said printing head upon release of the matter by the printing head.

3. Printing apparatus comprising in combination: a rotary printing head and a rotary platen for engaging matter to be printed and carrying it therebetween, means for rotating said printing head and platen, a movable stop member positioned in the path of matter moving into position to be engaged by said platen and printing head, and determining the position of said matter at the time of engagement by the printing head and platen, said stop being movable through a limited path by said matter, an abutment for limiting the movement of said stop by said matter, and means responsive to rotation of said printing head and platen into driving relation with said matter to move said abutment out of engagement with said stop member whereby said stop member may move completely out of the path of said matter.

4. Apparatus as described in claim 3, in which said machine is cyclically operable, with said platen and said printing head each rotating through one revolution during each said cycle, and means for restoring said stop member into stopping position at the completion of each cycle of operation.

5. Printing apparatus including a rotatable printing head, a rotatable platen cooperating with said printing head to engage matter to be

printed and feed it therebetween, in which said platen has a relieved section normally juxtaposed to said printing head to permit insertion of matter to be printed between said platen and printing head, driving means for rotating said platen and printing head in synchronism with each other to engage matter positioned therebetween, and means for adjustably rotating said platen relative to said printing head to adjust the relative positions to a new relationship for continued operation.

6. A printing machine comprising in combination: a printing head and a printing platen adapted to print upon and feed an object entered therebetween, a discharging means for receiving an object from said printing head and platen, said discharging means being movable between operative and inoperative positions, a tape-supporting and feeding mechanism movable between inoperative and operative positions, a control member movable between two positions, and means responsive thereto for simultaneously shifting said tape-supporting means from inoperative to operative positions and said discharge means from operative to inoperative positions, respectively, said means including a mechanism interconnecting said control member and said tape-supporting mechanism operable in all positions to transmit motion from said control member to said tape-supporting mechanism, but incapable of transmitting motion from said tape-supporting mechanism to said control member in the operative position of said tape-supporting means.

7. In a device for printing and feeding tape between a rotary platen and a cooperating rotary printing head adapted to engage and feed a tape to be printed on therebetween, the combination of, means for feeding a tape to said printing head and platen comprising an arcuate tape chute of substantially uniform curvature for guiding tape through and beyond the contact line of the printing head and platen, and means supporting said tape chute for rocking movement substantially about its axis of curvature from operative position between said printing head and platen to inoperative position spaced from said printing head.

8. A printing machine adapted to print on and feed tape, comprising: a printing head and platen adapted to engage, print on and feed a tape therebetween, driving means for rotating said printing head and platen, said driving means including a shaft for supporting and rotating said platen, tape-supporting means defining a tape chute for guiding tape in a predetermined path between said printing head and platen, an interlock means comprising means rotating with said shaft and defining a shoulder, stop means movable into the path of said shoulder for preventing rotation of said shaft, and means adapted to abut against and be stopped by tape in said chute for holding the stop member clear of said shoulder in response to tape in said chute.

9. Apparatus as described in claim 8, with means for supporting said tape-supporting means for rocking movement between operative and inoperative position, said stop means being mounted upon said tape-supporting means and moving clear of said shoulder in response to movement of said tape-supporting means into inoperative position.

10. Printing apparatus comprising: a printing head and cooperating platen for printing on a tape; tape-supporting means defining a chute for guiding tape past said printing head and platen, means for driving said printing head and

platen, interlock means including a shoulder movable with said printing head and platen, and stop means movable to intercept said shoulder for blocking operation of the printing head, means for moving said stop means into position to intercept said shoulder, comprising finger means movable against tape in said chute, whereby the tape supports the finger and maintains said stop out of engagement with said shoulder, means for cyclicly operating said printing head and platen through a cycle, which cycle includes a printing phase, and means responsive to movement of the machine into the printing phase for lifting said finger from said tape during said printing phase of the cycle.

11. A printing apparatus comprising a printing head and cooperating platen for printing on a tape comprising: tape-supporting means defining a chute for guiding tape past said printing head and platen, means for driving said printing head and platen, interlock means for blocking operation of the printing head including finger means movable against tape in said chute, whereby the tape supports the finger and disables said interlock, driving means for cyclicly operating said printing head and platen through a cycle to print an impression on said tape, means operable by said driving means for retracting said tape in said chute prior to engagement of the tape by the printing head and advancing the tape through the chute following the completion of the printing operation thereon, and means responsive to movement of said driving means for lifting said finger from said tape during said tape-retracting and advancing movements.

12. In a printing machine including a printing head and a printing platen, the combination of a chute for guiding tape between said printing head and platen, said chute including means for slidably engaging the edge portions of a tape, means for shifting the tape longitudinally in said chute comprising a supporting means and means for moving it parallel to said chute, and means extending from said supporting means above and below a tape within said chute, and clamping said tape therebetween intermediate the edge portions of said chute.

13. In a printing machine having a printing head and a printing platen and means for rotating said printing head and platen to print on a tape moving therebetween, the combination of a tape chute for guiding tape past the contact line of said printing head and platen, tape-moving means operable in a first direction to retract a tape in the chute and operable in the opposite direction to advance the tape in the chute, actuating means movable through a predetermined distance, and means responsive to movement of said actuating means through said predetermined distance for first moving said tape-moving means in one direction to retract said tape in said chute, then engage said printing head and platen with said tape to print on the tape and advance the tape through the chute, then move said tape-moving means in said other direction to additionally advance the tape through the chute.

14. In printing apparatus having: a printing head and a cooperating platen, the combination of, a tape chute for guiding a tape between said printing head and platen, tape-moving means and means guiding it for bodily movement parallel to said tape, means yieldably urging said tape moving means in one direction, means operable to positively move said tape moving means

in the opposite direction and then release it for restoring movement by said yieldable means, and adjustable stop means for contacting said member and limiting the extent of return movement thereof by said yieldable means.

15. Printing apparatus comprising: a printing head and platen for printing on a tape fed therebetween; a tape chute for guiding tape to and past said printing head; interlock means for preventing operation of said printing head unless tape is in said chute, said interlock means including blocking means for said printing head and control means for said blocking means, including a finger adapted to press against and be restrained by tape in said chute; means for retracting and advancing tape in said chute including a spring-pressed member adapted to grip tape in said chute; a control member and means responsive to said control member for simultaneously retracting both said interlock finger and said tape-clamping finger to free tape in the chute for unrestricted movement there-through.

16. Printing apparatus comprising, in combination, a rotary printing head and a rotary platen for engaging matter to be printed and feeding it therebetween while printing on it, means for rotating said platen and printing head to print matter engaged therebetween, said platen and printing head being arranged to release said matter at the completion of the printing thereon, a discharging member for engaging said printed matter and discharging it from the printing apparatus subsequent to the printing operation, and inertia means for operating said discharging means following completion of movement of said printing head and said platen.

17. A printing machine adapted to print on and feed tape, comprising, in combination, a printing head and platen adapted to engage, print on and feed a tape therebetween, driving means for rotating said printing head and platen, said driving means including a shaft for supporting and rotating said platen, tape supporting means defining a tape chute for guiding tape on a predetermined path between said printing head and platen, interlock means including a shoulder defining member rotating with said shaft, stop means movable into the path of said shoulder for preventing rotation of said shaft, and means located at the entry and discharge ends of said chute and adapted to abut against and be stopped by tape in said chute for holding said stop means clear of said shoulder as long as tape is at both ends of said chute.

18. In apparatus for moving strip tape to a predetermined printing position between a cyclicly operated rotary printing head and associated platen from a position remote from such printing position, said tape moving apparatus comprising, in combination, a member adapted to frictionally engage said tape at a point substantially spaced from the free end thereof and adapted upon actuation to move said tape end from a normal position remote from the printing position of the tape, a second tape engaging member juxtaposed to said first member and lying on the opposite side of said tape, said tape being gripped by said members, means operable at the beginning of the cycle of operation for actuating said first member to move said tape end from said remote position to said printing position wherein said tape may be printed upon by said printing head at a point spaced a predetermined distance from the tape

end, said printing head and platen being adapted to draw said tape between said members during the printing operation, and means operable subsequent to the printing operation for effecting relative movement between said members to move that portion of the tape to be printed during the next cycle of operation of the printing head and platen to said remote position.

19. In a printing machine including a rotary printing head and associated platen adapted to print on a strip of tape fed therebetween, the combination of means defining a tape chute for supporting the tape and feeding it to said platen, means adapted to rotate said printing head and platen through a cycle of operation to print an impression on said tape and including a cyclically operable driving means, means also operable by said driving means for retracting said tape in said chute prior to engagement of the tape by the printing head and for advancing the tape through the chute following the completion of the printing operation thereon, said driving means including a shaft, a cam on said shaft, a cam follower, means for engaging the tape in said chute, and means connecting said tape engaging means to said follower whereby said tape engaging means is oscillated to first retract and then advance said tape within said chute during each cycle of operation of the printing head and platen.

20. Apparatus as described in claim 19 in which said means for retracting and advancing said tape comprises means movable toward and away from tape in said chute to grip the tape

and movable parallel to said chute for retracting and advancing the tape.

21. Apparatus as described in claim 19, characterized by means for moving said tape engaging means rearwardly to retract said tape through a predetermined distance, and means responsive to movement of said tape engaging means into fully retracted position for disengaging it from the tape.

22. Apparatus according to claim 8 further including tape moving means operable in a first direction to retract a tape in said chute, and operable in the opposite direction to advance the tape in the chute, actuating means, and means responsive to movement of said actuating means for first moving said tape moving means in one direction to retract the tape in the chute thus to bring the tape to a position wherein it may be engaged by the printing head and platen which upon operation advance the tape through the chute, said responsive means subsequent to the operation of the printing head and platen then moving said tape moving means in the other direction to additionally advance the tape through the chute.

23. Apparatus according to claim 8 wherein the means which holds the stop member clear of the shoulder in response to tape in the chute comprises detector fingers at the entrance and exit ends of the chute which engage and are held by tape in the chute.

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