Jan. 6, 1953 J. D. KLOPFENSTEIN 2,624,276

SCREEN PRINTING MACHINE

Filed Dec. 16, 1947 8 Sheets-Sheet 1

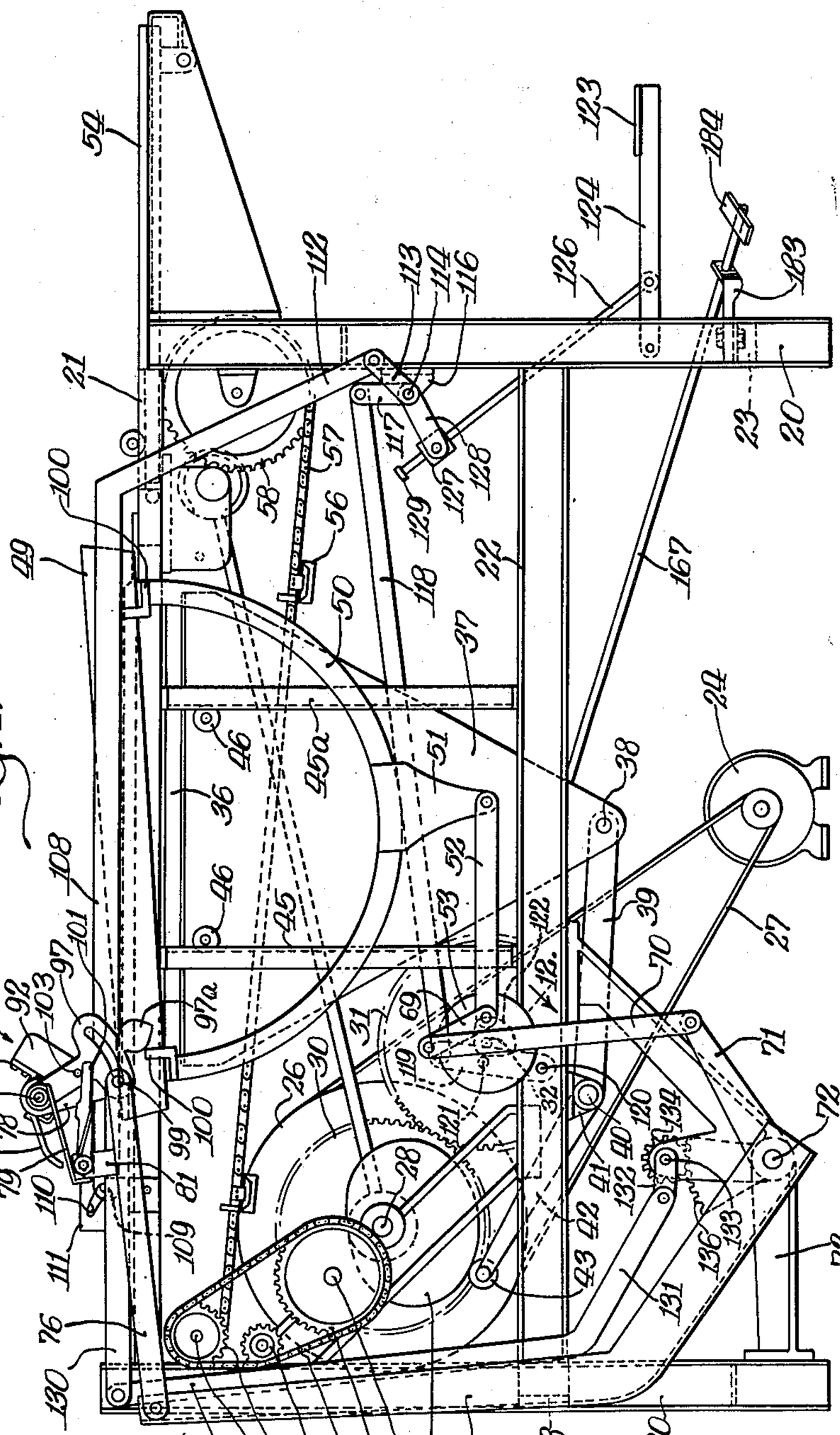

FIG. 1.

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SCREEN PRINTING MACHINE

Filed Dec. 16, 1947 8 Sheets-Sheet 2

Fig. 2.

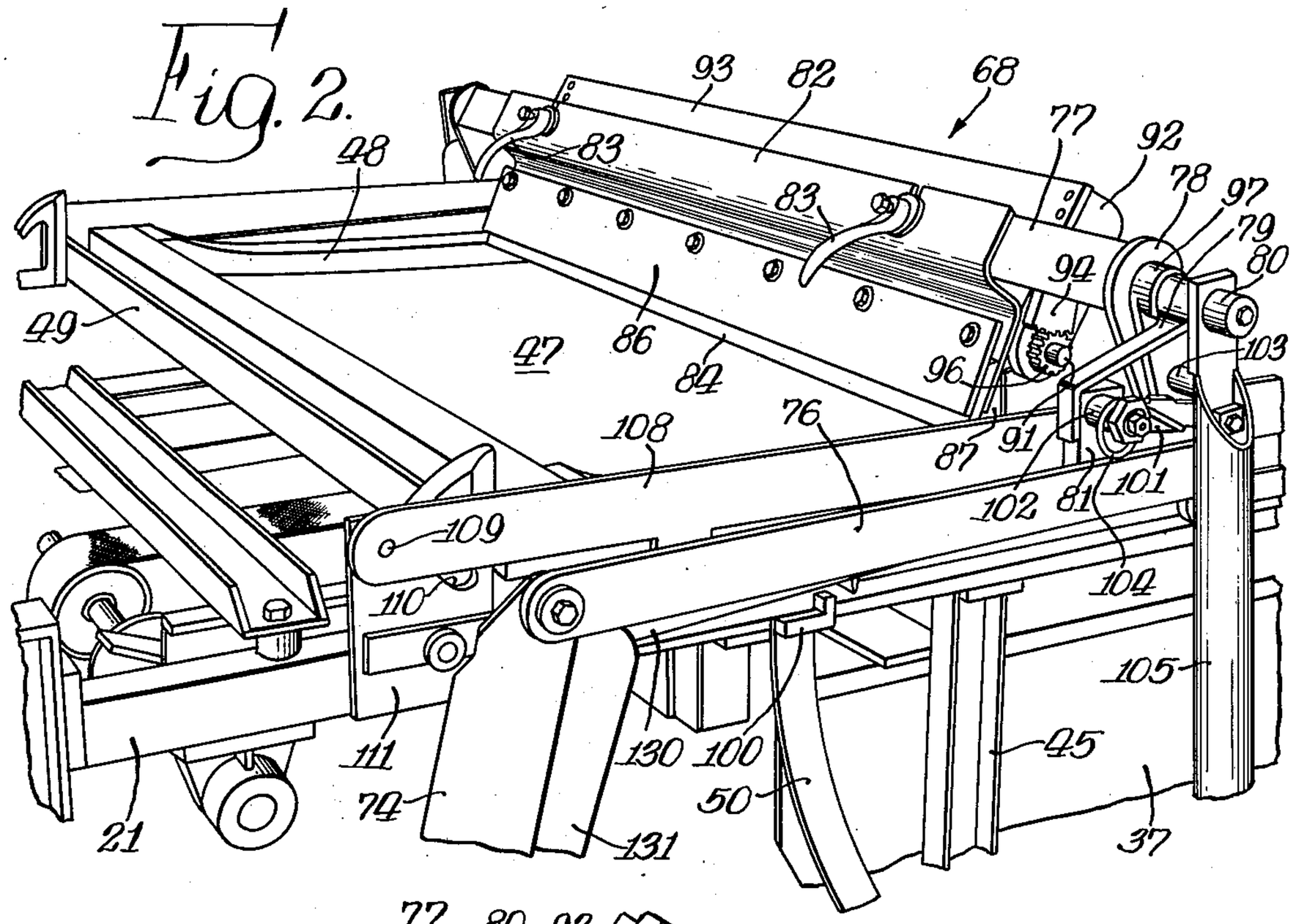

Fig. 3.

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SCREEN PRINTING MACHINE

Filed Dec. 16, 1947 8 Sheets-Sheet 3

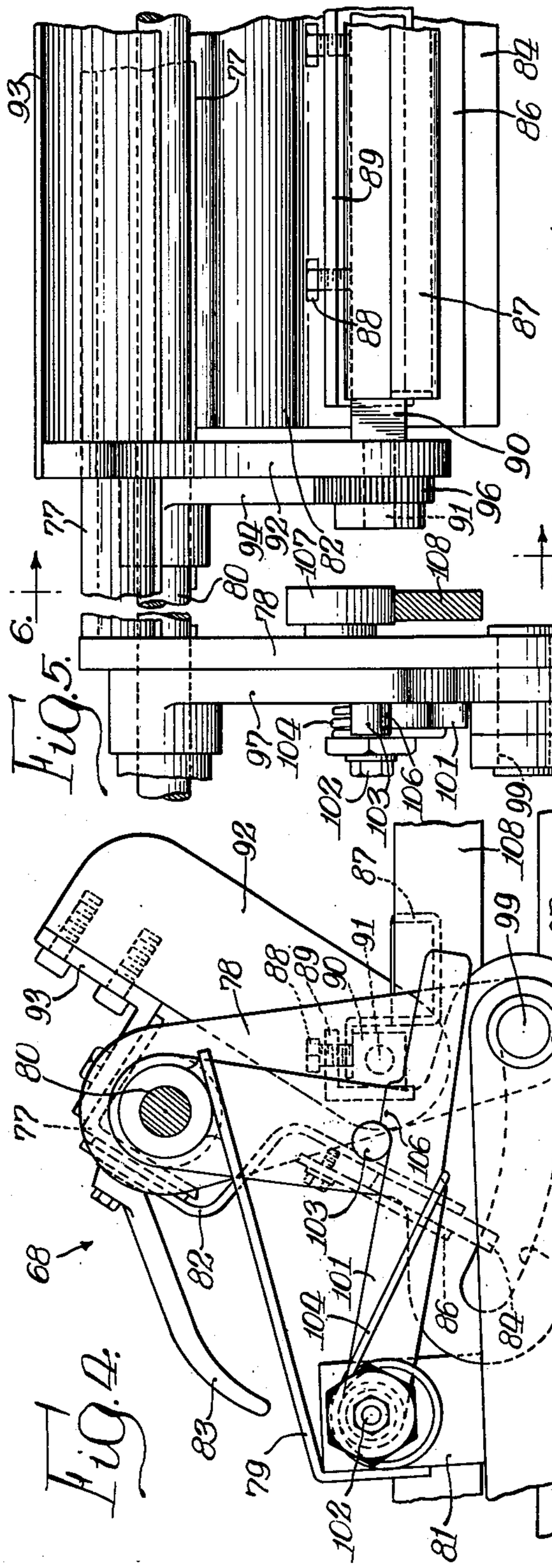

Fig. 5.

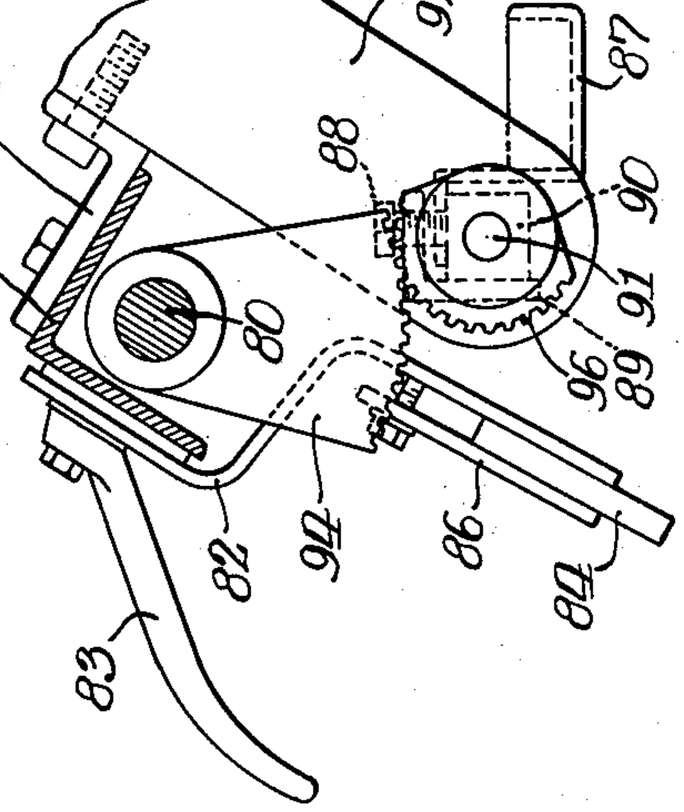

Fig. 6.

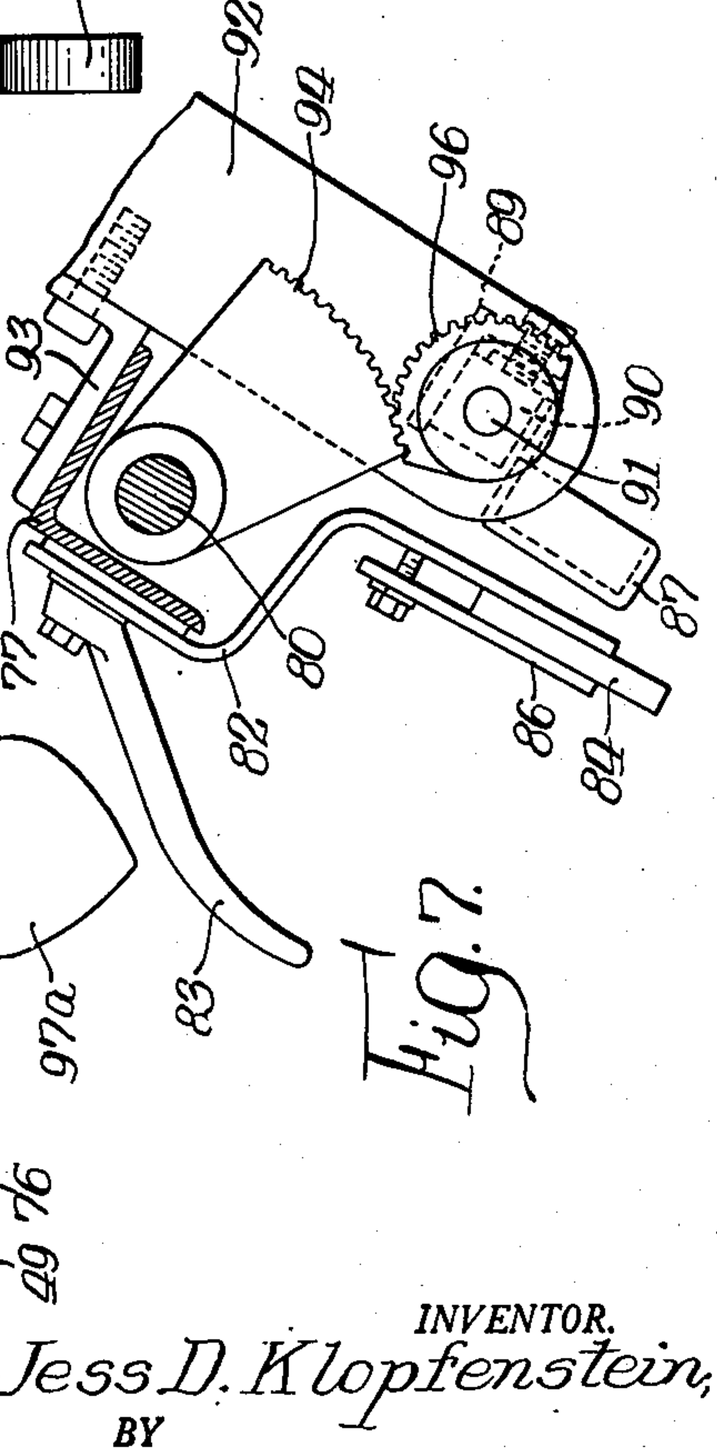

Fig. 7.

Fig. 4.

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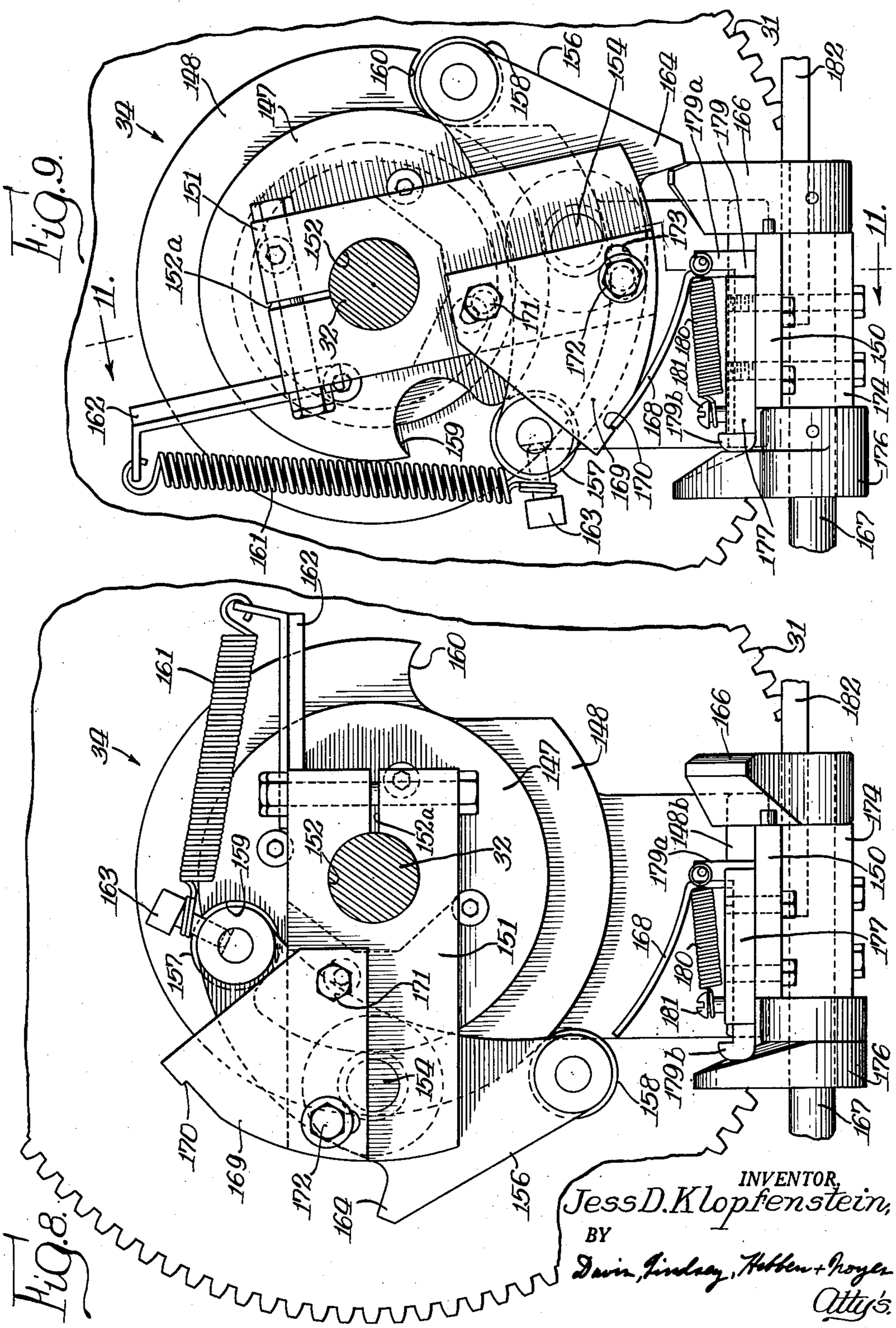
SCREEN PRINTING MACHINE

Filed Dec. 16, 1947 8 Sheets-Sheet 4



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SCREEN PRINTING MACHINE

Filed Dec. 16, 1947 8 Sheets-Sheet 5

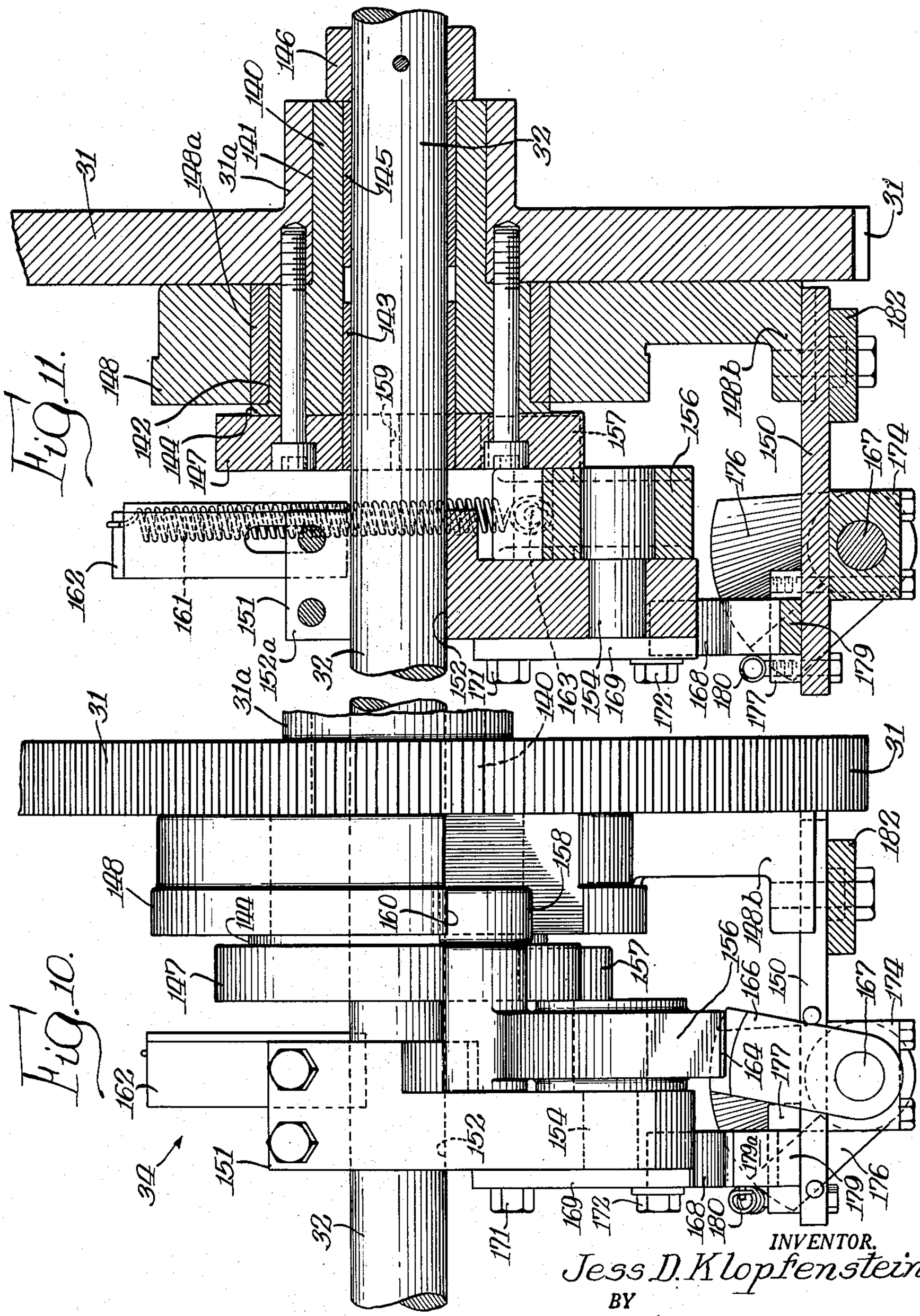

FIG. 11.

FIG. 10.

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SCREEN PRINTING MACHINE

Filed Dec. 16, 1947 8 Sheets-Sheet 6

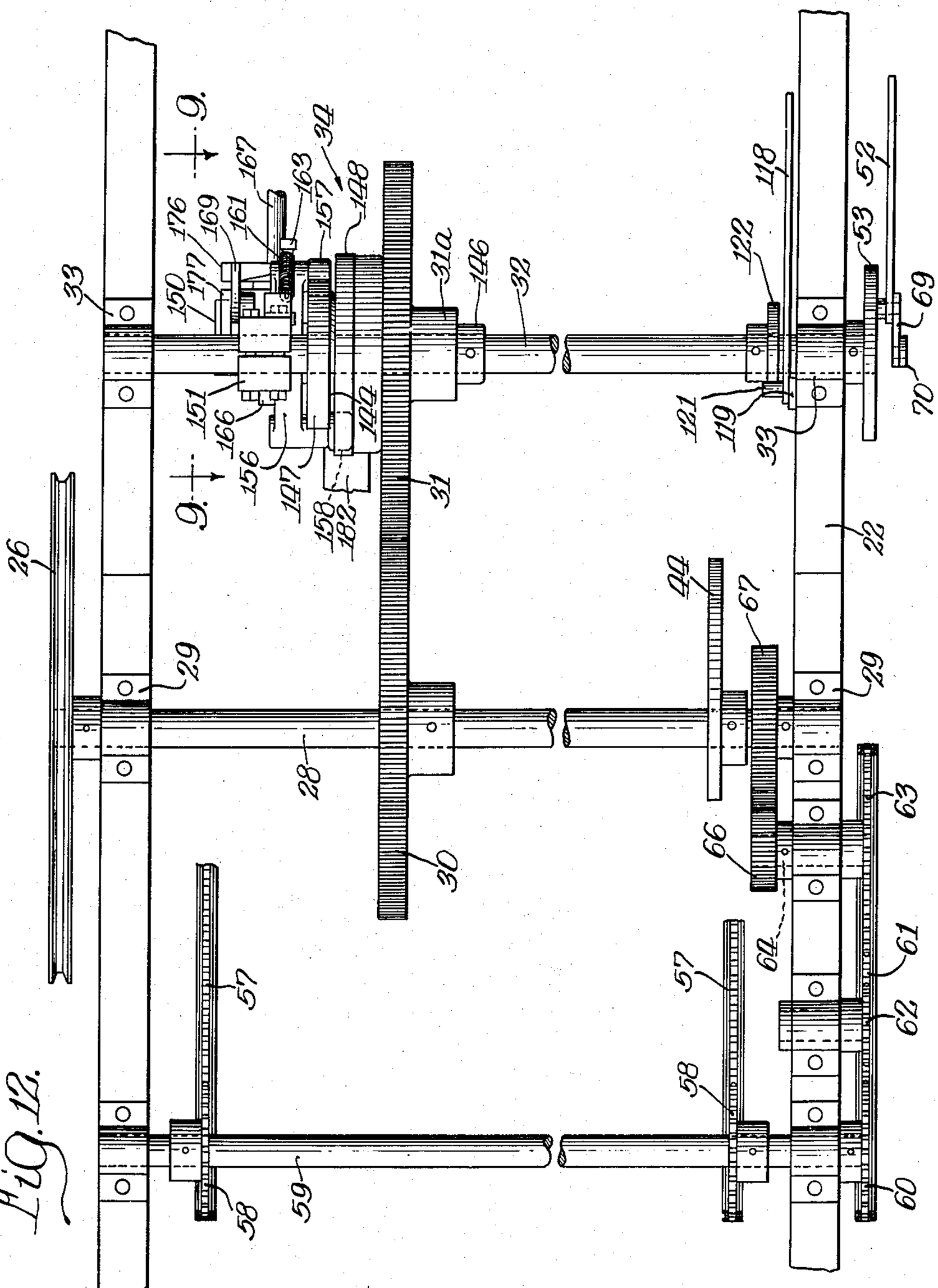

Fig. 12.

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SCREEN PRINTING MACHINE

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Fig. 13.

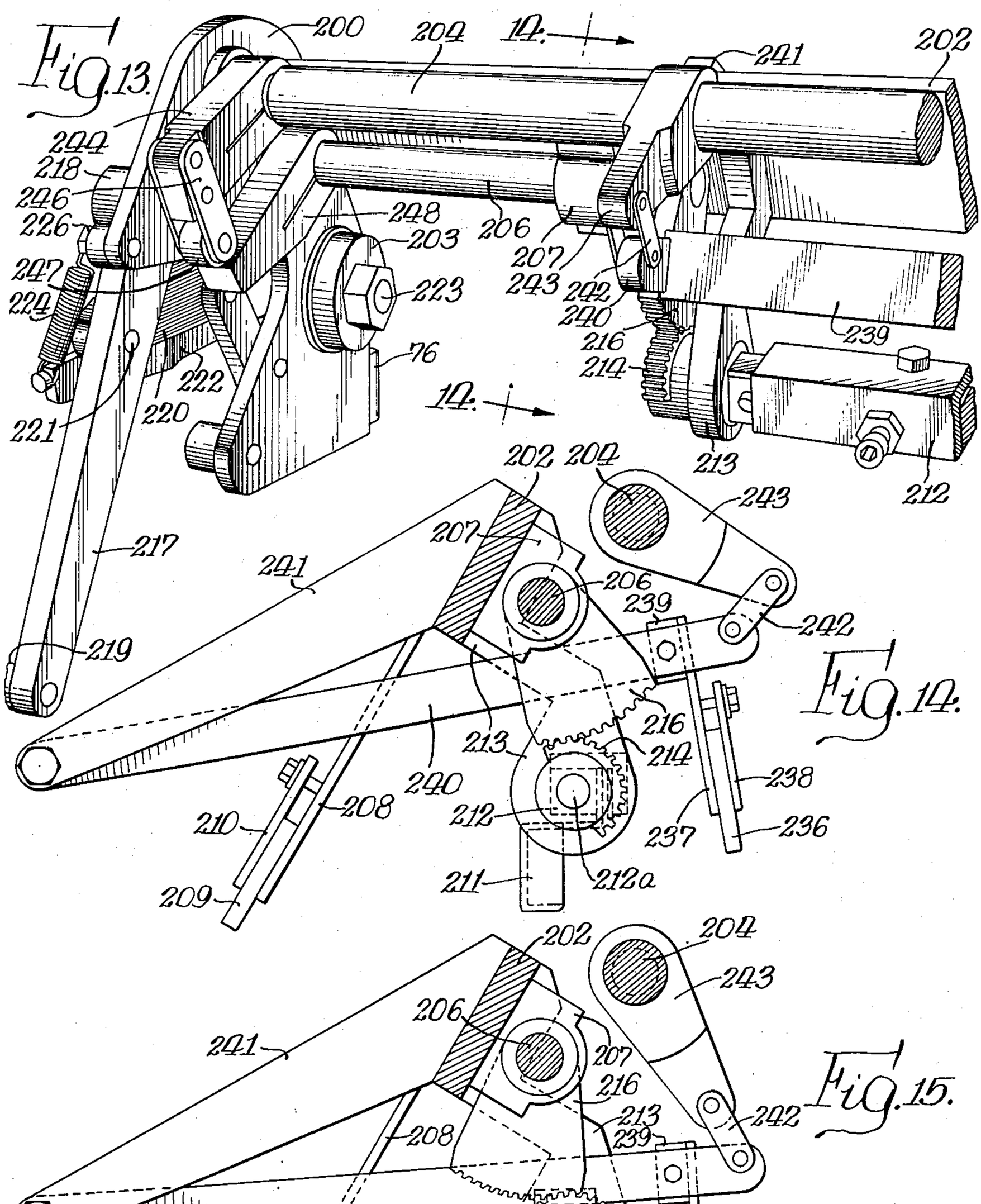

Fig. 14.

Fig. 15.

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SCREEN PRINTING MACHINE

Filed Dec. 16, 1947 8 Sheets-Sheet 8

Fig. 16.

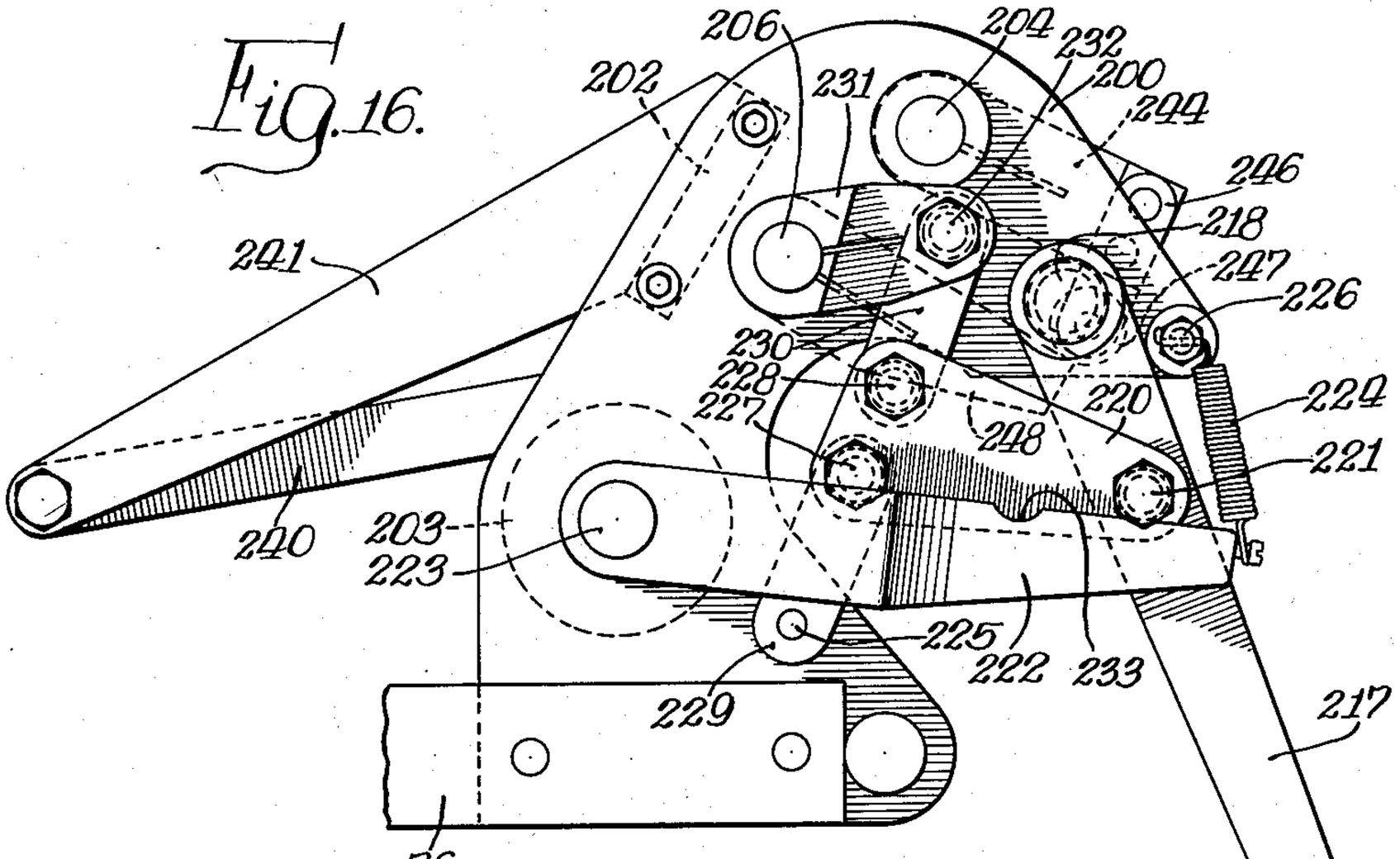
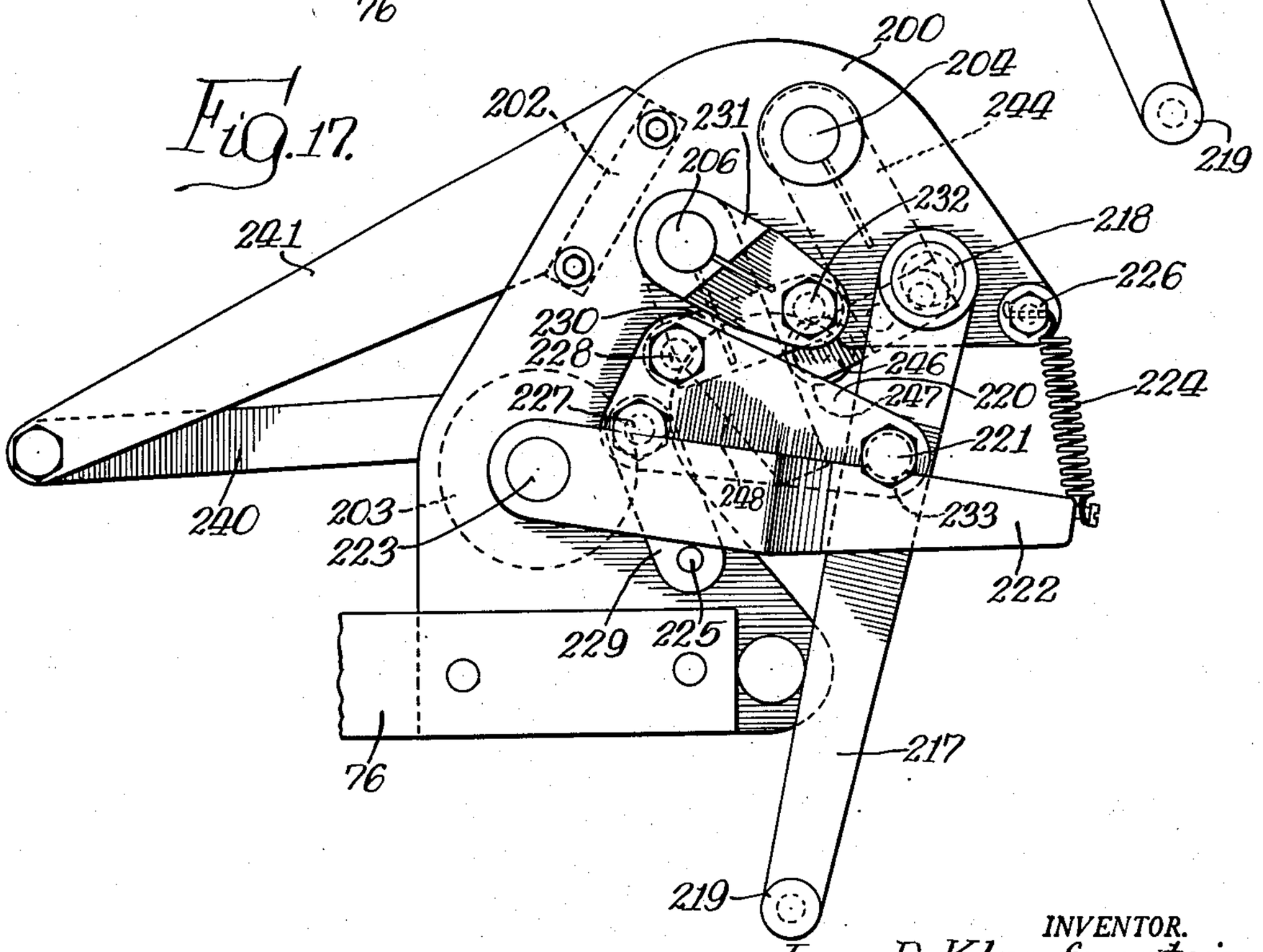


Fig. 17.



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Patented Jan. 6, 1953 2,624,276

UNITED STATES PATENT OFFICE

2,624,276

SCREEN PRINTING MACHINE

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Application December 16, 1947, Serial No. 791,955

14 Claims. (Cl. 101—123)

1

This invention relates to a screen printing machine and more particularly to a novel form of squeegee mechanism adapted to be reciprocated over a stencil screen and to a novel form of clutch mechanism by means of which the operation of the squeegee mechanism and other moving parts of the machine may be stopped with the machine in open position for adjustment without effecting stoppage of the entire machine.

One of the principal objects of the present invention is to provide a screen printing machine having a squeegee mechanism in accordance with which the squeegee prints in one direction only and not on its return stroke.

Another object of the invention is to provide a reciprocating squeegee mechanism for a screen printing press having a squeegee adapted to print in one direction only and a scoop adapted to pick up a quantity of the printing ink at the end of the printing stroke and to transport it on the return stroke to the other end of the screen where it is spilled in front of the squeegee prior to the beginning of the printing stroke.

Another object is to provide a reciprocating squeegee mechanism for a screen printing machine having a squeegee adapted to engage the stencil screen and print in one direction only and to be disengaged therefrom on the return stroke, and also having a movable scoop adapted to pick up a quantity of printing ink at the end of the printing stroke and transport it to and deposit it at the other end of the screen, said squeegee and said scoop being movable to their various positions by automatic means at the ends of the printing and return strokes.

A further object of the invention is to provide a screen printing machine having a printing bed movable to and from printing position and under a stencil screen and a squeegee mechanism adapted to be reciprocated over the stencil screen for printing in one direction only and for return movement in the other direction, the squeegee mechanism being provided with a printing squeegee adapted to engage the screen on the printing stroke only and an ink spreading member adapted to engage the stencil screen only on the return stroke when the screen is unsupported by the printing bed which is in withdrawn, inoperative position.

A still further object is to provide a squeegee mechanism for a screen printing machine having a squeegee adapted to print against the stencil screen in one direction only and also having provision for interchangeably mounting a scoop device and an ink spreading member, the scoop

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device being adapted to pick up a quantity of ink at the end of the printing stroke and transport and deposit the ink at the other end of the screen on the return stroke, and the ink spreading member being adapted to engage the stencil screen on the return stroke and to spread ink thereover and therein when the screen is unsupported by the printing bed which is in withdrawn position.

Another further object is to provide a squeegee mechanism of the character referred to in the foregoing object and having automatic means operable at the ends of the printing and return strokes for moving the squeegee, the scoop or the ink spreading member to their various operating positions.

Another object is to provide a screen printing machine in which the moving parts, which may include a reciprocating squeegee mechanism, a movable printing bed, a rocker cradle and a squeegee elevating mechanism, are driven off of a common shaft and in which a novel form of clutch mechanism is interposed in the driving connections between the source of power and the shaft, the clutch providing means by which the squeegee mechanism and the other moving parts may be stopped without causing stoppage of the other elements of the machine.

A further object is to provide a novel form of clutch mechanism by which certain moving parts of a screen printing machine may be caused to cease operation without causing stoppage of the entire machine, thereby permitting adjustment of the machine while still in partial operation and when in open position.

Still another object of the present invention is to provide novel means and structures by which the foregoing objects may be accomplished.

Other and further objects and advantages of the invention will become apparent as this description progresses, reference being had to accompanying drawings, in which:

Figure 1 is a side elevational view of a rocker screen printing machine on which are operably mounted the novel squeegee mechanism and the novel clutch mechanism for stopping operation of the squeegee mechanism as well as other movable parts and comprising the present invention;

Fig. 2 is an enlarged, fragmentary, side perspective view of the upper portion of the machine showing a squeegee mechanism comprising one embodiment of the present invention;

Fig. 3 is an enlarged, fragmentary side elevational view of the squeegee mechanism shown in Fig. 2, certain of the parts thereof being shown

in broken lines and the mechanism being shown in its position as it approaches the end of the printing stroke;

Fig. 4 is a view similar to Fig. 3 but showing the relative positions of the squeegee and scoop during the return stroke;

Fig. 5 is a fragmentary, elevational view of one end of the squeegee mechanism as viewed from the feeding end of the machine;

Fig. 6 is a side elevational view taken on the line 6—6 in Fig. 5, looking in the direction of the arrows, and showing the scoop operating mechanism and showing the scoop in horizontal, ink supporting position on the return stroke;

Fig. 7 is a view similar to Fig. 6 but showing the scoop in its depending, ink-depositing position on the printing stroke;

Fig. 8 is an axial, fragmentary view of a novel type of clutch mechanism comprising one embodiment of the present invention and mounted on the shaft for driving the squeegee mechanism and certain other moving parts of the machine, the parts being shown in driving, clutched position;

Fig. 9 is a view similar to Fig. 8 showing the parts latched in declutched position;

Fig. 10 is a side elevational view of the clutch mechanism shown in Figs. 8 and 9;

Fig. 11 is a vertical sectional view of the clutch mechanism taken on the line 11—11 in Fig. 9, looking in the direction of the arrows;

Fig. 12 is a fragmentary, top view taken on the line 12—12 in Fig. 1, looking diagonally downwardly in the direction of the arrows:

Fig. 13 is a fragmentary, perspective view of one end portion of a second form of squeegee mechanism comprising the present invention in which a scoop or an ink spreading member may be interchangeably mounted;

Fig. 14 is a vertical sectional view taken on the line 14—14 in Fig. 13 and showing the printing squeegee, the scoop and ink spreading member as they appear during the printing stroke;

Fig. 15 is a vertical sectional view similar to Fig. 14 but showing the relative positions of the parts on the return stroke;

Fig. 16 is a side elevational view of the second embodiment of squeegee mechanism as viewed from the left in Fig. 13 and showing the relative positions of the parts during the printing stroke; and

Fig. 17 is a view similar to Fig. 16 but showing the relative positions of the parts during the return stroke.

General construction of machine

Referring more particularly to Figs. 1, 2 and 12 of the drawings, the rocker screen press therein illustrated comprises a main upright frame of generally rectangular character. This frame includes four corner upright members 20, longitudinal top and lower rails 21 and 22, respectively, and transverse rails 23. The source of power for operating the machine is an electric motor 24 which drives a pulley 26 by means of a belt drive 27. The pulley 26 is secured on one end of the main drive shaft 28 of the press, the shaft 28 being rotatably supported by bearing members 29 carried by the main frame. A large gear 30 is secured for rotative movement on the main shaft 28 and is in constant mesh with another large gear 31 loosely carried on another rotatable shaft 32 journaled in bearing members 33 also supported by the main frame. Rotation of the shaft 32 is effected by the gear 31 through a novel form

of clutch mechanism indicated generally by the numeral 34 in Fig. 12 and to be described more fully hereinafter by reference to Figs. 8 to 11, inclusive, wherein the mechanism is shown in enlarged detail.

The upper central portion of the press is provided with an opening adapted to receive a vertically movable table or bed 36 carried by triangularly shaped side supports 37 connected at their pointed lower ends by a transverse rod 38. A link 39 is pivotally secured at one of its ends to the rod 38 and at its other end the link 39 is fixed to a rotatable shaft 40 journaled in bearing brackets 41 mounted on the main frame. A lever 42 has its lower end fixed to the shaft 40 and its upper or free end is provided with a roller 43 which, under the weight of the printing bed 36 and the supports 37, is adapted to be maintained in constant bearing engagement with a rotating cam 44 secured on the main drive shaft 28. Thus, as the lever 42 is rocked downwardly in a counterclockwise direction or is permitted to move upwardly by the cam 44, the bed supports 37 and the bed 36 are raised or lowered in timed relation to movement by other parts of the machine during operation. The vertical reciprocal movement of the platen supports 37 is controlled and guided by spaced rollers 46 carried by the supports 37 and adapted for rolling movement in vertical tracks formed in spaced upright members 45 and 45*a* secured in vertical position between the upper and lower frame rails 21 and 22 on each side of the machine.

Over the platen table 36, as shown in Figs. 1 and 2, there is a stencil screen 47 stretched within a frame 48 secured within a curved support or cradle 49, the cradle 49 being adapted for rocking movement in a longitudinal direction on the upper portion of the press. The rocking movement of the screen cradle 49 is accomplished by means of semi-circular brackets 50 secured to the under side thereof at each side of the machine, the brackets having depending plates 51 pivotally connected at their lower ends to the right ends of horizontal links 52. The other ends of the links 52 are pivotally and eccentrically secured to a rotatable disc 53 secured on the rotatable shaft 32, and consequently, upon rotation of the disc 53 the screen cradle 49 is rocked through the links 52, the plates 51 and the brackets 50. By such rocking movement the stencil screen 47 is caused to be peeled cleanly and without smudging from the imprinted sheet supported on the printing bed 36.

Preparatory to printing, a plurality of sheets may be placed upon a table 54 at the feed end of the press, which is the right side thereof as viewed in Fig. 1, where the operator may be stationed. The sheets are adapted to be fed into the press by the operator and their forward ends are engaged in the usual manner by a plurality of gripper bars 56 carried in spaced relation by spaced conveyor chains 57 extending around sprocket wheels 58 rotatably supported at the feed and delivery ends of the press. Movement of the conveyor chains 57 is in the direction of the delivery end of the machine, or to the left as viewed in Fig. 1, so that the gripped sheets are moved from the table 54 to the printing position on the platen 36 from which they are moved, after printing, to the delivery end of the machine from which they are removed for drying.

Movement of the conveyor chains 57 is effected by movement of the sprocket wheels 58 at the

delivery end of the press which are fixed on a rotatable cross shaft **59** to which is also fixed a sprocket wheel **60** engaged by a chain **61**. The chain **61** passes over an idler sprocket **62** and is driven by a sprocket wheel **63** secured on a spindle **64**. A gear **66** is also secured on the spindle **64** and meshes with another gear **67** mounted on the main drive shaft **28**, which upon rotation causes movement of the conveyor chains **57** through the above described driving mechanism.

The squeegee mechanism

The squeegee mechanism, indicated generally by the numeral **68** in Figs. 1 and 2 of the drawings, extends transversely across the top of the press and is adapted to be reciprocated over and against the stencil screen **47** to cause an imprint to be made in the usual manner on the sheet supported therebelow on the platen bed **36**. In accordance with the novel means to be described in detail hereinafter the squeegee **68** is adapted to engage the stencil screen for printing only as it moves from its left hand position adjacent the delivery end toward the operator at the feed or right end of the press. Upon its return movement to the left, the squeegee mechanism **68** is maintained in raised position above and out of contact with the screen **47** so that printing is accomplished only in one direction with the result that the sheets need not be segregated as is the case where the squeegee prints in both directions of movement. It has been found that a slight stretching or distortion of the stencil screen occurs in the direction of movement of a squeegee and, hence, it is necessary that all prints on a sheet be made in the same direction in order to prevent overlapping of the colors of the various prints constituting the completed design.

The reciprocal printing and return movement of the squeegee mechanism **68** is, like the vertical movement of the bed **36** and the rocking movement of rocker cradle **49**, accomplished by driving connections with the rotatable shaft **32**. These connections comprise a short crank **69** eccentrically pivoted at one end to the rotating disc **53** on the shaft **32** and having its other end pivotally secured to the end of a vertical link **70** which extends downwardly into pivotal engagement with the end of a crank **71**. The other end of the crank **71** is fixed to a rocker shaft **72** journaled in a bracket **73** on the main frame and likewise the lower ends of a pair of large vertically directed levers **74** are also fixed to the rocker shaft. The levers **74** extend upwardly on the outside of the main frame adjacent the delivery end of the press and their respective upper ends are pivoted to the left ends of horizontal links **76** which extend to the right in secured engagement with the squeegee mechanism **68**. Thus, as the shaft **32** is rotated in a clockwise direction as viewed in Fig. 1, the link **70** is moved downwardly causing the crank **71** to also turn in a clockwise direction. As a result, the shaft **72** is also rotated in a clockwise direction which moves the upper ends of the vertical levers **74**, the links **76** and the squeegee mechanism **68** toward the right on its printing stroke. Upon continued rotation of the shaft **32** in the clockwise direction, the vertical link **70** is pulled upwardly causing movement of the vertical levers **74** to the left, thus pulling the squeegee mechanism **68** to the left on its return, non-printing stroke.

The squeegee mechanism **68**, as shown more particularly in enlarged detail in Figs. 2 to 7, inclusive, of the drawings, comprises an elongated angular plate **77** which extends transversely of the press and has its respective ends rigidly secured to the upper portions of vertical end plates **78**, the end plates **78** and the transverse plate **77** constituting the squeegee frames. The lower portions of the end plates **78** are pivotally secured to the right ends of the horizontal links **76**, respectively, and this assembly is braced by an angular strap member **79** extending between a transverse rock shaft **80** and an upstanding bar element **81** rigidly secured at one side of the machine to the inner surface of one of a pair of horizontal links. The respective ends of the rock shaft **80** are journaled in the upper ends of the end plates **78** immediately beneath the angular plate **77**.

The squeegee support proper comprises a transversely extending angular plate member **82** bolted to the left portion of the main angle plate **77** and to which two spaced handles **83** are secured to facilitate handling for installation and adjustment of the squeegee unit. The squeegee blade **84**, which may be composed of rubber or other suitable flexible material, is clamped to the lower end portion of the angular plate **82** by means of an elongated, flat plate **86** bolted to the upper surface of the angular plate **82** and it extends downwardly beyond the plates **82** and **86** so as to flexibly engage the stencil screen **47** on its printing stroke.

On the lower right side of the squeegee mechanism **68** adjacent to and ahead of the squeegee blade **84**, there is provided a pivotally movable scoop **87** extending across the stencil screen **47** and adapted to scoop up a quantity of the printing ink from the mass thereof at the right or fountain end of the screen and to transmit the ink to the left end of the screen upon the return stroke of the squeegee mechanism. As the end of the return stroke is reached, the scoop **87** is tipped so as to spill its contents onto the stencil screen **47** ahead of the squeegee and thus afford an adequate supply of ink for the squeegee blade **84** on its printing stroke. The scoop **87** is shown in depending, spilling position in Fig. 7 and in horizontal, ink transmitting position in Fig. 6. The scoop **87** is rigidly secured by means of bolts **88** and an angle plate **89** to an elongated bar **90** which is rectangular in cross section and has reduced cylindrical ends **91** journaled in a pair of depending bearing plates **92**. The bearing plates **92** are rigidly secured at their upper ends to another elongated angle iron **93** which is in turn rigidly secured to the right portion of the main angular supporting member **77** of the unit. It will thus be seen that the scoop **87** is adapted for pivotal rocking movement relative to the squeegee unit by the pivotal mounting of the scoop supporting bar **90** on the bearing plates **92**.

As shown in Figs. 2, 5, 6 and 7, the rocking movement of the scoop **87** is effected by means of a segment **94** rigidly secured to and depending from the main rock shaft **80** for rotation therewith adjacent the outer side of one of the end plates **92**. This segment **94** meshes with a small gear segment **96** secured on one of the journaled ends of the rotatable cross bar **90** so that upon rotation of the main cross shaft **80** the scoop will be caused to pivot in one direction or the other depending upon which end of its stroke the squeegee mechanism is being moved. Rotation of the main shaft **80** is accomplished by means of a pendulum-shaped rocking arm **97** fixed on the

main shaft 80 for rotation therewith between the one end plate 78 and the bracing strap 79. The arm 97 is provided intermediate its ends with an arcuate slot 98 through which projects the stud 99 connecting the horizontal link 76 to the end plate 78, this construction permitting the arm 97 to rock freely relative to the end plate 78 and the stud 99. The lower end 97*a* of the rocker arm 97 is heart shaped and is adapted to engage spaced stops 100 which may be secured on the upper ends of the rocker screen bracket 50. The stops 100 project upwardly into the path of movement of the arm 97 adjacent each end of the squeegee stroke with the result that the arm 97 will be rocked as the squeegee unit approaches either end of its stroke, thus causing the scoop 87 to be pivoted up or down from the depending to horizontal position and return.

In Fig. 1 the rocker arm 97 is illustrated in its position just after it has been rocked to the right in a counterclockwise direction at the end of its return stroke by engagement with the left stop 100. By such rocking action, the scoop 87 has been turned downwardly to the position shown in Figs. 3 and 7, so as to spill a major portion of its ink contents ahead of the squeegee 84. In this position the scoop 87 is still in spaced position above the stencil 47. However as the squeegee starts back on its printing stroke in engagement with the stencil screen, some of the printing ink is still contained in the inclined scoop 87 and it continues to drip therefrom ahead of the squeegee 84 during the printing stroke, thus further insuring an adequate supply of printing ink ahead of the squeegee, which, of course, is also pushing before it the ink supply spilled by the scoop.

In Fig. 3 of the drawings, the squeegee mechanism is shown as it appears at the end of its printing stroke just as the rocker arm 97 engages the right stop 100 but before it has been rocked thereby. Upon continued movement of the squeegee mechanism 68 to the right, the rocker arm 97 is swung to the left, as shown in Fig. 4, which causes the scoop 87 to pivot in a counterclockwise direction until it assumes the horizontal position shown in Figs. 4 and 6. As the scoop 87 moves from its downward or depending position to its horizontal position, its front lip is caused to scrape against the top of the stencil screen 47 at its right end under the mass of printing ink so as to cause a quantity of the printing ink to pass onto the scoop. The scoop 87 remains in its horizontal, ink-retaining position all during the return, non-printing stroke away from the operator, and during the return stroke some printing ink drips from the front lip of the scoop onto the stencil screen, thus providing an additional small quantity of ink for spreading by the squeegee 84 on its printing stroke. The scoop 84 is of such extent that it will be held in elevated position from the stencil screen 47 during the printing and return strokes but upon rotation is capable of extending downwardly into scraping contact with the screen 47.

In order that the scoop 87 may be retained in either its horizontal or downward positions, there is provided a yieldable latch mechanism shown in detail in Figs. 3 and 4 and comprising a horizontal arm 101 pivotally secured on a stud 102 carried by the upright bar element 81. This pivoted latch arm 101 is constantly urged upwardly into engagement with a roller 103, carried on the intermediate portion of the rocker arm 97, by means of a spring 104 supported

around the stud 102 and engaging the arm 101 intermediate its ends. The yieldable latch arm 101 is provided on its upper surface intermediate its ends with a raised abutment 106 so that the roller 103 may be retained on the top surface of the arm 101 on one side or the other of the abutment 106. When the scoop 87 is in its down position, the roller 103 is positioned on the right side of the abutment 106, as shown in Figs. 1 and 3, and when the scoop 87 is in its horizontal position the roller 103 is on the left side in engagement therewith, as shown in Fig. 4. Hence, as the rocker arm 97 is rocked by engagement with the stops 100, the roller 103 moves downwardly in an arcuate path and depresses the latch arm 101 and passes over the abutment 106. The roller 103 engages the abutment 106 when scoop 87 is in horizontal position, but is considerably beyond the abutment when the scoop is in downward position, the yieldable engagement between the roller 103 and the latch arm 101 being sufficient to retain the rocker arm 97 in its respective positions.

The squeegee 84 being rigidly mounted remains in the same angular position at all times as shown in Figs. 3 to 7, inclusive, of the drawings. However, it is in contact with the stencil screen 47 only during the printing stroke to the right and during the return stroke it is held in elevated position out of screen contact. Elevation of the squeegee 84 is accomplished by elevation of the entire squeegee mechanism 68 in the following manner. Each of the end plates 78 is provided with a roller 107 on its inner side which respectively engage the top surfaces of slidable tracks 108 mounted on each side of the machine along the top of the frame, and, as the squeegee mechanism 68 reciprocates on its printing and return strokes, the rollers 107 roll along the tracks 108 first in one direction and then the other. The rollers 107 are held down on the tracks 108 by spring tensioned rods 105 pivotally secured to the ends of the squeegee rock shaft 80.

The tracks 108, as shown in Figs. 1 and 2, are provided at their left ends with inwardly directed studs 109 slidably mounted in diagonal slots 110 formed in upstanding brackets 111 secured to the longitudinal frame member 21. At their right ends the tracks 108 are each provided with integral arms 112 which extend downwardly and rearwardly toward the feeding end of the machine adjacent the operator. The lower ends of the track arms 112 are pivotally secured to one end of short links 113 which have their other ends fixed to a cross rock shaft 114 journaled in brackets 116 secured to the right upright members 20. Another short vertical link 117 has its lower end fixed to the rock shaft 114 and its upper end is pivotally secured to the right end of a long horizontal link 118 which extends to the left over the shaft 32 into pivotal engagement with the upper end of a vertical lever 119. This latter lever 119 is pivotally supported at its lower end on a stud 120 supported on the main frame and it is provided intermediate its ends with a roller 121 which is in constant bearing engagement with a cam 122 rotatably carried on the shaft 32.

As the cam 122 rotates, the long link 118 is moved back and forth, rocking the short links 117 and 113 and raising and lowering the tracks 108. When the tracks 108 are raised at the end of the printing stroke, the studs 109 in their left ends slide upwardly into the upper end of the bracket slots 110 where they remain during the

entire return stroke of the squeegee mechanism 68, the lower ends of the tracks being supported against downward movement by the link mechanism under the urge of the cam 122. At the end of the return stroke, the tracks 108 are lowered, thus causing the squeegee 84 to engage the stencil screen 47 for the printing stroke.

In addition to the above-described automatic means for elevating the tracks 108 and consequently the squeegee mechanism 68, there is provided a treadle mechanism accessible to the operator at the feed end of the machine, as shown in Fig. 1. This mechanism comprises a vertically movable treadle 123 on the end of a lever 124 pivotally secured to one upright frame member 20. A vertical link 126 is pivoted to the lever 124 intermediate the ends thereof and extends upwardly through a block 127 in slidable relation therewith, the block 127 being secured on the end of a short link 128 which has its other end fixed on the rock shaft 114 for movement therewith. The vertical link 126 in normal position extends above and beyond the block 127 and on its upper end has an enlarged head 129 adapted to engage the block 127 when the treadle 123 is depressed by the operator. By reason of this lost motion connection, the rocking movement of the short link 128, which is occasioned, through the automatic linkage by the cam 122, does not cause unwanted movement of the link 126 or the treadle 123. However, should the operator for any reason desire to elevate the squeegee mechanism 68 during its printing stroke, he may do so by depressing the treadle mechanism which rocks the shaft 114 and hence raises the tracks 108.

At the top of the machine and on each side thereof, the horizontal, leveling links 130 are rigidly connected at their right ends to the studs 99 of the end plates 78 of the squeegee mechanism 68 and their left ends are pivoted to the upper ends of vertical levers 131 disposed inwardly adjacent the vertical levers 74. The lower ends of the levers 131 are in turn pivoted to short cranks 132 fixed on a cross rock shaft 133. A gear 134 is also fixed to the shaft 133 and meshes with a gear segment 136 fixed on the shaft 72. Thus when the shaft 72 is rocked by movement of the lever 71 and the link 72, the segment 136 also is rocked so as to reciprocate the vertical lever 131 in a vertical direction. This vertical movement of the lever 131 draws down or raises the left end of the horizontal link 130 and hence the link 130 is maintained in substantially a straight line relative to the squeegee as the vertical lever 74 reciprocates the squeegee mechanism 68 on its printing or return strokes. By maintaing the link 130 in such a straight line, the squeegee is held in proper angular position for printing.

The clutch mechanism

During operation of the press, it quite often becomes necessary for the operator to have immediate and ready access to the interior of the machine. Frequently, splinters, specks or other foreign matter become lodged in the under surface of the stencil screen 47 or on the upper surface of the bed 36 so as to interfere with the printing operation. Also it frequently happens that the sheet guides become out of registry and other parts become misadjusted, all of which require readjustment. It is, therefore, an important feature of the present invention to provide a means by which the machine may be opened up and the squeegee mechanism 68 and certain other elements thereof stopped in their movement without stopping the entire machine operation. Such means is provided by driving all the machine elements which are required to be stopped during the period of adjustment or cleaning, by the rotatable shaft 32 and by providing a novel type of clutch mechanism 34 by which the driving connection between the main drive shaft 28 and rotatable shaft 32 may be completed or broken under control of the operator. It is apparent that since the respective movements of the rocker cradle 49, the printing bed 36, the squeegee mechanism 68 and the tracks 108 are all effected by rotation of the shaft 32, the breaking of the driving connection to the shaft 32 through the clutch 34 will result in stoppage of all those elements simultaneously.

The clutch mechanism 34 is so constructed and arranged with respect to the operation of the above-named elements that when the driving connection is broken, the bed 36 is stopped in its lowered position and the squeegee unit 68 is at the end of its printing stroke with the squeegee blade 84 still in contact with the top surface of the stencil screen 47, thus serving as a dam to prevent the flow of the mass of printing ink material from the fountain end of the stencil out over the screen while adjustment is being made. An important feature of the clutch mechanism 34 is that the point of clutching and declutching is always constant so that the bed 36, squeegee unit 68 and blade 84 will always be stopped in the same desired positions. But at the same time provision is made for the operator to actuate the clutch mechanism at any point in the cycle in anticipation of clutching or declutching at the constant point in the cycle.

The clutch mechanism 34, shown in detail in Figs. 8 to 11, inclusive, of the drawings, comprises a rotatable sleeve 140 having portions 141 and 142 of different diameters and an annular flange 144, the sleeve 140 being mounted on bushings 143 and 145 carried on the rotatable shaft 32 for free relative rotative movement independently thereof. The sleeve 140 is confined on the shaft 32 against axial movement by a collar 146 fixed to the shaft 32 on the right side of the sleeve, as viewed in Fig. 11, and by other clutch mechanism fixed on the shaft 32 on the left side thereof. The large gear 31 and its hub portion 31*a* are carried on the sleeve portion 141 and the sleeve portion 142 extends through a stationary cam plate 148, being spaced therefrom for free rotative movement relative thereto by a bushing 148*a*. The annular flange 144 of the sleeve 140 is disposed between a cam lock plate 147 and the end of the bushing 148*a*. The gear 31, the cam lock plate 147, and the sleeve 140 are secured together for rotation as a unit by means of a plurality of axially extending bolts 149, the bolts extending through the cam plate 147, the enlarged sleeve portion 142 and into the gear 31. The stationary cam plate 148 extends downwardly and adjacent the gear 31 and the lower end 148*b* is bolted to a horizontal stationary base plate 150. The cam plate 148 is thus fixed against rotation whereas the sleeve 140 and the gear 31 and the cam lock plate 147 are capable of rotation as a unit relative thereto, the opposed surfaces between the said stationary and moving parts being machined for a running fit on the bushings 143, 145 and 148*a*. When the machine motor 24 is in operation, the gear 31, the sleeve 140 and the cam lock plate 147 are in constant rotation and remain in rotation even when the

other parts of the clutch are disconnected therefrom.

These other parts of the clutch mechanism which are secured on the shaft 32 for rotation therewith comprise a rectangular clamp shaft arm 151 having an opening 152 and a split 152*a* at one of its ends permitting it to be clamped around the shaft 32, in spaced relation with respect to the cam lockplate 147, a bolt and nut arrangement serving to draw the split portions of the arm 151 into tight non-slip engagement with the shaft 32. The clamp arm 151 which extends radially from the shaft 32 is provided adjacent its free end with an axially extending stud 154 on which is mounted for limited pivotal movement a rocking lever 156 disposed between the clamp shaft arm 151 and the cam lockplate 147. On the opposite ends of the rocking lever 156 are mounted rollers 157 and 158, respectively, serving as cam followers, the roller 157 being adapted to become engaged in clutched position within a semi-circular recess 159 in the outer circumferential portion of the rotatable cam lockplate 147, and the roller 158 being adapted to become engaged in declutched position within a recess 160 in the outer circumferential portion of the stationary cam plate 148. By the foregoing arrangement, the parts will remain in clutched driving engagement even under heavy load.

As shown in Figs. 8, 9, and 11, the rocking lever 156 is constantly urged in a clockwise direction about its pivot 154 by a tension spring 161 extending between the free end of a bracket 162, secured on the split end of the clamp arm 151, and a stud 163 secured in the end of the rocking lever 156 adjacent the roller 157. The spring 161 thus serves to maintain the roller 157 in driving engagement within the recess 159 of the rotating cam lockplate 147 so that rotative movement of the gear 31 will be transmitted to the shaft 32 through the cam lockplate 147, the roller 157, the rocking lever 156 and the clamp shaft arm 151.

In order that the operator may retract the roller 157 from the recess 159 so as to declutch the mechanism, the rocking lever 156 is formed with an outwardly projecting lug 164 which is adapted to become engaged with a dog 166 secured on an elongated rotatable trip shaft 167 and adapted to be rocked into the path of circular movement of the lug 164, which moves in a clockwise direction as viewed in Figs. 8 and 9. Upon engagement of the lug 164 with the dog 166, further rotative movement of the rocking lever 156, the clamp arm 151 and the shaft 32 is arrested, and the rocking lever 156 is turned in a counterclockwise direction about its pivot 154 so as to withdraw the roller 157 from the recess 159 of the cam lockplate 147 and to permit the cam lockplate 147 to continue on in its rotational movement.

Simultaneously, and as a result of such pivotal movement of the lever 156, the roller 158 on the other side of the rocking lever 156 moves up into the recess 160 of the stationary cam plate 148 where it remains throughout the period the parts are in declutched position. Also at this point in the operation a curved leaf spring 168, which projects upwardly into the path of movement of a flat locking plate 169, engages in a notch 170 in the outer curved edge of the plate 169 as in a ratchet mechanism, thereby locking the clamp arm 151 and shaft 32 against any movement in a counterclockwise direction. The locking plate

169 is rigidly secured to the clamp shaft arm 151 by means of bolts 171 and 172, the bolt 172 extending through an arcuate slot 173 in the plate 169 whereby the plate may be adjusted about the bolt 171 as a pivot for proper engagement with the flat spring 168.

By the foregoing construction the clamp shaft arm 151, the rocking lever 156 and the shaft 32 are restrained against movement in either direction while the elements of the clutch mechanism are in declutched position. When the roller 157 is out of the recess 159 of the cam lockplate 147 and the parts are in declutched position, it is apparent that the lockplate 147, the bushing 149 and the gear 31 continue to rotate freely on the now stationary shaft 32 and relative to the other clutch parts fixed to the shaft as above described.

The stationary base plate 150, to which the lower end 148*b* of the stationary cam plate 148 is bolted, extends axially under the above described clutch mechanism and has bolted on its under surface intermediate its ends a transversely extending bearing block 174 having a longitudinal circular bore through which the trip shaft 167 extends. The dog 166 is secured on the end portion of the trip shaft 167 which extends beyond the bearing block 174 and a side cam 176 is secured on the shaft 167 on the other side of the block 174 so that upon rotation of the shaft 167 the dog 166 and side cam 176 will rotate therewith in vertical planes relative to the base plate 150.

On the left end of the upper surface of the base plate 150 as viewed in Figs. 10 and 11, there is bolted a transverse slide 177 having a slideway formed in its lower surface and adapted to receive a slidable spring holder 179. The spring holder 179 has an upstanding portion 179*a* at one end to which is secured the curved plate locking spring 168 and at its other end it is formed with a rounded knob 179*b* which is adapted to be engaged by the side cam 176. The spring holder 179 is constantly urged toward the side cam 176 by a tension spring 180 extending between the upstanding portion 179*a* of the holder 179 and a screw 181 secured in the upper surface of the slide 177. The base plate 150 and the parts mounted thereon are secured in position under the clutch mechanism by means of a tie member 182 connected between the machine frame and the base plate 150.

As shown in Fig. 1, the trip shaft 167 extends diagonally toward the operator at the feed end of the machine where it is supported by a bracket 183 secured to the cross member 23, the end of the shaft 167 being provided with a cross treadle 184 which may be pressed down on one side or the other to rock the shaft 167 in the desired direction to clutch or declutch the parts. When the operator desires to stop movement of the squeegee mechanism 68, the bed 36, the tracks 108 and the rocker cradle 49, the treadle 184 is depressed in the desired direction so as to rock the shaft 167 in a clockwise direction as viewed in Figs. 10 and 11. When the shaft 167 is so rocked, the dog 166 is rotated into vertical position into the path of movement of the rocking lever lug 164 by which it is suddenly engaged, and simultaneously the side cam 176 is also turned into vertical position in which it engages the knob 179*a* and forces the slide 179 to the right and tensions the spring 180. The curved spring 168 is, therefore, carried to the right into engagement with the lock plate 169 in the notch 170 in which locked position the locking parts remained interengaged so as to hold the other parts

out of clutched position. Conversely, when the operator desires to restore the parts to clutched position, the shaft is rocked in the other direction or counterclockwise so as to turn the side cam 178 and the dog 166 out of their operable vertical positions, thus freeing the rocking lever lug 164 and permitting rocking movement of the lever 156 in a clockwise direction under the urge of the spring 161. Thus, the roller 157 is free to and does drop into the recess 159 into locking engagement therewith as the cam lockplate 147 rotates relative to the rocking lever 156. Simultaneously, the locking plate 169 is carried by the clamp shaft arm 151 away from the curved locking spring 168, thus releasing the slidable spring holder 179 for movement to the left, such movement to the left being permitted by the earlier restoration of the side cam 176 to normal position. As the spring holder 179 slides to the left, the curved spring 168 is likewise carried to the left out of the path of movement of the locking plate 169.

It is thus apparent that a simple and efficient clutch mechanism has been provided by which the squeegee mechanism 68 and the other elements operated off the shaft 32 may be readily thrown into and out of operation whenever the screen 47 or the bed 36 require attention or whenever other parts of the machine require adjustment. When the operator notes that the machine requires such attention, he may immediately depress the treadle 184 in order to declutch the mechanism without waiting for the moving parts to reach the exact and desired points in their cycles. It is consequently unnecessary that he pay close attention to the moving parts in order that the mechanism be declutched at any exact point of time, for as soon as the treadle 184 is depressed the dog 166 is turned upwardly into active position where it is thereafter engaged by the lug 164 of the rocking lever 156 upon continued rotation of the clutch parts. During continued rotation of the clutch parts after depression of the treadle 184, the printing bed 36, the squeegee mechanism 68, the rocker cradle 49 and the tracks 108 continue in their movement to their desired inoperative positions and when such positions are reached by the parts it is at that instant that the dog 166 is engaged by the lug 164 thereby declutching the parts as above described. All of the other parts driven off the main shaft 28, however, remain in operation when the clutch mechanism is in declutched position, thus enabling the operator to adjust the sheet guides properly during operation of any other parts.

Second embodiment of squeegee mechanism

In Figs. 13 to 17, inclusive, of the drawings, there is illustrated another form of squeegee mechanism which is generally similar in principle and operation to the squeegee mechanism 68 disclosed in Figs. 1 to 6, inclusive, but which has additional features and advantages. This second embodiment comprises a pair of hook-shaped end plates 200 secured at each side of the machine to an elongated plate 202 extending across the machine and being inclined at an angle of approximately 45° to the stencil screen 47. As shown in Fig. 13, the end plates 200 are provided on their inner faces with rollers 203 which are adapted to engage the top surfaces of the tracks 108 and to support the entire squeegee mechanism on its printing and return strokes as do the rollers 107 of the squeegee mechanism 68. The end plates 200 also serve as bearing supports for a transverse

rock shaft 204, the respective ends of which are journaled in the upper portions of the end plates. The left end plate 200, as viewed in Fig. 13, further serves as a support for a short rock shaft 206, one end of which is journaled in the end plates 200 and the other end of which is supported for rotative movement in a depending bearing support 207 secured to the under surface of the inclined transverse plate 202 some distance inwardly from the left end plate 200.

The end plates 200 are adapted to be secured at the lower portions of their outer faces to the ends of the horizontal links 76, the movement of which will control and effect movement of this form of squeegee mechanism in the same manner as in the first form 68. A flat squeegee supporting plate 208 is secured to the inclined upper surface of the transverse plate 202, extending angularly downwardly toward the stencil screen 47, and at its lower end there is a flexible squeegee 209 clamped thereto by a flat clamping plate 210. The squeegee 209 is of sufficient length as to engage and bear against the stencil screen 47 on the printing stroke and to be spaced therefrom when elevated by the tracks 108 for the return stroke.

Similar to the squeegee mechanism 68, there is provided a readily detachable and pivotally supported scoop 211 which is secured on an elongated bar 212 of rectangular cross section whose reduced respective ends 212*a* are journaled in depending bearing brackets 213 secured to the under inclined surface of the transverse plate 202. As shown particularly in Figs. 13 and 14, a gear segment 214 is secured on one end of the rock bar 212 and meshes with a segment 216 mounted on the inner end of and depending from the short rock shaft 206. Thus, upon rocking movement of the shaft 206, the scoop 211 may be caused to move from depending vertical, ink-spilling position to horizontal, ink-retaining position in precisely the same manner as described above with respect to the squeegee mechanism 68.

Rocking movement of the short shaft 206 in first one direction and then the other is accomplished as shown clearly in Figs. 13, 16 and 17 by a depending actuating arm 217 pivoted at its upper end on a stud 218 to the left end plate 200 and having a roller 219 on its lower end for engagement with the stops 100 at either end of the machine. Intermediate its ends, the arm 217 is secured to the end of a triangular plate 220 by means of a headed stud 221 having a projecting shank in constant bearing engagement with the upper surface of a yieldable locking arm 222. This arm 222 is pivoted at its left end to the outer side of the left end plate 200 on a pin 223 and at its right, free end it is connected to a tension spring 224 extending upwardly and having its upper end secured to a stud 226 on the left end plate 200, the spring 224 serving to maintain the locking arm 222 in horizontal position and to resist its pivotal movement in a downward or clockwise direction.

The left end of the triangular plate 220 is connected by means of studs 227 and 228 to the ends of toggle links 229 and 230, respectively. The lower end of the link 229 is pivoted to the end plate 200 by a stud 225 and the upper end of the link 230 is secured to the right end of an arm 231 by means of a stud 232. The left end of the arm 231 is secured to the end of the short rock shaft 206 which projects beyond the outer face of the end plate 200.

In accordance with the foregoing arrangement of parts, when the squeegee mechanism approaches the end of its printing stroke, the roller 219 will first engage the stop 100 and continued movement of the squeegee mechanism under the control of the link 76 will cause the actuating arm 217 to be rocked in a clockwise direction from the Fig. 16 position to the Fig. 17 position. This movement forces the triangular plate 220 to the left, the stud 221 on the arm 217 moving slightly downwardly in an arcuate path so as to depress and slide along the top edge of the locking arm 222 until it becomes engaged in a recess 233. At this point, the parts are in the position shown in Fig. 17. As the plate 220 is moved to the left the adjacent ends of the toggle links 229 and 230 are also moved to the left, movement of the link 230 being also downwardly so as to pull down the arm 231 in a clockwise direction which in turn rocks the short shaft 206 in the same direction so as to raise the scoop 211. Conversely, when the squeegee mechanism approaches the end of its return stroke to the left, the actuating lever 217 is forced to the right in a counterclockwise direction by the other stop 100, thus restoring the moving parts to their Fig. 16 position and lowering the scoop 211.

The ink spreading member

The form of squeegee mechanism shown in Figs. 13 to 17, inclusive, of the drawings also has provision for the removal of the scoop 211 from its square supporting bar 212 and for the attachment of a special form of a second "flooding" squeegee or ink spreading member, as shown particularly in Figs. 14 and 15. The additional squeegee and the scope 211 are not intended to be carried and operated at the same time, but it is intended that one be removed while the other is in operation. However, in Figs. 14 and 15 of the drawing and for the purposes of this description both the elements are shown mounted on the squeegee frame at the same time. This ink spreading member comprises a vertically arranged flexible squeegee 236 clamped to the lower end of a transverse plate 237 by a clamping plate 238, the transverse plate 237 being bolted to a bar 239 extending transversely of the machine in front of and over the scoop supporting bar 212. The respective ends of the squeegee supporting bar 239 are rigidly secured to horizontal levers 240 adjacent the ends thereof and the other ends of the levers 240, which project under and beyond the main cross plate 202 toward the delivery end of the machine, are pivoted to the ends of fixed inclined arms 241 secured to the upper inclined surface of the main cross plate 202.

The ends of the levers 240 adjacent the bar 239 are pivotally connected by pairs of links 242 to the ends of rock arms 243 fixed on the long rock shaft 204, so that upon rotation of the shaft 204 in a clockwise direction the rocker arms 243 will be moved downwardly from their Fig. 14 position to their Fig. 15 position wherein the flat bar 239 is in lowered position ahead of the scoop bar 212 and the pairs of links are in parallel alignment with the rocker arms 243. When the flat bar 239 is lowered, the "flooding" squeegee 236 which it supports will consequently be forced down into engagement with the upper surface of the stencil screen where it remains during the return stroke.

In order to effect rotation of the long shaft 204 and consequent raising and lowering of the squeegee 236, there is provided a lever 244 fixed at one end on the shaft 204 adjacent the end plates 200, the lever 244 being provided at its other end with a pair of downwardly extending plates 246 between the lower ends of which a roller 247 is rotatably supported. The roller 247 is adapted to bear against and ride the upper surface of a lever 248 which is fixed at its other end to the short rock shaft 206, the roller 247 being caused to bear downwardly against the lever 248 only by gravity and not by any auxiliary means.

Thus, when the short rock shaft 206 is rotated in the manner described above upon actuation of the lever 217 by the stops 100, the long shaft 204 will also be rotated so as to actuate the supporting plate 239 of the ink spreading member 236. As the short shaft 206 is rocked in a clockwise direction, the arm 243 will be rocked downwardly which permits the arm 244 also to follow downwardly under the force of gravity, thereby rocking the long shaft 204 in a clockwise direction and lowering the "flooding" squeegee 236 for the ink-spreading return stroke. Conversely, upon rotation of the short rock shaft 206 in a counterclockwise direction the arm 248 will raise the arm 244 and rock the long shaft 204 in a counterclockwise direction so as to raise the squeegee 236 for the printing stroke.

The squeegee 236 is a non-printing squeegee in that it is in elevated position over the stencil screen 47 during the printing stroke when the main printing squeegee 209 engages the screen as it moves toward the operator. However, during the return stroke when the main squeegee 209 has been raised off the screen by elevation of the tracks 103, the auxiliary squeegee 236 is lowered into engagement with the screen. It is to be noted that when the squeegee 236 is first lowered at the end of the printing stroke, it engages that portion of the screen which is supported by the fountain plate (not shown) and consequently at this time the squeegee 236 has not reached its lowermost position. As a result the roller 247 is supported away from the arm 248 a slight distance. However, as the squeegee 236 begins the return stroke and passes beyond the fountain plate to where the stencil screen is unsupported because of the lowering of the platen bed 36, the screen yields slightly so as to permit the squeegee to move down to its lowermost position and exert the desired degree of pressure on the upper surface of the screen.

As the squeegee 236 is lowered at the beginning of return, non-printing stroke, it dips down into the mass of ink material, and then as it moves on the return stroke, it spreads a supply of ink before it over the stencil screen and down in the interstices thereof. Because the platen bed 36 is in lowered position below the screen on the return stroke and no sheet is below the screen to take the ink therefrom, the ink remains in and on the screen until the main squeegee 209 engages the screen during the printing stroke at which time additional ink material is again forced over the screen by the main squeegee. By flooding or predepositing the ink material in and on the stencil screen prior to the printing stroke, an adequate supply of ink material will be insured for a full clear print at every point on the sheet, the ink material being on, within the screen and at the under surface thereof for ready application to the sheet when the printing pressure is applied by the main squeegee 209. Although the

screen during the return stroke is not supported by the bed, the pressure of the flooding squeegee **236** thereagainst is of lesser degree than that exerted by the main squeegee **209** during the printing stroke, thus preventing permanent distortion of the stencil screen and insuring that no ink will be squeezed down through the stencil screen so as to drip on the upper surface of the bed **36**. It has been found that ink of the normal consistency used for screen printing will not pass through a screen having interstices of average size when the ink material is flooded by the squeegee **239**, nor will any droplets or concentrations of the ink form on the under surface of the screen so as to cause blotting or smudging of the sheet when printed.

Although the present invention has been illustrated in the drawings and described above with relation to several embodiments of the reciprocal squeegee mechanism and an embodiment of the clutch mechanism for stopping operation of the squeegee mechanism and other machine parts, it will be understood that changes and modifications in the details of structure and operation may be resorted to without departing from the spirit and scope of the appended claims.

I claim:

1. In a screen printing machine, a stencil screen having a supply of printing ink at one end thereof for continuous machine operation, a squeegee mechanism adapted to be reciprocated over a stencil screen for printing in one direction toward the supply of ink and for return movement in the reverse direction, said mechanism comprising a movable frame extending transversely of the screen, a squeegee carried by said frame in engagement with the screen during the printing stroke and out of said engagement during the return stroke, a scoop pivotally mounted on said frame out of engagement with and spaced above said screen on the printing and return strokes, a pivotal connection between said scoop and said frame, means on said frame for supporting said scoop in spaced relation out of contact with said screen on said printing and return strokes, said scoop being pivotal at the end of the printing stroke through the supply of printing ink at the one end of the screen for picking up a quantity of said ink and for movement into horizontal ink retaining position and said scoop being maintained in horizontal ink retaining position during said return stroke and pivotable at the end of the return stroke into inclined discharging position for depositing said quantity of ink ahead of the squeegee at the other end of the screen opposite the supply of ink for use during the printing stroke and for return to the ink supply by the squeegee, means for retaining said scoop in horizontal ink retaining and in inclined discharging positions during said strokes, respectively, means operable at the end of the printing stroke for actuating said scoop through the supply of ink into horizontal ink retaining position, and means operable at the end of the return stroke for actuating said scoop to discharging position to deposit said ink at the other end of the screen, said pivotal connection of said scoop with said frame being spaced a sufficient distance from said screen and said scoop being of such extent relative to such spacing that said scoop in horizontal ink retaining position and in discharging position during the printing and return strokes is retained out of contact with said screen.

2. In a printing machine, a squeegee mechanism adapted to be reciprocated over a stencil screen for printing in one direction and for return movement in the reverse direction, said mechanism comprising a movable frame extending transversely of the screen, a squeegee carried by said frame in engagement with the screen during the printing stroke and out of said engagement during the return stroke, a scoop pivotally mounted on said frame out of engagement with the screen on the printing and return strokes and movable from open depending position to closed, substantially horizontal position, a pivotal connection between said scoop and said frame, means on said frame for supporting said scoop in spaced relation out of contact with said screen on said printing and return strokes and said scoop having an upstanding rear wall secured to said frame and upstanding end and front walls forming a receptacle with said rear wall and the upper edge of the front wall comprising the scraping edge of the scoop, said scoop being movable at the end of the printing stroke from inclined discharging position to horizontal position through the mass of printing ink at the one end of the screen for picking up a quantity of said ink and being maintained in ink-retaining, horizontal position during said return stroke and movable at the end of the return stroke to open inclined discharging position for depositing said quantity of ink at the other end of the screen, means operable at the end of the printing stroke for actuating said scoop from inclined discharging to horizontal position, and means operable at the end of the return stroke for actuating said scoop from horizontal to inclined discharging position, said scoop also being open and unobstructed at its scraping edge to permit a limited quantity of ink to dribble onto the stencil screen during said return movement and to permit visual observation by the operator as to the contents thereof during the return stroke, said pivotal connection of said scoop with said frame being spaced a sufficient distance from said screen and said scoop being of such extent relative to such spacing that said scoop in horizontal ink retaining position and in discharging position during the printing and return strokes is retained out of contact with said screen.

3. In a screen printing machine, a squeegee mechanism adapted to be reciprocated over a stencil screen for printing in one direction and for return movement in a reverse direction, said mechanism comprising a reciprocable frame extending transversely of the screen, a squeegee carried by said frame in engagement with the screen during the printing stroke and out of said engagement during the return stroke, a scoop rockably mounted on said frame out of engagement with the screen on the printing and return strokes and rockable from open depending position to closed, substantially horizontal position, said scoop being rockable at the end of the printing stroke from depending position to horizontal position through the mass of printing ink at one end of the screen for picking up a quantity of said ink and being maintained in ink retaining horizontal position during said return stroke and rockable at the end of the return stroke to open depending position for depositing said quantity of ink at the other end of the screen, a shaft rotatably mounted in said frame, a segment secured to said shaft, a gear segment secured to said scoop and in mesh with said segment for effecting pivotal movement of said scoop, an actuating

lever secured on one end of said shaft and movable with said frame, and stop means at each end of the screen in the path of movement of said lever and adapted to be engaged thereby as the lever approaches the ends of the printing and return strokes and to force movement of said actuating lever upon limited continued movement of the frame to the ends of the respective strokes for effecting rocking movement of the scoop to its respective positions.

4. In a screen printing machine, a squeegee mechanism comprising a movable frame extending transversely of the screen and adapted to be reciprocated thereover for printing in one direction and for return movement in the reverse direction, bearing members carried by said frame, trackways adapted to be moved vertically relative to the screen and to be engaged by said bearing member for supporting said frame for horizontal reciprocal movement therealong, means for raising said trackways at the end of the printing stroke relative to the screen, means for lowering said trackways at the end of the return stroke realtive to the screen, and a squeegee carried by said frame and adapted to engage the screen during the printing stroke and to be elevated therefrom during the return stroke by elevation of said trackways.

5. In a screen printing machine, a squeegee mechanism comprising a movable frame extending transversely of the screen and adapted to be reciprocated thereover for printing in one direction and for return movement in the reverse direction, spaced supporting members adapted for vertical reciprocal movement relative to the screen and to support said frame for horizontal reciprocal movement relative thereto, means for raising said frame supporting members at the end of the printing stroke relative to the screen, means for lowering said members at the end of the return stroke relative to the screen, and a squeegee carried by said frame and adapted to engage the screen during the printing stroke and to be elevated therefrom during the return stroke by elevation of said supporting members.

6. A screen printing machine comprising a stencil screen, a squeegee mechanism adapted to be reciprocated over the screen for printing in one direction and for return movement in the reverse direction, and a movable printing bed adapted to be moved to printing position under the screen during the printing stroke and to be moved way from the screen during the return stroke, means for moving said bed away from the screen at the end of the printing stroke and for returning said bed adjacent said screen at the end of the return stroke, said screen being unsupported on its under surface during the return stroke, said squeegee mechanism comprising a movable frame extending transversely of the screen, a squeegee carried by said frame and adapted to engage the screen during the printing stroke and to be out of said engagement during the return stroke, an ink spreading member pivotally carried by said frame and adapted to be pivoted into pressing engagement with said unsupported screen and spread a supply of printing ink thereover on the return stroke when the bed is in withdrawn position and to be out of engagement with the screen during the printing stroke, and a pivotal connection between said frame and said ink spreading member, said pivotal connection being spaced from said screen a distance shorter than the height of said ink spreading member whereby during the return stroke said screen is depressed by engagement with said ink spreading member and the ink is forced down into the interstices of said screen for ready application on the next printing stroke.

7. In a screen printing machine having a rotatable shaft for driving a moving part thereof and a source of power for rotating said shaft, a clutch mechanism adapted to be interposed in the driving connection between said source of power and the shaft and comprising a sleeve adapted to be mounted on said shaft for rotative movement independently thereof, a driver member secured on said sleeve and in constant operating engagement with the driving connections to said source of power, a flat, annular cam plate secured on said sleeve and having a single recess in its outer periphery, an arm adapted to be secured on said shaft for rotation therewith, a rocking lever pivotally supported on said arm and having a projecting portion engageable with said cam plate around its outer periphery and in said recess and a lug portion at its outer periphery, resilient means for urging said rocking lever into recess engaging position, a movable stop member adapted to be moved from normal retracted position into the path of movement of said lug portion for engagement therewith and for stopping rotation of said arm and shaft and for rocking said lever to withdraw said projecting portion from said recess.

8. In a screen printing machine having a rotatable shaft for driving a moving part thereof and a source of power for rotating said shaft, a clutch mechanism adapted to be interposed in the driving connection between said source of power and the shaft and comprising a sleeve adapted to be mounted on said shaft for rotative movement independently thereof, a driver member secured on said sleeve and in constant operating engagement with the driving connections to said source of power, a cam flat, annular plate secured on said sleeve and having a single recess in its outer periphery, an arm adapted to be secured on said shaft for rotation therewith, a rocking lever pivotally supported on said arm and having a projecting portion engageable with said cam plate around its outer periphery and in said recess and a lug portion at its outer periphery, resilient means for urging said rocking lever into recess engaging position, a movable stop member adapted to be moved from normal retracted position into the path of movement of said lug portion for engagement therewith and for stopping rotation of said arm and shaft and for rocking said lever to withdraw said projecting portion from said recess, and means for locking said rocking lever in declutched positions.

9. In a screen printing machine having a rotatable shaft for driving a moving part thereof and a source of power for rotating said shaft, a clutch mechanism adapted to be interposed in the driving connection between said source of power and the shaft and comprising a sleeve adapted to be mounted on said shaft for rotative movement independently thereof, a driver member secured on said sleeve and in constant operating engagement with the driving connections to said source of power, a cam plate secured on said sleeve and having a single recess in its outer periphery, an arm adapted to be secured on said shaft for rotation therewith, a rocking lever pivotally supported on said arm and having a projecting portion engageable with

said cam plate in said recess and a lug portion at its outer periphery, resilient means for urging said rocking lever into recess engaging position, a movable stop member adapted to be moved from normal retracted position into the path of movement of said lug portion for engagement therewith and for stopping rotation of said arm and shaft and for rocking said lever to withdraw said projecting portion from said recess, and means for locking said rocking lever in declutched position, said locking means comprising a locking plate secured on said arm and another movable stop element adapted to engage said locking plate to prevent rotation thereof, and said locking plate being adjustable relative to said arm for adjusting the point of engagement between said plate and said stop element.

10. In a screen printing machine having a rotatable shaft for driving a moving part thereof and a source of power for rotating said shaft, a clutch mechanism adapted to be interposed in the driving connection between said source of power and the shaft and comprising a sleeve adapted to be mounted on said shaft for rotative movement independently thereof, a driver member secured on said sleeve and in constant operating engagement with the driving connections to said source of power, a cam plate secured on said sleeve and having a single recess in its outer periphery, a stationary member disposed adjacent said sleeve and having a recess in its outer periphery, an arm adapted to be secured on said shaft for rotation therewith, a rocking lever pivotally supported on said arm and having a projecting portion at one end engageable in the recess of the cam plate and a projecting portion at the other end engageable in the recess of the stationary member, said rocking lever also having a lug portion engageable with a stop member, resilient means for urging said rocking lever into driving engagement with said cam plate, a stop member adapted to be moved from normal retracted position into the path of movement of said lug portion for engagement therewith and for stopping rotation of said arm and shaft for rocking said rocking lever to declutched position and moving said second projecting portion of said lever into the recess of said stationary member.

11. In a screen printing machine having a rotatable shaft for driving a moving part thereof and a source of power for rotating said shaft, a clutch mechanism adapted to be interposed in the driving connection between said source of power and the shaft and comprising a sleeve adapted to be mounted on said shaft for rotative movement independently thereof, a driver member secured on said sleeve and in constant operating engagement with the driving connections to said source of power, a cam plate secured on said sleeve and having a single recess in its outer periphery, an arm adapted to be secured on said shaft for rotation therewith, a rocking lever pivotally supported on said arm and having a projecting portion engageable in the recess of said cam plate in said recess and a lug portion at its outer periphery, resilient means for urging said rocking lever into recess engaging position, a movable stop member adapted to be moved from normal retracted position into the path of movement of said lug portion for engagement therewith and for stopping rotation of said arm and shaft and for rocking said lever to withdraw said projecting portion from said recess,

and means for maintaining said lever in declutched position and preventing rotation of said shaft in either direction comprising a stationary member disposed adjacent said sleeve and having a recess in its outer periphery, a second projecting portion on said rocking lever engageable in the recess of said stationary plate upon declutching rocking movement of said lever, a locking plate secured on said arm and another movable stop element adapted to be moved into locking engagement with said locking plate simultaneously with movement of said first stop means.

12. In a printing mechanism having a rotatable shaft for driving a moving part thereof and a source of power for rotating said shaft, a clutch mechanism adapted to be interposed in the driving connection between the source of power and the shaft and comprising a sleeve adapted to be mounted on said shaft for rotative movement independently thereof, a driver member secured on said sleeve and adapted to be in constant operating engagement with the driving connections to said source of power, a cam plate secured on said sleeve and having a recess at one predetermined point in its outer periphery, an arm adapted to be secured on said shaft for rotation therewith, a rocking lever pivotally supported on said arm and having a projecting portion adapted to be interengaged with said single recess on said cam plate and also having a second engaging element adapted to engage a stop means at a constant point in the cycle of operation, means for urging said rocking lever into cam plate engaging position, and a movable stop means mounted on a non-rotatable support and adapted to be moved into the path of movement of said second engaging element at any point during the cycle of operation for engagement thereafter with said second engaging element upon continued rotation of said clutch mechanism, said engagement between said stop means and said second engaging element stopping further rotation of said arm and shaft and causing said lever to be rocked out of engagement with said cam plate.

13. In a screen printing machine having a rotatable shaft for driving a moving part thereof and a source of power for rotating the shaft, a clutch mechanism adapted to be interposed in the driving connection between said source of power and the shaft and comprising a driver member mounted on said shaft for rotative movement independently thereof and adapted to be in constant operating engagement with the driving connections to said source of power, a flat, annular cam plate secured to said driver member and having a recess in its outer periphery, an arm adapted to be secured on said shaft for rotation therewith, a rocking lever pivotally supported on said arm and having a projecting roller engageable around the outer periphery of said cam plate and in said cam plate recess and a lug portion at its outer periphery, resilient means for urging said rocking lever and roller into recess engaging position, and a movable stop member adapted to be moved into the path of movement of said lug portion for engagement therewith and for stopping rotation of said arm and shaft and for rocking said lever to withdraw the roller from said recess, said roller upon release of said rocking lever toward cam plate engaging position being adapted to rollably engage the outer periphery of the cam plate upon rotation thereof and to thereafter enter the recess therein upon registry therewith.

14. A screen printing machine comprising a stencil screen, a printing bed adapted to be moved to and from printing position under the screen, a squeegee adapted to be reciprocated over said screen, means for moving said squeegee over said screen to operative position and return, means for moving said bed from operative to open inoperative position and return, a rotatable shaft in driving connection with said squeegee and said bed moving means, a main drive shaft for driving said machine, other movable operating parts operably connected with and driven by said main drive shaft, and a clutch mechanism between said main drive shaft and said rotatable shaft for completing or breaking the driving connection to said rotatable shaft for starting or stopping operation of said squeegee at the end of its stroke and said bed in open inoperative position without affecting operation of said other moving parts of the machine, said clutch mechanism comprising a clutch plate mounted on said main drive shaft for rotation relative thereto and being drivingly connected to said rotatable shaft and having a single clutching element rotatable therewith, a pivoted lever secured adjacent said clutch plate to said main drive shaft for rotation therewith and for pivotal movement relative thereto and engageable with the clutching element of said clutch plate for completing the driving connection from said main drive shaft to said rotatable shaft, and

a movable stop member adapted to be moved from normal retracted position into the path of movement of said lever for engagement therewith at any time in the cycle of rotation of said lever and for rocking the lever out of clutched engagement with said clutch plate at a constant point in the cycle of rotation of said clutch mechanism for stopping operation of said squeegee and said bed at said constant point.

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