

No. 670,167.

Patented Mar. 19, 1901.

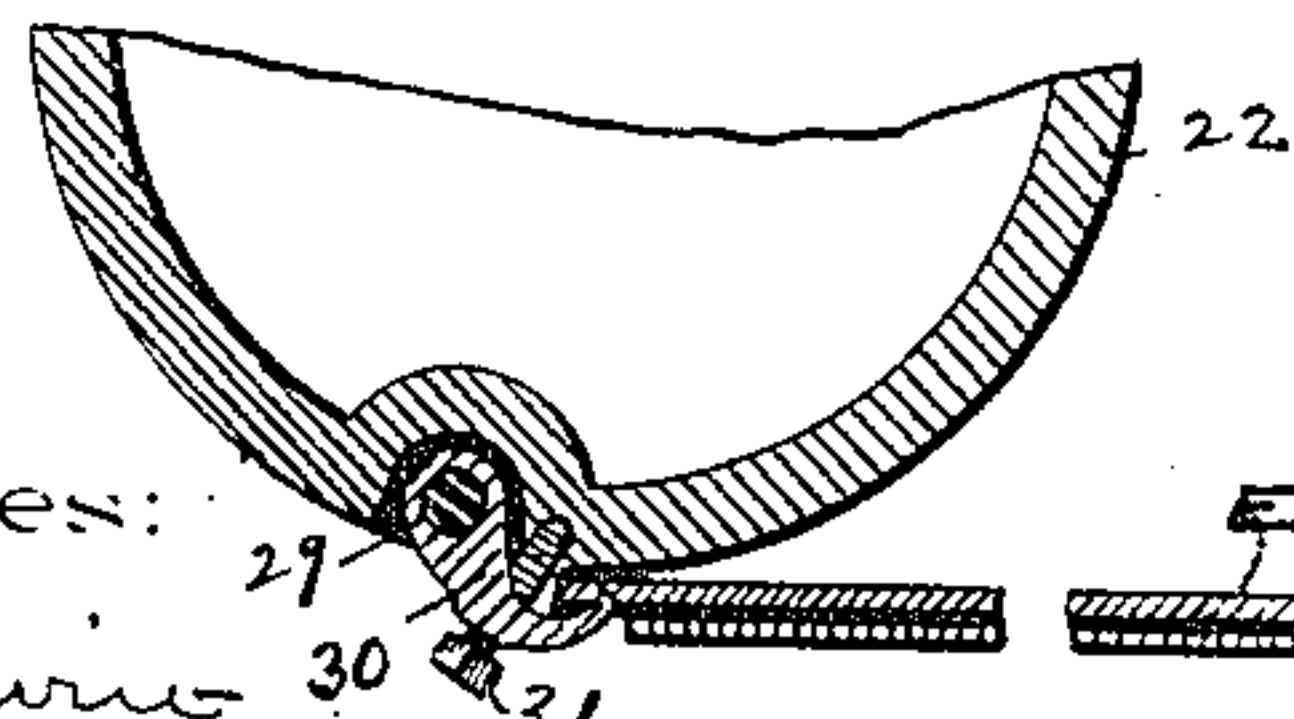
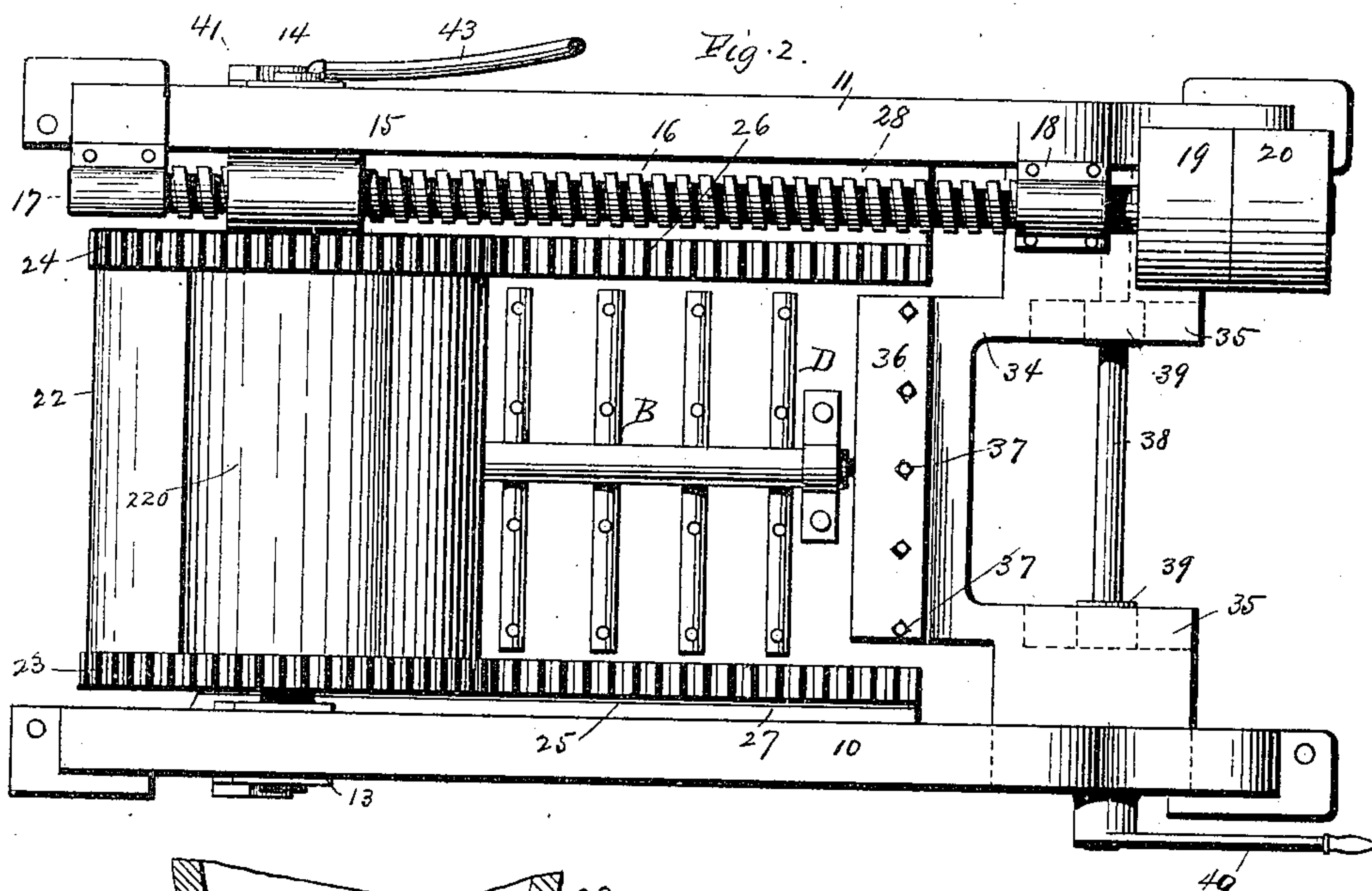
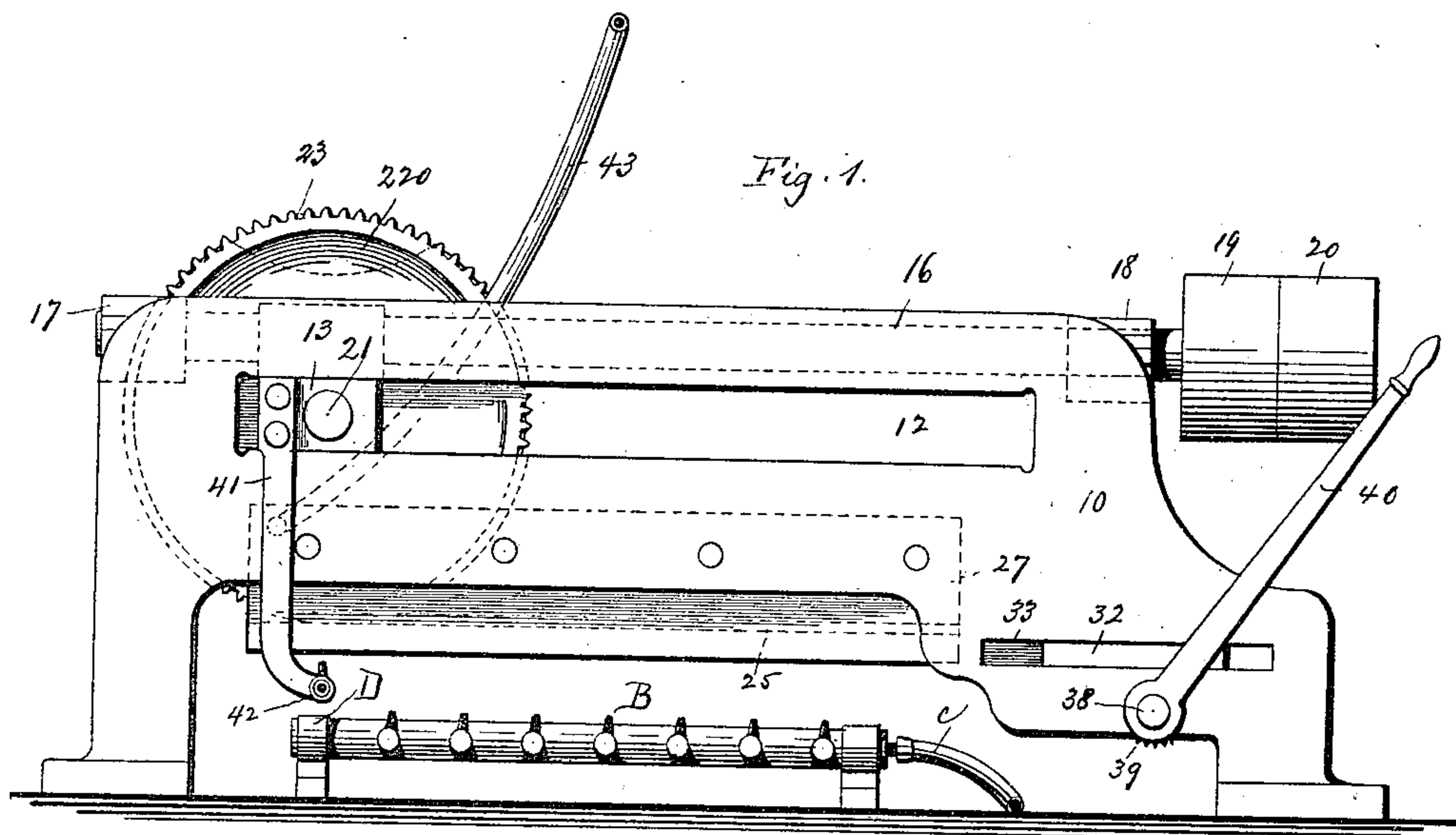
H. A. W. WOOD.

APPARATUS FOR BENDING PRINTING PLATES.

(Application filed May 31, 1895.)

(No Model.)

2 Sheets—Sheet 1.



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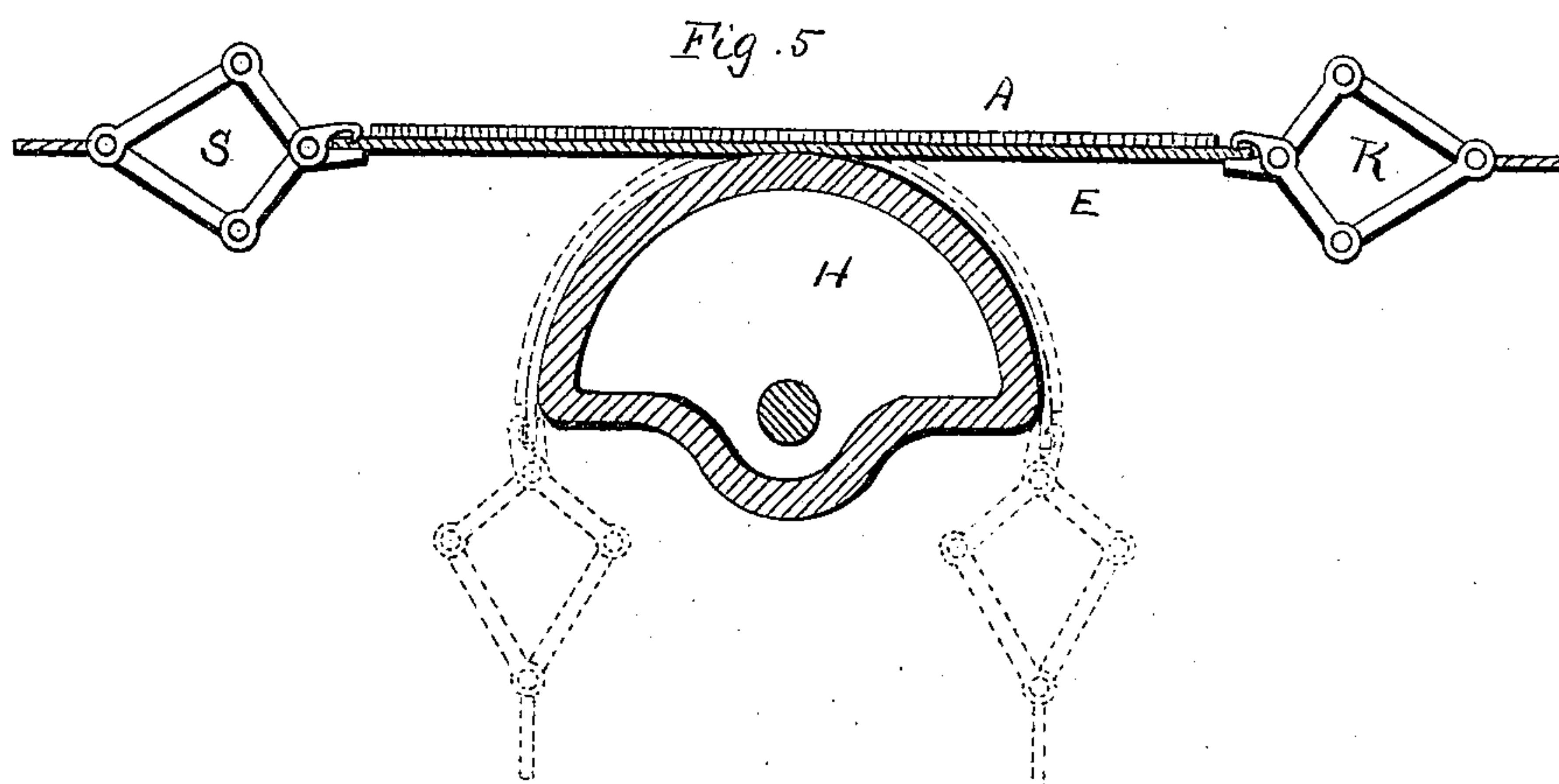
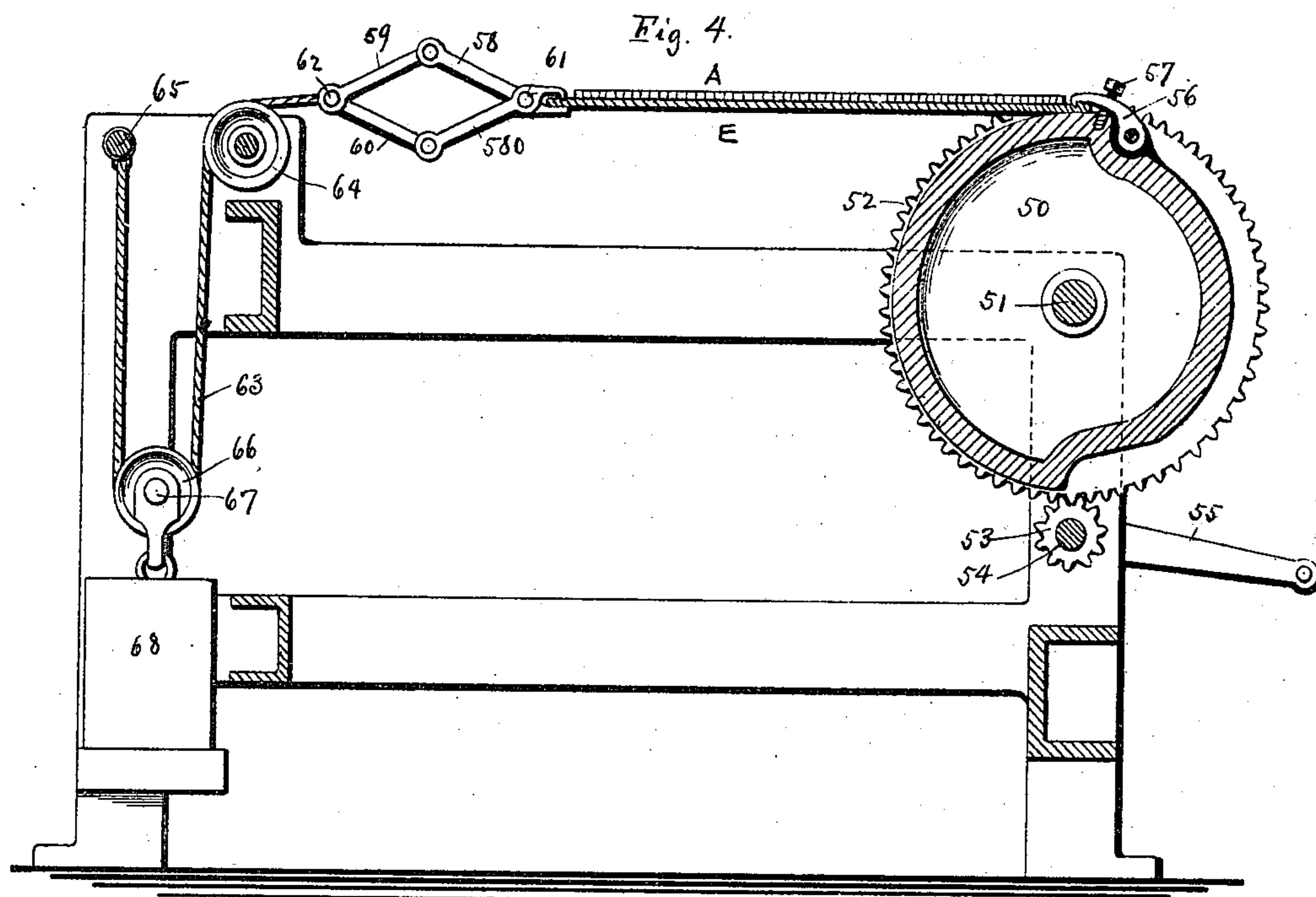
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APPARATUS FOR BENDING PRINTING PLATES.

(Application filed May 31, 1895.

(No Model.)

2 Sheets—Sheet 2.



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UNITED STATES PATENT OFFICE.

HENRY A. WISE WOOD, OF NEW YORK, N. Y., ASSIGNOR TO CAMPBELL
PRINTING PRESS & MANUFACTURING COMPANY, OF SAME PLACE.

APPARATUS FOR BENDING PRINTING-PLATES.

SPECIFICATION forming part of Letters Patent No. 670,167, dated March 19, 1901.

Application filed May 31, 1895. Serial No. 551,291. (No model.)

To all whom it may concern:

Be it known that I, HENRY A. WISE WOOD, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented a new and useful Improvement in Apparatus for Bending Printing-Plates, of which the following is a specification.

The aim of this invention is to provide a new and improved apparatus for bending printing-plates; and to this end the invention consists of devices described and claimed in this specification and illustrated in the accompanying two sheets of drawings, in which—

Figure 1 is a side elevation of a machine adapted to carry out my method. Fig. 2 is a plan of the same. Fig. 3 is a sectional elevation illustrating the way the plate is held between the cylinder and clamping device. Fig. 4 is a sectional elevation of a different form of machine adapted to carry out my improved method, and Fig. 5 illustrates in diagram another way in which my improved method may be carried out.

Many printing-plates are prepared or made in flat or plane form and are then bent to fit a curved member. There are now many well-known methods of bending printing-plates; but in all of these methods with which I am familiar the type-face of the plate must come in contact with bending-rollers or equivalent devices, so that when the plate is bent the type-surface will be more or less injured. It is desired in some classes of work to print from very fine and delicate printing-plates and to bend these plates, so that the same can be put upon a rotary cylinder, so that the printing may be done in the most expeditious manner now known in the art. The above applies more especially to what are known as "electrotype - plates." These electrotype-plates consist of thin copper shells which are backed with a suitable backing metal and are then bent to fit the printing-cylinder. When the electrotype-plates are bent by any of the old methods or machines, the delicate type surface or face will come in contact with the bending-surfaces and is liable to be greatly blurred and injured in the bending process, as in these old methods the pressure of bend-

ing is exerted upon the printing-surface of the plate as well as upon the back—that is to say, a pressure is exerted directly between the front and the back of the plate, which is necessarily injurious to the printing-surface of the plate.

My apparatus for bending printing-plates consists, essentially, of means for wrapping the printing-plate around a curved or cylindrical surface, so that the type or outside face of the plate need not come in contact with any of the mechanism.

My apparatus is especially designed for bending electrotype-plates; but the same may be adapted to and applied for use in connection with other printing-plates. I may also, if desired, heat the exterior or type face of the plates while the same is being bent and may apply this heat especially at the point on which the same is being bent. This heating of the plates is not necessary; but I find the same useful with some forms of plates, as the heating tends to expand and make plastic the delicate printing-surfaces, so that the same will not crack during the bending operation.

In the first sheet of drawings, 10 and 11 represent the side frames of a machine, and these side frames may be tied together by any suitable braces or tie-beams to constitute a strong framing, which braces or tie-beams are not necessary here to show. These side frames 10 and 11 have suitable ways or slots, as 12, formed therein, and fitting in these slots are the sliding journal-boxes 13 and 14. On the top of one of these boxes, as 14, is fastened or formed a screw-threaded nut 15, and threaded in this nut is a screw 16, which is mounted to revolve in suitable bearings 17 and 18, secured to the frame 11, as shown.

Mounted on one end of the screw 16 are suitable tight and loose pulleys, as 19 and 20, by which power, if desired, may be applied to operate the machine.

Journaled in the boxes 13 and 14 is a shaft 21, and mounted on this shaft 21 is a cylinder 22, which I will hereinafter term the "bending-cylinder." Fastened on the sides of this cylinder 22 are the gears 23 and 24, which mesh with stationary racks 25 and 26, secured to frames or pieces 27 and 28, bolted to the frames 10 and 11, as shown. A shaft 29 is mounted

in the cylinder 22, near the periphery thereof, and mounted on this shaft 29 are a series of gripping-fingers 30, which are operated and controlled by screws 31.

5 Formed in each side frame 10 and 11 is a finished slot 33, into which bearings 32 of the part I term the "clamping device" fit. This clamping device consists of a frame or piece 34, which has the bearings 32, before mentioned, and fastened to the lower side of the piece 34 are the short racks 35 for a purpose hereinafter noted. The cylinder 22 may have a recess, as 220, cut in the periphery thereof, so that this gripping device can fit practically 15 within the recess 220 when the cylinder is at its right-hand extreme.

Fitting on the front edge of the clamp 34 is a piece or gripper 36, which may be adjusted and clamped by means of screws 37, 20 so as to hold the edge of the plate between the frame 34 and the gripper.

A shaft 38 is journaled in the main frames 10 and 11, as shown, and this shaft has suitable pinions 39, which mesh with the racks 25 35, before noted, and on the end of this shaft 39 is arranged a handle 40, and by manipulating this handle 40 the clamping device can be moved horizontally in either direction for a purpose hereinafter described and so that 30 different lengths of plates may be manipulated.

Brackets D D may be mounted below the device, as shown, and between these brackets may be arranged a series of gas-pipes B, which 35 may have suitable jets whereby the type-faces of the plate may be heated during the bending operation, if desired. Fastened on each of the bearings 13 and 14 is a bracket 41, and between these brackets 41 is arranged another gas-pipe 42, which has suitable jets so 40 arranged that the flame from the same will strike or bear directly on the type-surface of the plate where the plate is tangential to the bending-cylinder, as hereinafter described.

45 Gas may be conveyed to this pipe 42 by a flexible tube 43, which may be connected to any desired source of supply, and gas may be conveyed to the pipes B by means of tube C.

The operation of my apparatus for bending 50 printing-plates as thus constructed is as follows: A plate E, which has the type-face A, is first nipped by the grippers 30, so that the edge of the same will be firmly held by the cylinder 22. Then the other end of the 55 plate E is nipped by the gripper 36, and the bolts 37 are tightly screwed down to hold the end of the plate to the clamping device 34. Then the handle 40 is operated so that the plate will be tightly stretched between the bending-cylinder 22 and the clamping device. 60 The screw 16 is then revolved by power, if desired. By this means the cylinder 22 will be caused to travel toward the right, and as the same travels toward the right the printing-plate E will be wrapped around its periphery, and the plate will thereby be bent to 65 assume the desired contour. The diameter of

the bending-cylinder 22 may be made slightly greater than the pitch-diameter of the gears 23 and 24, whereby as the cylinder 22 travels 70 to the right a strong pull will be exerted upon the bending-plate, which pull may be relieved as is necessary by the manipulation of the handle 40. During this bending operation the type-face may be heated by means before 75 described, so that the same will expand during the bending operation. Also it will be seen that by means of the pipe 42 a stronger heat may be applied at the tangential point between the printing-plate and the bending- 80 cylinder. The handle 40 should be so controlled during the bending operation that an even strain will come upon the printing-plate. If too much strain should come at one time, the same can be relieved by properly manipu- 85 lating the handle 40. It will be seen that by bending the plate in this manner the type-face of the same need not come in contact with any of the bending apparatus and that no squeeze or injurious pressure will be brought 90 to bear upon the type-surface. The plate after the bending operation is trued in the usual manner and can then be applied to the printing-cylinder.

If desired, the plate can be held for a long 95 time in the strain of the cylinder and can be tightly pulled or wrapped around the same by further manipulation of the handle 40 when the cylinder is at its right-hand extreme.

The cylinder 22 is preferably made of 100 slightly-smaller diameter than the diameter of the printing-cylinder to which the plate is to be applied, so as to counteract the "spring" of the plate after the same has been bent.

A modified form of apparatus constructed 105 according to my invention is shown in Fig. 4. In this case the bending-cylinder 50, instead of being a traveling cylinder, is made a stationary cylinder and is mounted on a shaft 51, which is journaled in a suitable frame, as 110 shown. On the side of the cylinder 50 may be mounted a gear 52, which gear may be revolved by means of a pinion 53, fastened on shaft 54, also journaled in the frame by means of handle 55. The cylinder 50 has the grip- 115 pers 56, which have screws 57, and these grippers 56 are adapted to catch and retain one end of the printing-plate E. The other end of the printing-plate E may be caught between the jaws of the lazy-tongs 58 and 580, 120 which are pivoted together on the shaft 61, and these tongs 58 and 580 are connected by links 59 and 60 to a shaft 62. Two or more of these tongs may be used side by side if the plate is a wide one. The lazy-tongs are con- 125 nected by a rope or cable 63, which passes over a pulley 64, mounted in the frame, to a stationary stud 65, the cable also passing around a sheave 66, mounted on a shaft 67, and connected to this shaft 67 is a heavy 130 weight 68. The operation with this machine is substantially the same as that before described, except that the cylinder does not travel. By turning the handle 55 the print-

ing-plate E will be wrapped around the surface of the cylinder 50 and will be thereby bent, the weight 68 holding the same back at a tension necessary to properly bend the same.

5 In this case the type-face A of the plate E is held uppermost instead of turned down, as in the previous machine.

10 In Fig. 5 I have illustrated diagrammatically a still further modification for practicing my invention. In this case I use a stationary curved bending-surface H and lay the plate E upon the same with the type-face up, as shown. The plate E is gripped by the grippers R and S, and then the plate is bent down 15 over the curved surface H, as shown in dotted lines.

20 The details and arrangements of the various machines for carrying out my invention can be widely varied by a skilled designer without departing from the scope of my invention, as expressed in the claims.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

25 1. The combination in a plate-bending machine of a curved or cylindrical surface having means for grasping one end of the plate, a clamping device adapted to grasp the other end of the plate, and means for revolving the 30 bending-surface so that the plate will be wrapped around the same without contact of the type-faces of the plate with any part of the bending mechanism, substantially as described.

35 2. The combination in a plate-bending machine of a curved or cylindrical surface having means for grasping one end of the plate, means for grasping and holding the other end of the plate, and means for revolving and 40 traveling said curved or cylindrical surface, whereby the plate may be wrapped around the same without contact of the type-face with any part of the bending mechanism, substantially as described.

45 3. The combination in a plate-bending machine of a curved or cylindrical surface having means for grasping one end of the plate, an adjustable clamping device adapted to grasp the other end of the plate, and means 50 for revolving the bending-surface, substantially as described.

4. The combination in a plate-bending ma-

chine of the bending-cylinder having means for grasping the end of the plate, means for revolving and moving said cylinder, and a 55 clamping device for holding the other end of the plate, consisting of a frame having means for grasping the plate, and an adjusting mechanism, whereby the tension of the plate between the bending-cylinder and the clamping 60 device can be controlled, substantially as described.

5. The combination in a plate-bending machine of the bending-cylinder, means for securing one end of the plate to the same, means 65 for securing or holding the other end of the plate, means for revolving and moving said bending-cylinder, and a heating device adapted to heat the type-face of the plate as the same is bent, substantially as described. 70

6. The combination in a plate-bending machine of the bending-cylinder having means for grasping the end of the plate, means for revolving and traveling said bending-cylinder, a heating device adapted to heat the plate 75 at the tangential point between the same and the bending-cylinder, and connections whereby the heating device will travel with the bending-cylinder, substantially as described.

7. The combination in a plate-bending machine of the bending-cylinder having means 80 as grippers for grasping one end of the plate, means for revolving and traveling said bending-cylinder, a clamping device for seizing the other end of the plate consisting of a frame 85 carrying grippers, and an adjusting mechanism for this frame consisting of racks attached to the under side of the same, a shaft having a handle, and pinions engaging said racks, substantially as described. 90

8. The combination in a plate-bending machine of the bending-cylinder having grippers for grasping one end of a plate, means for revolving said bending-cylinder, a clamping device for seizing the other end of the plate, 95 and means for holding back on the clamping device, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

HENRY A. WISE WOOD.

Witnesses:

WALTER G. BENNETT,
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