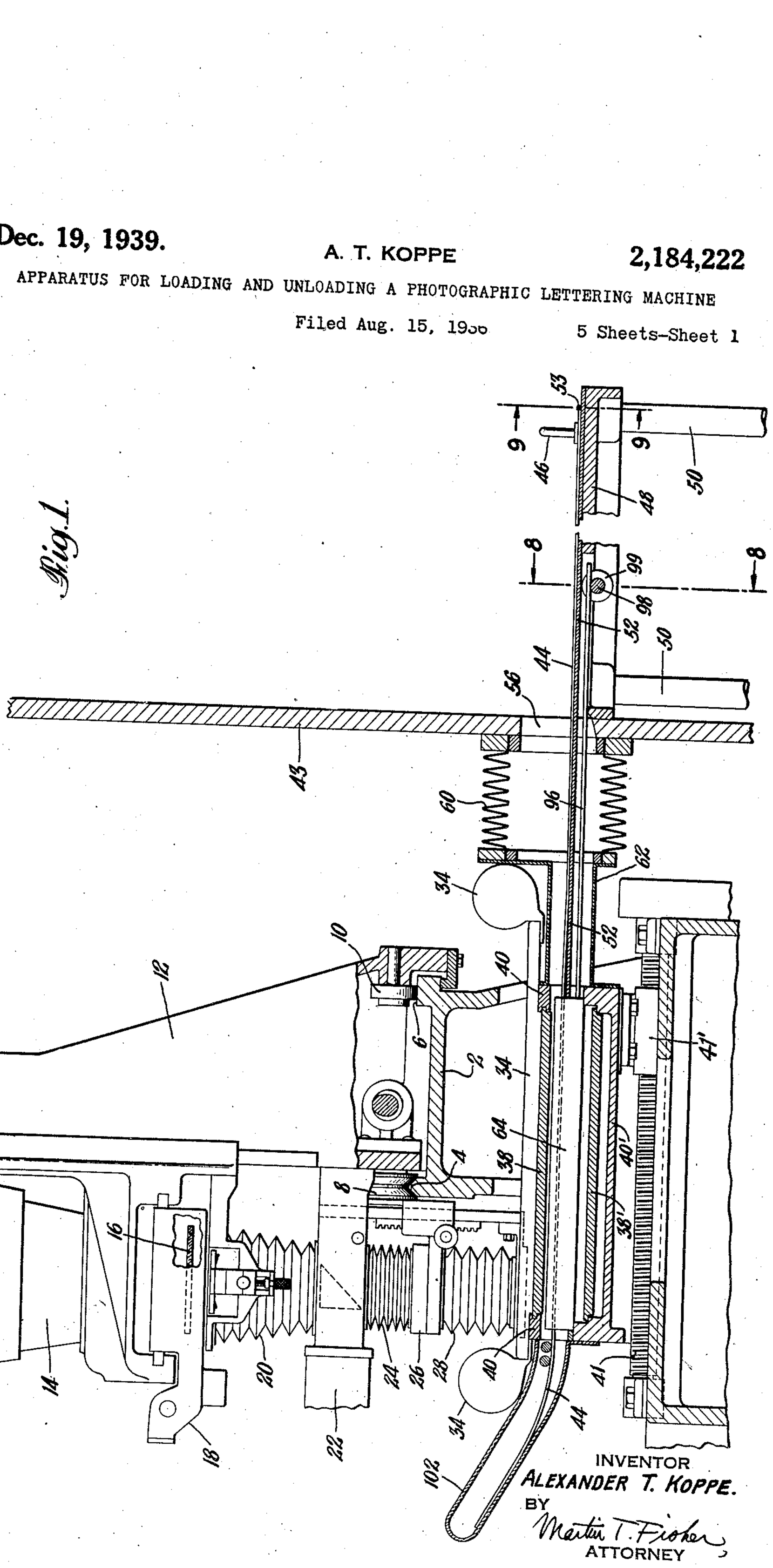
Dec. 19, 1939. A. T. KOPPE 2,184,222

APPARATUS FOR LOADING AND UNLOADING A PHOTOGRAPHIC LETTERING MACHINE

Filed Aug. 15, 1936 5 Sheets-Sheet 1

Fig. 1.



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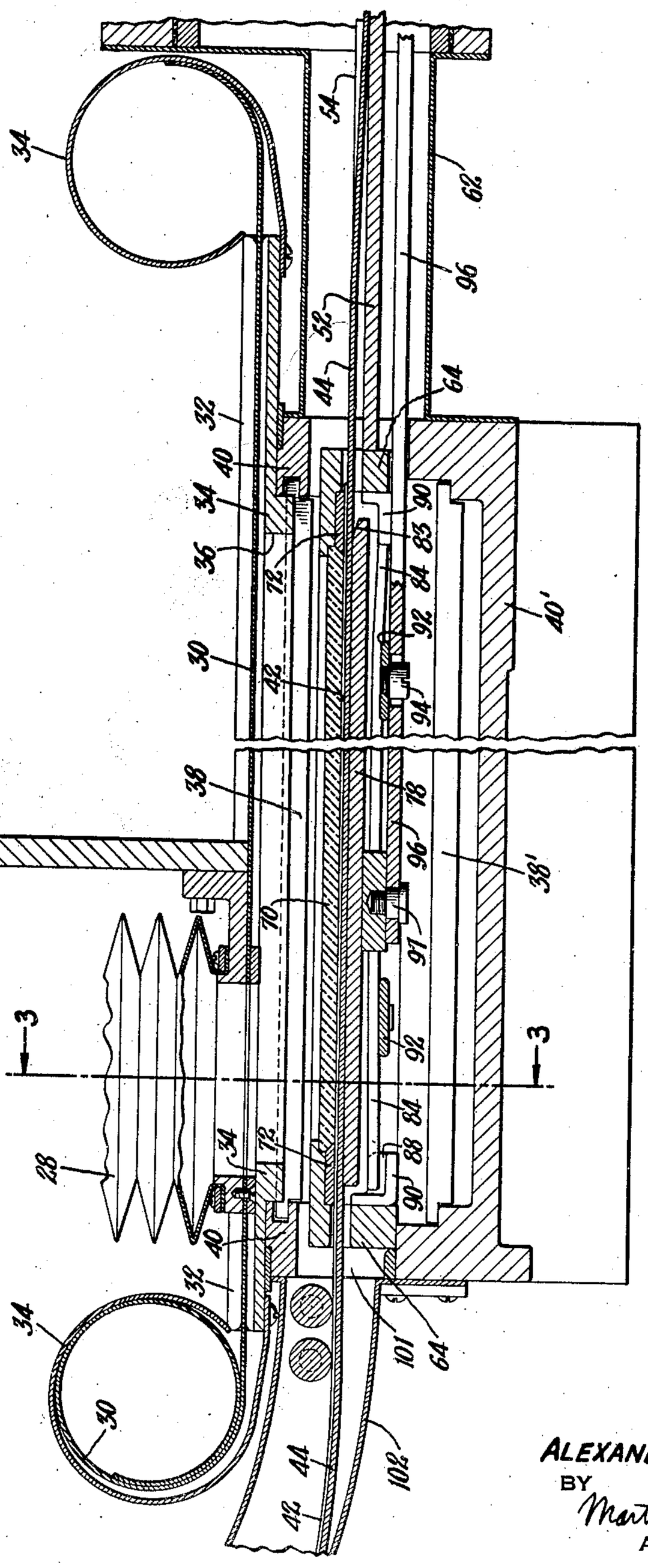
Filed Aug. 15, 1936 5 Sheets-Sheet 2

Fig. 2.



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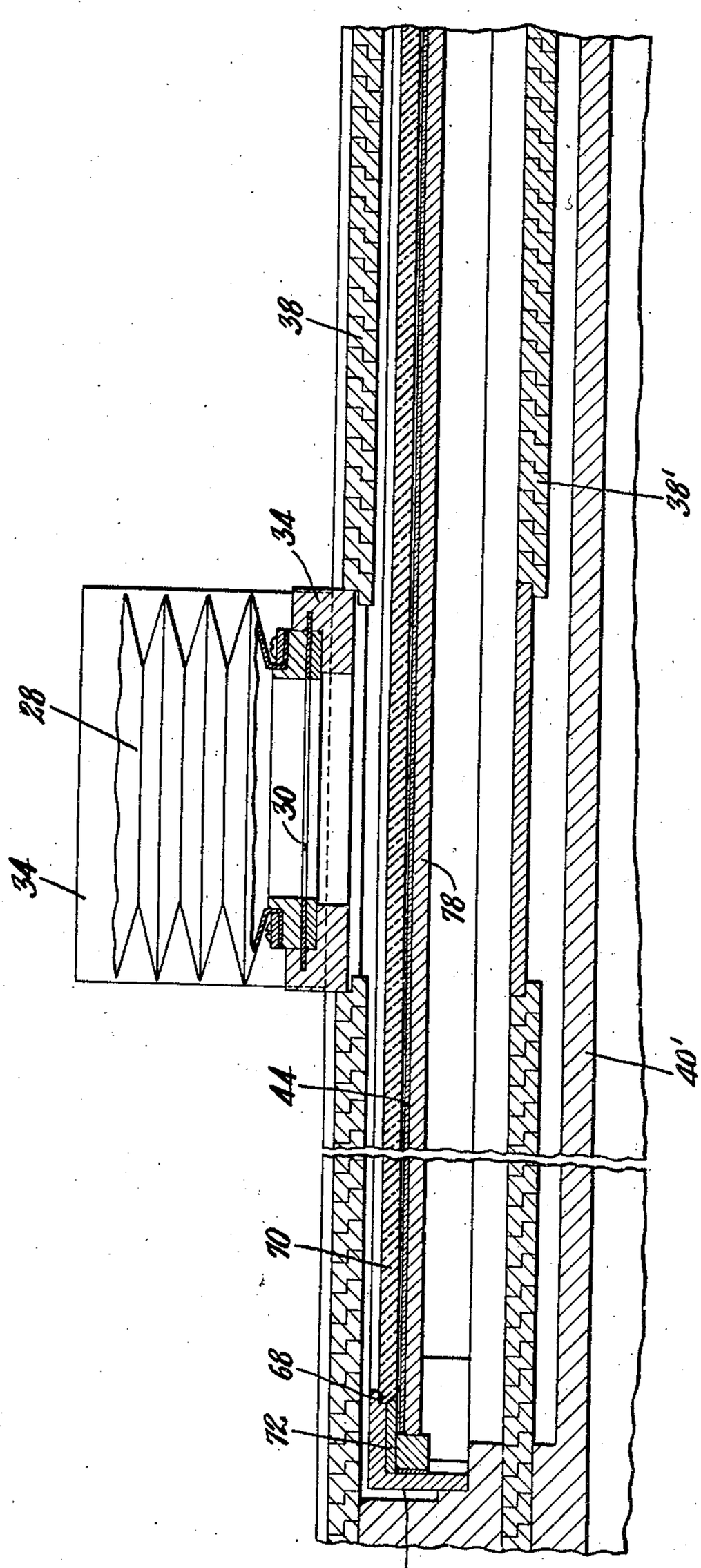

Fig. 3.

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Filed Aug. 15, 1936 5 Sheets-Sheet 4

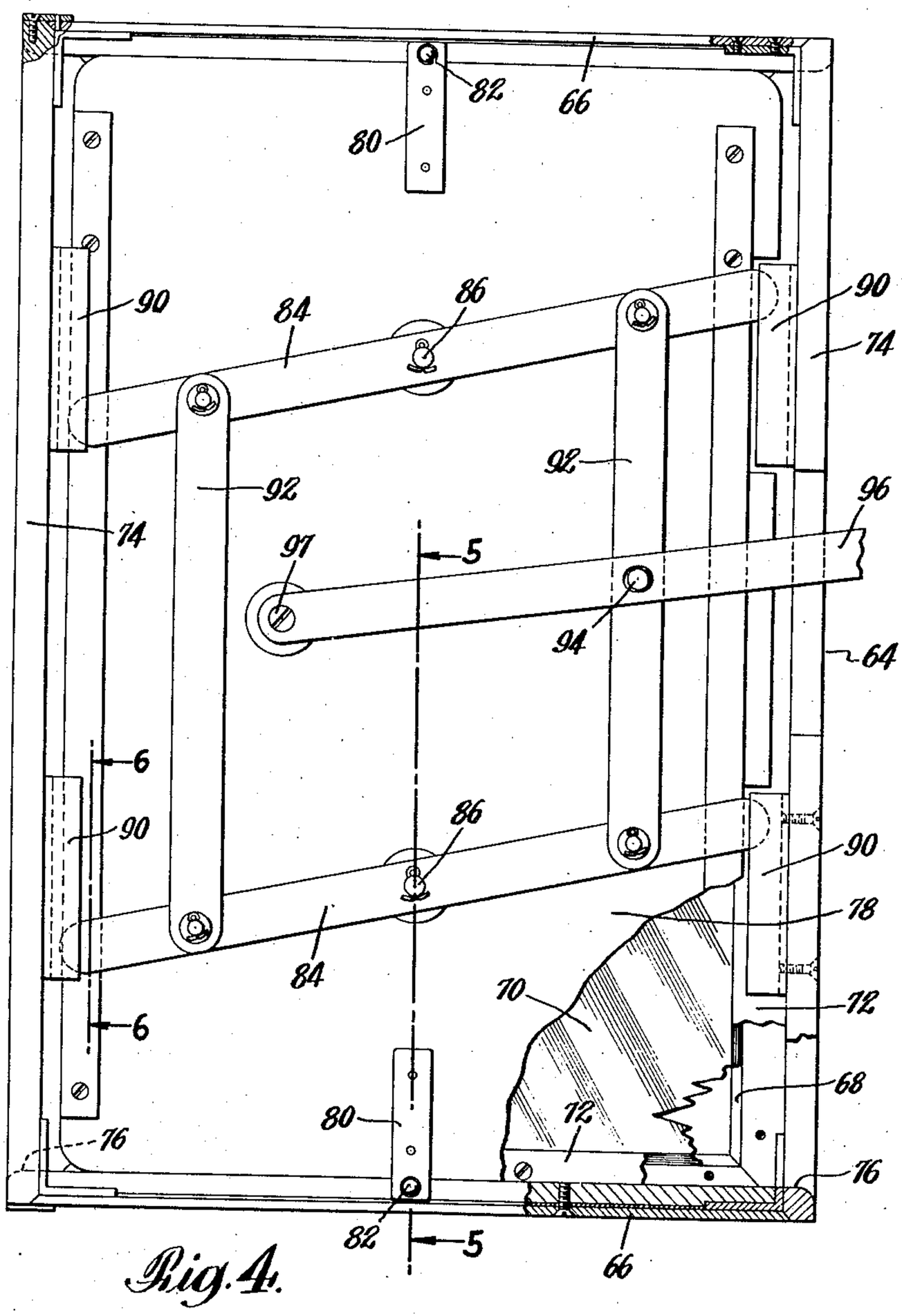

Fig. 4.

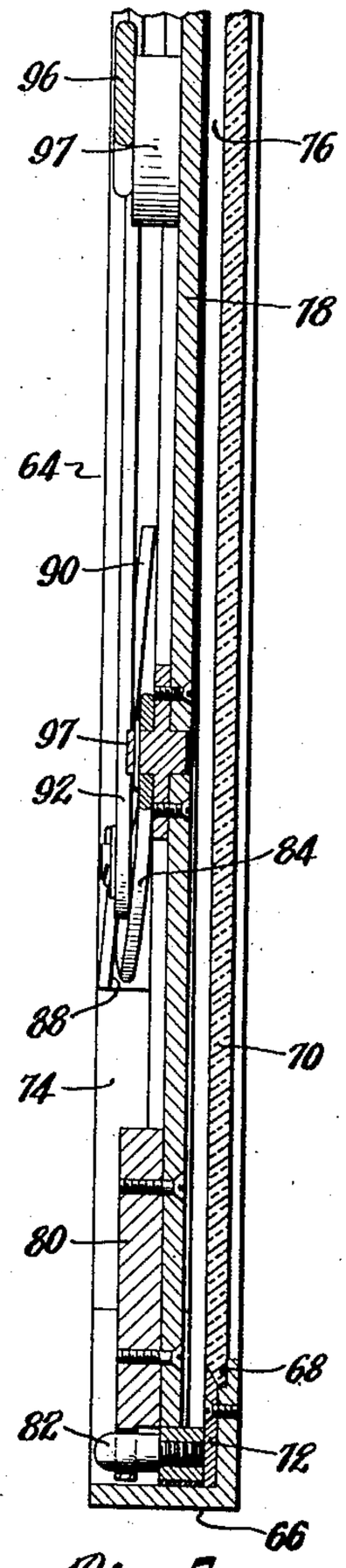

Fig. 5.

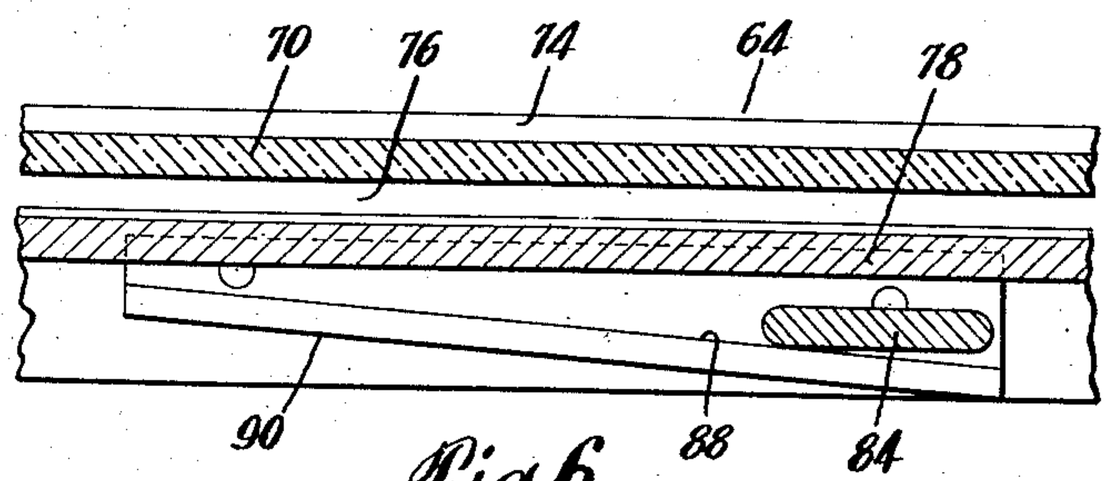

Fig. 6.

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APPARATUS FOR LOADING AND UNLOADING A PHOTOGRAPHIC LETTERING MACHINE

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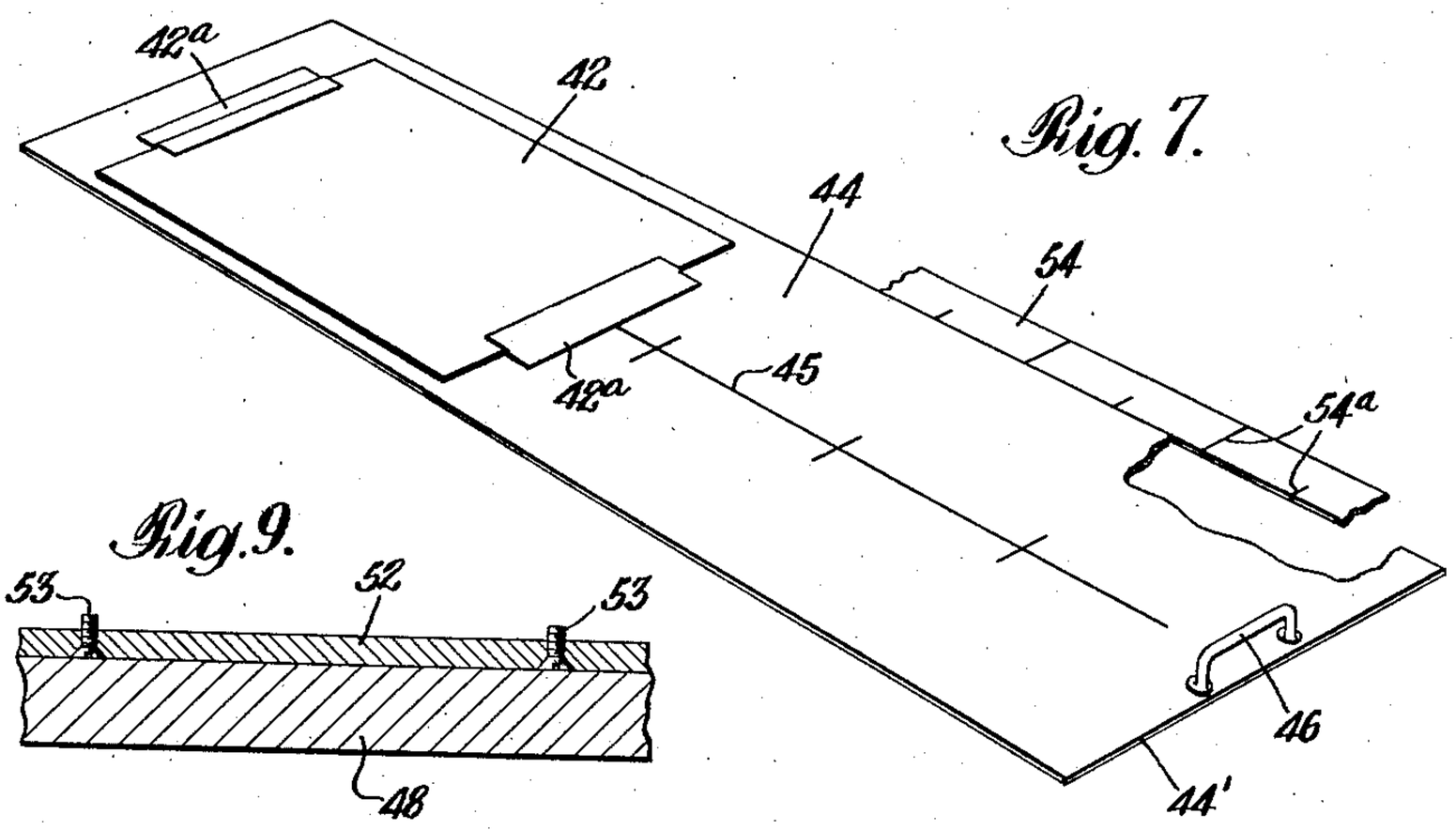

Fig. 7.

Fig. 9.

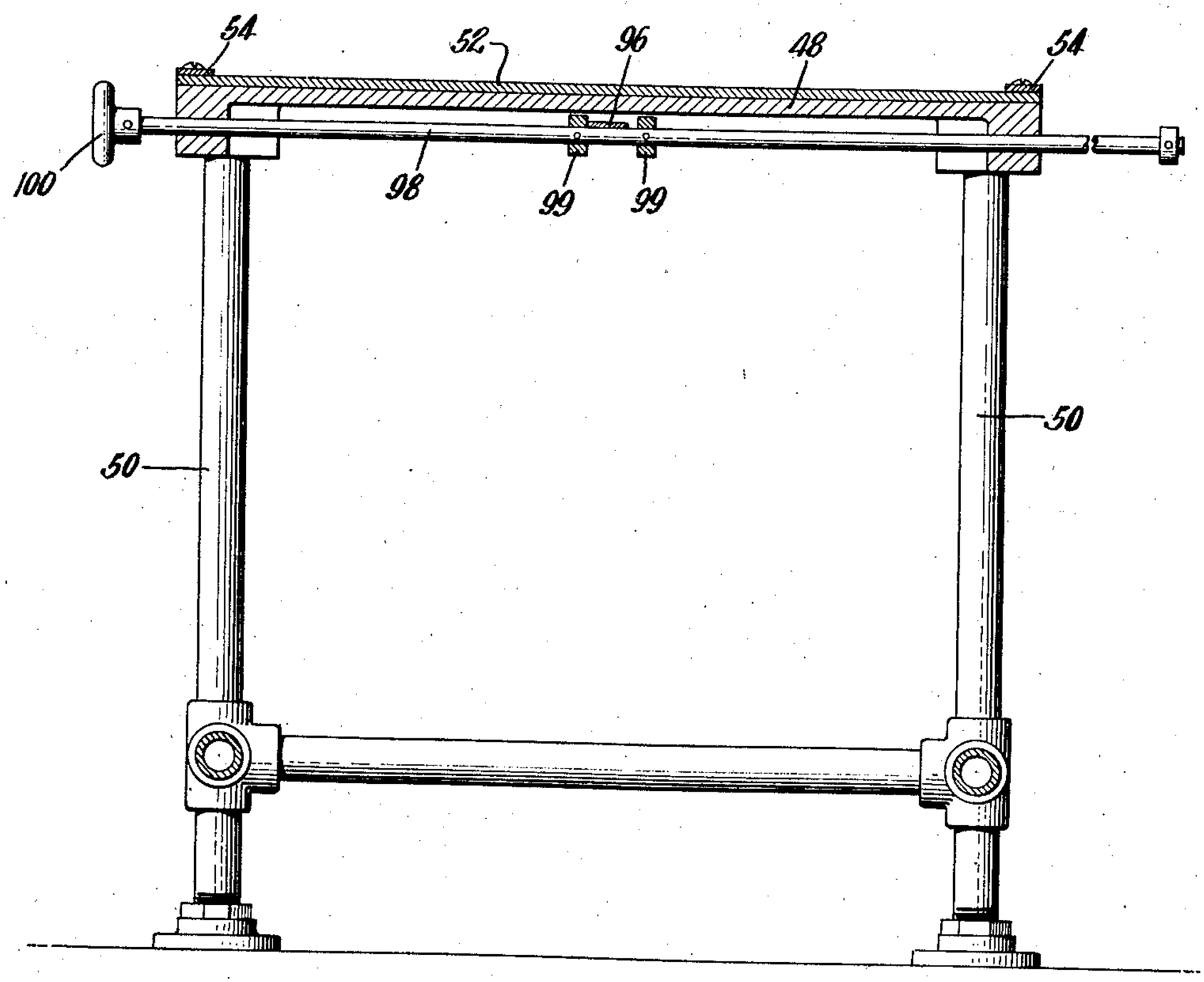

Fig. 8.

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Patented Dec. 19, 1939 2,184,222

UNITED STATES PATENT OFFICE

2,184,222

APPARATUS FOR LOADING AND UNLOADING A PHOTOGRAPHIC LETTERING MACHINE

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Application August 15, 1936, Serial No. 96,295

14 Claims. (Cl. 95—4.5)

This invention is an apparatus for loading and unloading a photographic lettering machine of the general type shown in the patents to Ogden, No. 1,893,439, dated January 3, 1933 and No. 2,019,764, dated November 5, 1935.

The invention comprises the following principal features:

A. A carrier for the light sensitive material which is loaded in the dark room and which moves through the wall of the dark room into position in the photographic lettering machine.

B. A printing frame, comprising clamping means cooperating with said carrier and with the sheet of light sensitive material, for positioning and clamping the light sensitive material firmly and accurately in proper focal position in the machine.

By virtue of the foregoing improvements, the productive capacity of the machine is substantially increased. The light sensitive material is positioned on a slide or carrier, which is conveniently a sheet of steel or other suitable material, in the dark room, and then this carrier is moved out of the dark room and into position in the machine, suitable light tight connections of course being provided between the machine and the dark room.

After the light sensitive material has thus been moved into the machine, a clamping device is brought into play for clamping the light sensitive material firmly and accurately in the focal plane of the camera.

Further advantages of construction and operation will be apparent from the attached drawings illustrating the present preferred embodiment of the invention in detail.

In these drawings, Fig. 1 is a vertical sectional view showing the apparatus of the present invention and cooperating parts.

Fig. 2 is a vertical sectional view on an enlarged scale, showing certain details of Fig. 1.

Fig. 3 is a section on the line 3—3 of Fig. 2.

Fig. 4 is a bottom plan view of the printing frame.

Fig. 5 is an enlarged section on the line 5—5 of Fig. 4.

Fig. 6 is a section showing a detail of part of Fig. 4.

Fig. 7 is a perspective view of the carrier for the light sensitive material.

Fig. 8 is a vertical section through the table in the dark room; and

Fig. 9 is a view of a detail.

Referring now to these drawings, in which similar reference characters indicate similar parts, 2 indicates one of the main frame castings of the machine, provided with trackways 4 and 6 on which ride rollers 8 and 10 which carry the main transversely movable carriage 12. The movable carriage 12 is provided with a light housing 14 which projects a beam of light through an alphabet plate 16 carried by a movable carriage 18. The light passes through bellows 20, prism housing 22, bellows 24, shutter and lens housing 26 and bellows 28, which is in light tight connection at its lower end with a flexible sheet 30, and thence onto a sheet of light sensitive material, as will be described. The sheet 30, which may conveniently be of copper, is guided by guideways 32 into roll-up cylinders 34. The guides 32 are carried by an apertured frame member 34, the aperture of which is indicated generally at 36, providing a light tight connection with the upper reach 38 of a light tight endless belt, the lower reach of which is shown at 38'. The upper reach of the belt 38 moves in a guideway 40.

The foregoing features are similar in a general way to Figs. 13, 14, 17 and 18 of the Ogden Patent No. 1,893,439. The provision of the light tight belt 38 provides for transverse movement of the frame 12 on its rollers 8 and 10 while the flexible sheet 30 provides for fore and aft movement, both of these movements being insulated against the entry of light.

The guideway 40 is carried by the lower frame member 40'. 40' also forms a guideway for the lower stretch 38' of the belt. Guideway 40' is operatively engaged with a feed screw 41, through the medium of an internally threaded collar 41' secured to 40' and operatively engaged with the feed screw; the operation of the feed screw moves the entire image projecting means in a fore and aft direction for shifting the projected image from one line to another.

The two described lateral movements of the image projector are evidently perpendicular to each other.

Coming now to the important features of the present invention, a sheet of light sensitive material 42 is suitably secured, as by adhesive tape or the like, 42*a*, to a flat flexible sheet 44, preferably of metal and preferably of thin steel. This sheet is of considerable length so that it can be drawn into the dark room, loaded with a light sensitive material 42 and pushed out through the wall 43 of the dark room into the lettering machine by means of the handle 46. It may be provided with markings 45 useful in placing the sheet of light sensitive material thereon. In the dark room there is provided a table 48 supported by standards 50 and having a top surface member 52 provided with edge strips 54, the inner vertical edges of which provide guideways for the steel sheet 44. The table top 52 and guide strips 54 extend out through the wall of the dark room, into the lettering machine, as shown in Fig. 1. One or both of these strips 54 may be provided with a scale 54*a* for indicating the position of the carrier sheet with rela-

tion to the lettering machine. The dark room end of the table top 52 is provided with one or more positioning studs 53 against which the end 44' of sheet 44 engages.

The steel sheet 44 extends through the opening 43 in the wall of the dark room, then through a light tight bellows 60 and connecting passageway 62, into a material holder, indicated generally at 64. The purpose of this material holder is to accurately position and hold a light sensitive material which is moved in contact with the glass plate 70 by raising the steel pressure plate against the material slide 44, so as to bring the sensitive material into the focal plane of the camera. It is quite important, in a machine of this sort, that the focusing be very accurate in order to give the necessary sharpness to the letters.

This material holder, which is shown more particularly in Figs. 3, 4, 5 and 6, will now be described. This material holder comprises end members 66, the inner edges of which are recessed to provide shoulders 68 against which is held a glass plate 70 by means of a clamping strip 72.

The side members 66, described above, are located parallel to the movement of the steel carrier sheet. In order to permit the steel sheet to enter the printing frame, the side members 74 thereof are slotted, this slot being indicated at 76.

The material holder is provided with an upwardly and downwardly movable clamping plate 78 provided with apertured cleats 80 adapted to engage over guide pins 82. One edge is beveled, as at 83, for guiding the front edge of the carrier sheet into the material holder.

In order to move the plate 78 up and down there is provided a pair of levers 84, pivoted to the bottom of the plate on pins 86, the ends of these levers projecting over inclined cam surfaces 88 provided by the inwardly extending right-angled plates 90 carried by the side member 74. The levers 84 are linked together by links 92, to give them parallel motion, one of the links 92 being provided with a pin 94 passing through an aperture in an actuating handle 96, pivoted to the underside of the plate 78 at 97. It will be apparent that when the handle 96 is actuated in one direction, the ends of the levers 84 will ride up on the cam surfaces 88 and lift the plate 78. Therefore, when the steel sheet carrying the light sensitive material is passed through the slot 76 into the material holder, and the bottom movable plate 78 of the frame raised as just described, the steel sheet, together with the light sensitive material, will be moved upwardly and clamped accurately in the focal plane of the camera.

The actuating handle 96 projects into the dark room and rests on a tranverse rod 98 between two collars 99 secured to the rod. The rod is mounted loosely in bearings in the table 48 and is movable lengthwise of itself, and transversely with respect to the handle 96, by means of handle 100. Rod 98 is in the dark room and it is evident that the handle 96, controlling the clamping plate in the material holder, can be operated from the dark room.

In order to permit the steel sheet 44 to pass entirely through the material holder, for the purpose, for example, of bringing a new section of light sensitive material into operative position, the left hand or forward end of the machine is provided with an opening 101 so that the sheet, coming out of the material holder, can pass through this aperture into a light-tight housing 102, for taking care of the projected end of the steel sheet and any light sensitive material that may be carried thereby. The purpose of bending the housing 102 upwardly is to avoid the knees of the operator.

The material holder 64, together with its clamping plate and handle 96, constitute an operating unit which may be readily removed from the machine. This is preferably effected by removing the housing 102 and inserting or removing the material holder through the opening 101. Or, it could be inserted and removed from the dark room side, if more convenient.

Summarizing briefly the operation of the apparatus: the steel sheet 44 is drawn into the dark room in position against the stops 54 and loaded by securing thereon one or more pieces of light sensitive material 42. The sheet is then pushed into the machine through the slots 76 and into the material holder 64 until it is in approximately the right position, as may readily be ascertained by suitable guide marks applied to the edge strips 54. When thus positioned, the handle 96 is actuated by means of the rod 98 in the dark room, which raises the clamping plate and thereby clamps the steel sheet and light sensitive material carried thereby to the under side of the glass plate 70 when it will be accurately positioned in the focal plane of the camera. After one section of the light sensitive material is used up, the steel sheet can be projected further inwardly to expose another section, the excess length of the steel sheet going into the housing 102. When exposure has been completed, rod 98 is operated to release the clamping plate of the material holder, and the steel carrier sheet 44 drawn into the dark room for developing the exposed sheet and reloading with a new sheet.

While the present preferred embodiments of the invention have been described in some detail, it should be understood that the invention is not to be limited to these details, but may be carried out in other ways.

I claim as my invention:

1. In a photographic lettering machine, in combination with image projecting means positioned on the outside of a dark room, carrier means for light sensitive material loadable and unloadable in the dark room, before and after exposure, and movable back and forth between the dark room and the lettering machine, and means for moving the carrier and the light sensitive material in a direction parallel to the optical axis of the lettering machine, to an exact focal position, after the carrier and the light sensitive material have reached an approximate focal position in the lettering machine.

2. In a photographic lettering machine, in combination with image projecting means positioned on the outside of a dark room, carrier means for light sensitive material loadable and unloadable in the dark room, before and after exposure, and movable back and forth between the dark room and the lettering machine, and means, operable from the dark room, for moving the carrier and the light sensitive material in a direction parallel to the optical axis of the lettering machine, to an exact focal position, after the carrier and the light sensitive material have reached an approximate focal position in the lettering machine.

3. In a photographic lettering machine, in combination with image projecting means po-

sitioned on the outside of a dark room, carrier means for light sensitive material loadable and unloadable in the dark room, before and after exposure, and movable back and forth between the dark room and the lettering machine, and means, including a manipulating handle extending into the dark room, for moving the carrier and the light sensitive material in a direction parallel to the optical axis of the lettering machine, to an exact focal position, after the carrier and the light sensitive material have reached an approximate focal position in the lettering machine.

4. In a photographic lettering machine, in combination with image projecting means positioned on the outside of a dark room, carrier means for light sensitive material movable back and forth to and from the dark room, loadable and unloadable in the dark room, before and after exposure, and a material holder into which the carrier carries the sheet of light sensitive material, said holder being movable in a direction parallel to the optical axis of the projecting means for holding the light sensitive material in the focal plane of the projecting means.

5. In a photographic lettering machine, in combination with image projecting means positioned on the outside of a dark room, carrier means for light sensitive material movable back and forth to and from the dark room, loadable and unloadable in the dark room, before and after exposure, and a material holder, comprising a clamping plate operable from the dark room, for moving the light sensitive material into the focal plane of the projecting means and for holding it there.

6. In a photographic lettering machine, in combination, means for projecting an image vertically downwardly, means for moving said image projecting means horizontally, in two directions at right angles to each other, means connecting the machine to a dark room, carrier means for light sensitive material adapted to travel back and forth between the image projector and the dark room, loadable and unloadable in the dark room, before and after exposure, and means for moving the light sensitive material into the focal plane of the camera after it has come into the machine from the dark room.

7. In a photographic lettering machine, in combination, image projecting means, a dark room, means for connecting the image projecting means to the dark room, a horizontally disposed carrier sheet for light sensitive material, movable in a horizontal plane, between the projecting means and the dark room, and a material holder in the image projector, slotted to receive the carrier sheet and the light sensitive material carried thereby, and provided with a clamping plate for clamping the light sensitive material in the focal plane of the image projector.

8. In a photographic lettering machine, in combination, image projecting means, a dark room, means for connecting the image projecting means to the dark room, a horizontally disposed carrier sheet for light sensitive material, movable in a horizontal plane, between the projecting means and the dark room, and a material holder in the image projector, slotted to receive the carrier sheet and the light sensitive material carried thereby, and provided with a clamping plate for clamping the light sensitive material in the focal plane of the image projector, said clamping plate being manually operable from within the dark room.

9. In a photographic lettering machine, in combination, image projecting means for projecting an image vertically downwardly, a dark room, a light tight means connecting the image projecting means to the dark room, a horizontally disposed table in the dark room extending through said light tight connection into the image projector, a material holder in the focal plane of the image projecting means, and a carrier for light sensitive material loadable and unloadable in the dark room, before and after exposure, and adapted to slide on said table and into said material holder.

10. In a photographic lettering machine, in combination, image projecting means for projecting an image vertically downwardly, a dark room, light tight means connecting the image projecting means to the dark room, a horizontally disposed table in the dark room extending through said light tight connection into the image projector, a material holder in the focal plane of the image projecting means, and a carrier for light sensitive material adapted to slide on said table and into said material holder, and back into the dark room and means for operating said material holder from the dark room.

11. In a photographic lettering machine, in combination, image projecting means for projecting an image vertically downwardly, a dark room, light tight means connecting the image projecting means to the dark room, a table in the dark room extending through said light tight connection into the image projector, a material holder in the focal plane of the image projecting means, a carrier for light sensitive material adapted to slide on said table and into said material holder, and means extending underneath said table and into the dark room, for operating said material holder.

12. In a photographic lettering machine, in combination, image projecting means for projecting an image vertically downwardly, a dark room, light tight means connecting the image projecting means to the dark room, a table in the dark room extending through said light tight connection into the image projector, a material holder in the focal plane of the image projecting means, the material holder including an upwardly movable clamping plate, a carrier for light sensitive material adapted to slide on said table and into said material holder, means extending underneath said table and into the dark room, for operating said material holder, and means in the dark room, for operating said clamping plate.

13. In combination with a photographic lettering machine, wherein the image is projected vertically downwardly, a dark room operatively connected with the machine, a table in the dark room, a horizontally slidable sheet for light sensitive material slidable on said table, and loadable and unloadable in the dark room and a scale for indicating the position of said sheet.

14. In combination with a photographic lettering machine, wherein the image is projected vertically downwardly, a dark room operatively connected with the machine, a table in the dark room, a horizontally slidable sheet for light sensitive material, made of thin sheet metal, slidable on said table, and loadable and unloadable in the dark room, and a scale carried by said table, alongside the sheet, for indicating its position in relation to the lettering machine.

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