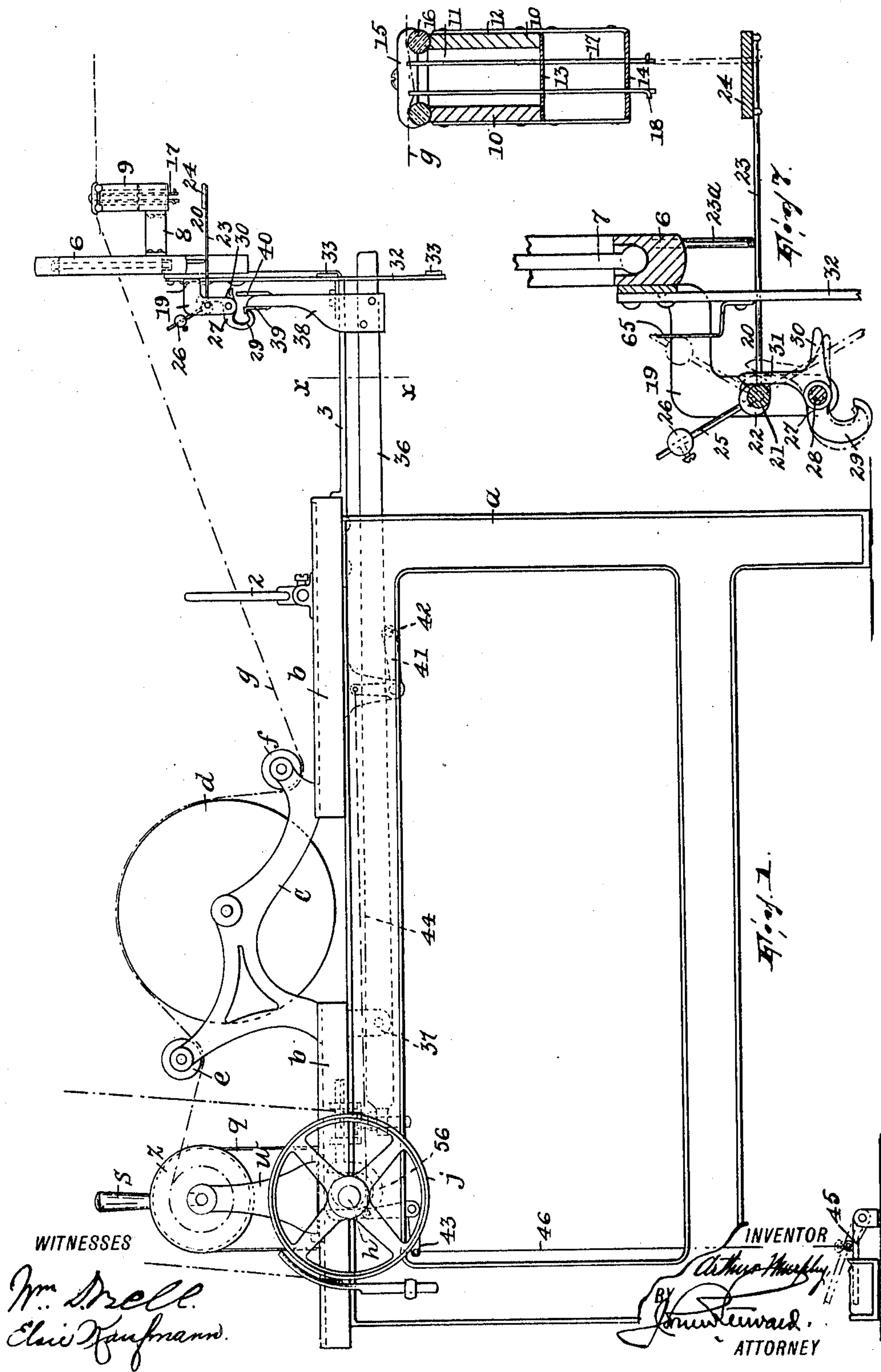


970,085.

A. MURPHY.
WARPING MACHINE.
APPLICATION FILED JULY 6, 1909.

Patented Sept. 13, 1910.

3 SHEETS—SHEET 1.



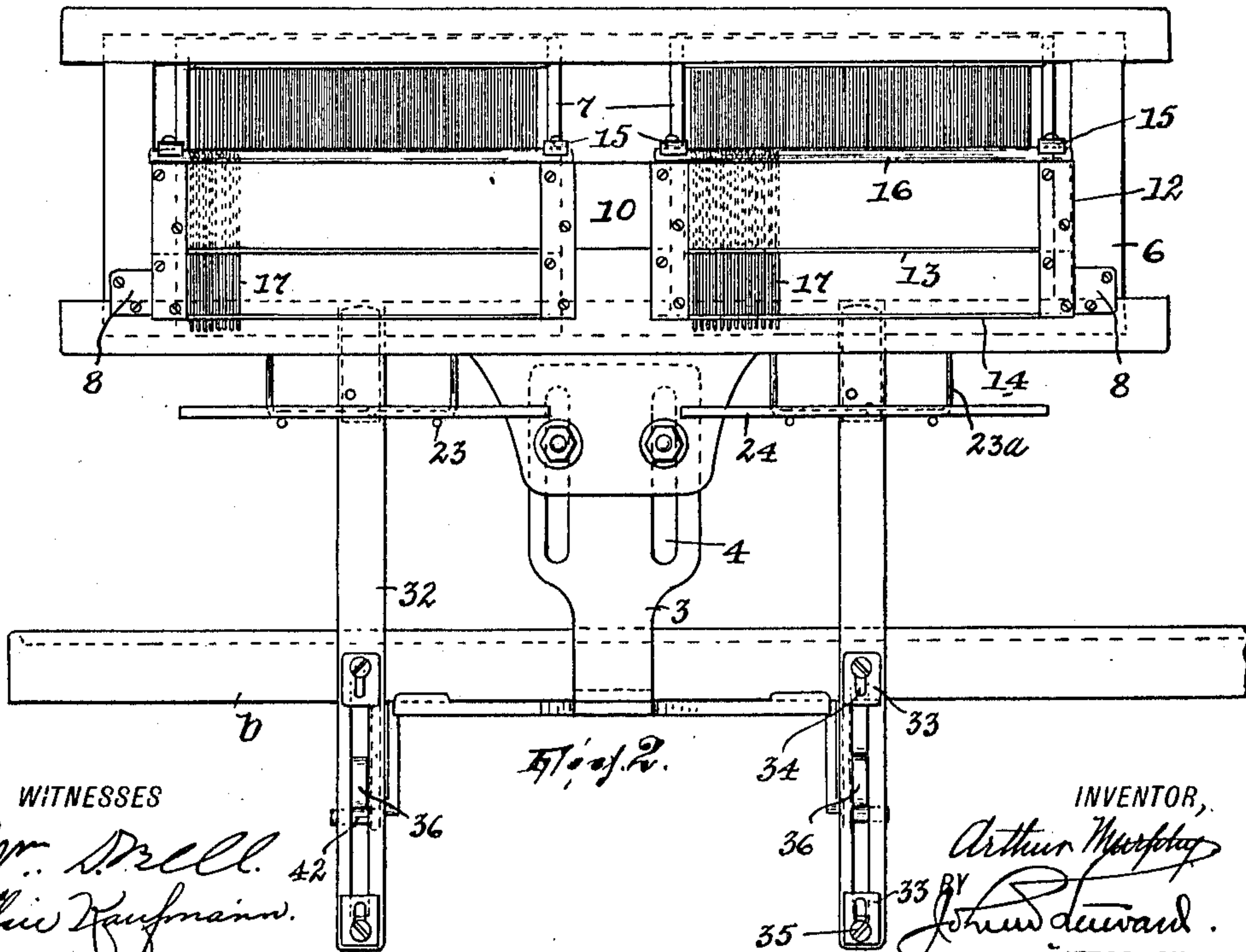
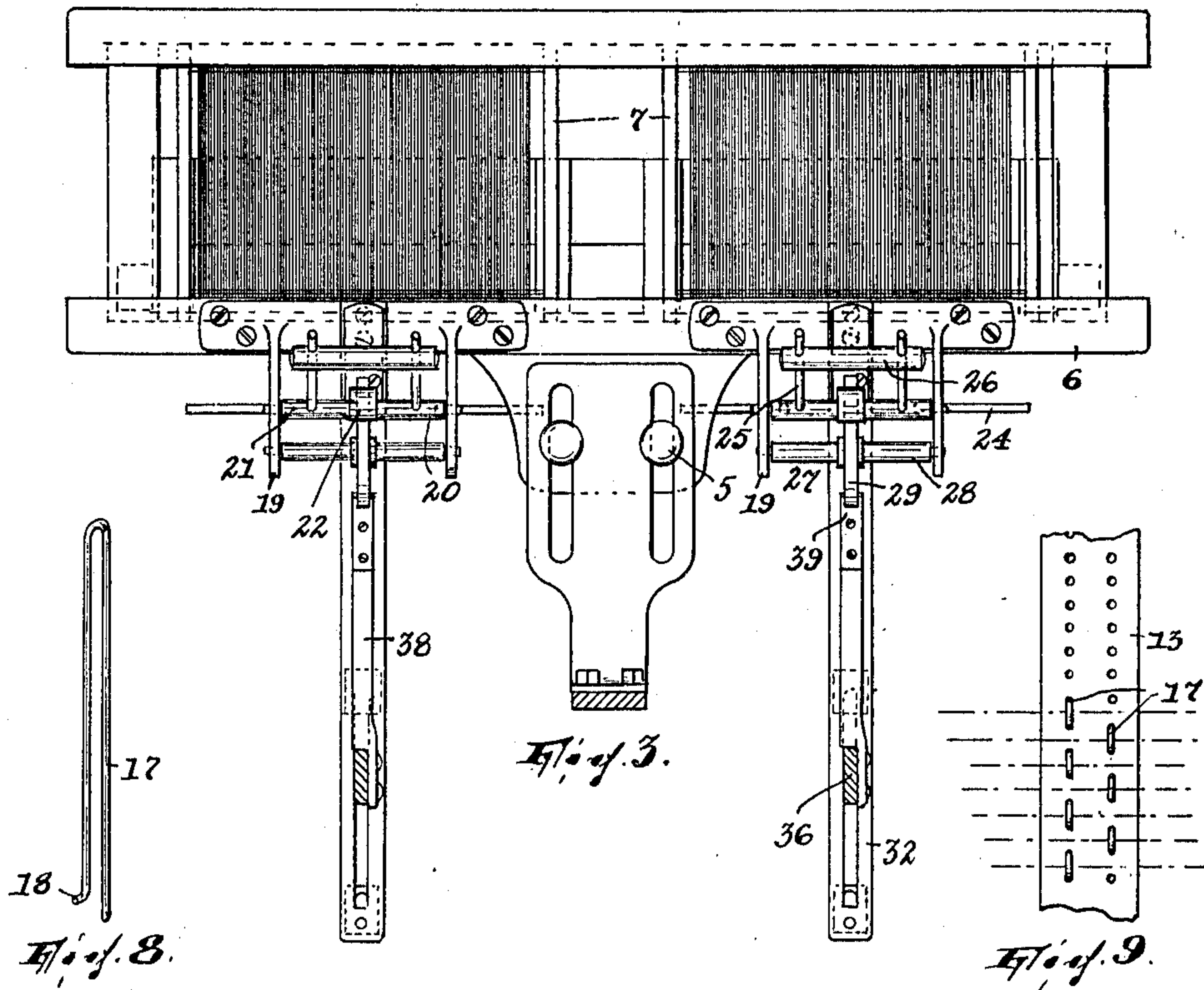
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3 SHEETS—SHEET 2.



WITNESSES
Wm. D. Zell.
Eliu Kaufmann.

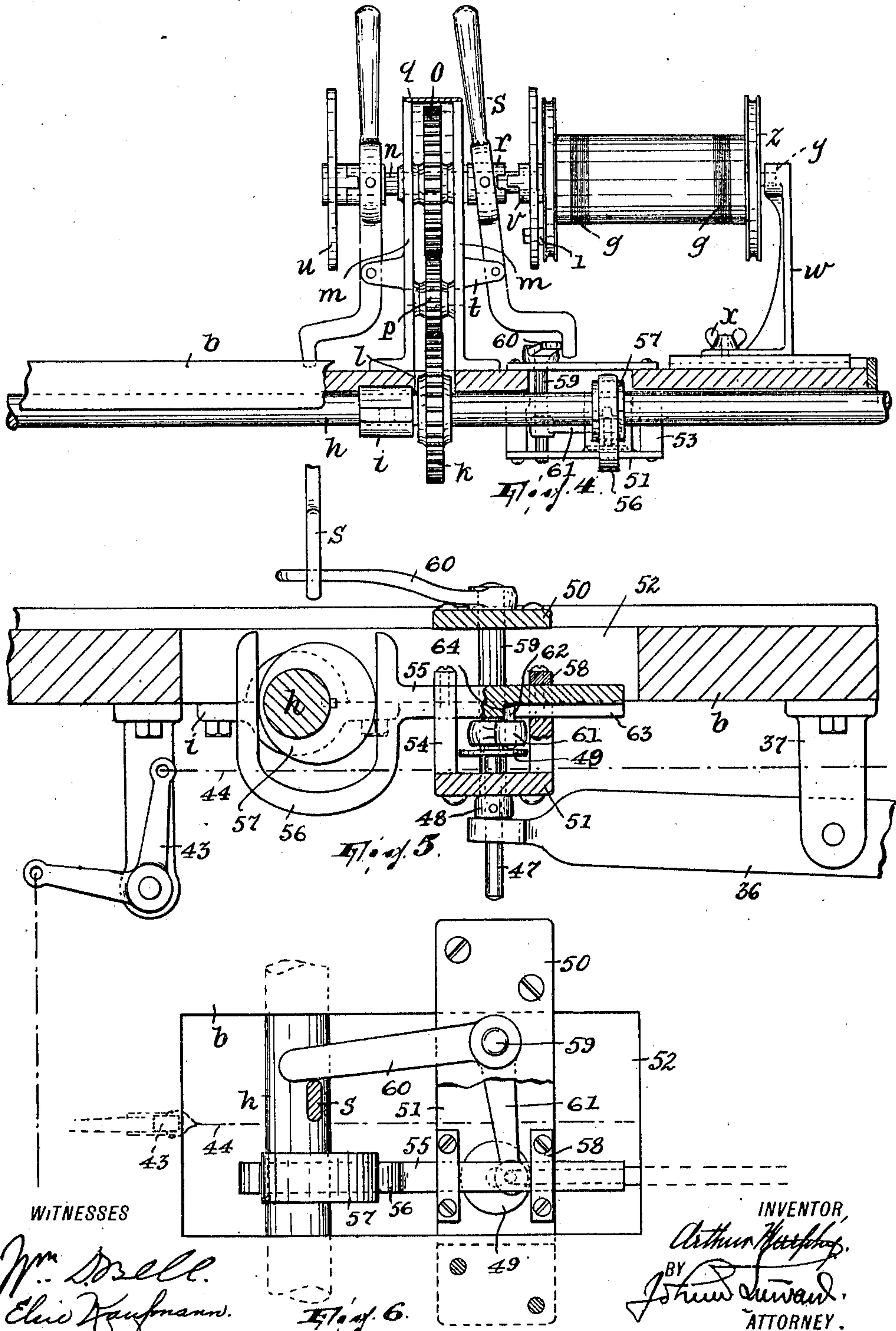
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3 SHEETS—SHEET 3.



WITNESSES

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Fig. 6.

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UNITED STATES PATENT OFFICE.

ARTHUR MURPHY, OF PATERSON, NEW JERSEY, ASSIGNOR TO FRANK AND DUGAN,
OF PATERSON, NEW JERSEY, A FIRM.

WARPING-MACHINE.

970,085.

Specification of Letters Patent. Patented Sept. 13, 1910.

Application filed July 6, 1909. Serial No. 506,009.

To all whom it may concern:

Be it known that I, ARTHUR MURPHY, a citizen of the United States, residing in Paterson, Passaic county, New Jersey, have invented a certain new and useful Improvement in Warping-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

15. This invention relates to warping machines and it consists in certain improvements in such machines having for their principal objects to increase the output of the machine, improve the product, eliminate the necessity for constant attention on the part of the operator in order to assure himself that all of the threads are being continuously advanced, and make it possible to piece threads with increased facility and convenience whenever they become broken.

My invention is fully illustrated in the accompanying drawings, wherein,

Figure 1 is a view in side elevation of the improved machine; Fig. 2 is a view in rear elevation of the reeds and reed frame and mechanism associated therewith; Fig. 3 is a vertical sectional view on the line $x-x$ of Fig. 1 and looking rearwardly; Fig. 4 is a view in front elevation, partly in section, showing the means whereby the winding is effected and that part of the stop-motion mechanism which directly affects said winding mechanism; Fig. 5 is a vertical sectional view on a larger scale and taken in a vertical plane immediately to the right of a certain cam shown in Fig. 4; Fig. 6 is a top plan view, partly broken away, of what is shown in Fig. 5; Fig. 7 is an enlarged detail view, partly in side elevation and partly in section, of a portion of the mechanism shown in Figs. 2 and 3; and, Figs. 8 and 9 are detail views illustrating one of the fallers and one of the perforated plates in which they move.

50 The machine is illustrated in the drawing as designed particularly for the warping of

edge warps; it will be understood, however, that the essential features of my invention are applicable to machines designed for the warping of various other kinds of warps than merely edge-warps. Further, I have only shown in the drawings two beams and their accessory mechanisms; it will be understood that the number of beams and their accessory mechanisms may be increased in a single machine, if desired.

a in the drawings designates a suitable frame and b two tables supported thereon and extending transversely thereof and spaced from each other. These tables are bridged by brackets c in which are journaled a drum or drums d and guide-rollers e and f disposed the one in front of and the other back of said drum; the parts d , e and f preserve a suitable tension on the warps g , and the drum or drums d may be connected up in the usual manner with a suitable "clock" (not shown) to indicate the number of yards of warps passed through the machine.

A rotary shaft h is journaled in suitable bearings i under the front table b , extending transversely of the frame, the table being recessed longitudinally thereof to receive the shaft. This shaft carries a pulley j around which a driving belt may be passed and it also carries a gear k which projects up through an opening l in the table b . A pair of brackets m surmount the table b at opposite sides of the opening l , and in these brackets is journaled a shaft n carrying a gear o driven from gear k by a transmission gear p , also journaled in said brackets; a gear casing q is shown in section in Fig. 4. The shaft n carries the clutch members r , which are splined thereto, said clutch members being controlled by the levers s pivoted in arms t of the brackets m . A face plate u is fixed on each end of the shaft n , and it has a clutch member v adapted to interlock with the clutch member r . At each side of the brackets m is another bracket w rendered adjustable to and from the brackets m by a wing-nut x . Each bracket w has an open recess y forming a bearing for one trunnion of a beam z , the other trunnion of which may be inserted into a socket (not shown)

in the clutch member *v*, the beam being caused to rotate with the face plate *u* by a pin or the like 1.

In view of the foregoing it will be seen that the gear *o* transmits rotary motion to two beams, and that either of these beams is disconnectively connected with the shaft *n* carrying said gear. The shaft *h* continuously rotates, and so long as the clutch members *r* stand engaged with clutch members *v*, the beams *z* will be driven; occasionally, however, a thread will break, making it necessary to stop the rotation of the particular beam until that thread can be pieced. In order that the stopping of the beams may be effected automatically, the following mechanism is provided: On the rear table *b* is arranged the usual condensing reed 2. Rearwardly from the table projects a bracket 3 whose rear end is turned upwardly and vertically slotted, as at 4. Against its upturned slotted rear end is adjustably secured, by means of bolts 5 penetrating the slots 4, the tail of a reed frame 6 in which are removably arranged the reeds 7, preferably one for each beam *z*. From the back of the reed frame project arms 8 which carry a faller-box 9; as shown in Figs. 2, 3 and 7, this box comprises front and back walls 10, end walls 11, vertical strips 12 secured to the front and back of the box and projecting downwardly, and perforated plates 13 and 14, the former secured directly to the lower portion of the box and the latter carried at the lower ends of the strips 12. Surmounting each wall 10 of the box, and held thereon by cap-pieces 15, are the spaced glass bars 16, over which the threads *g* extend on their way to the beams through the reeds 7 and 2 and under rollers *e* and *f* and over drums *d*.

In the perforated plates 13 and 14 move vertically the inverted U-shaped fallers 17, each faller being a piece of bent wire whose legs penetrate two holes in each plate (so as to be held against turning) and one of whose extremities is bent off as at 18 for a purpose to be indicated. The fallers are held suspended by the threads in the position shown in full lines in Fig. 7.

To the front of the reed frame are secured the brackets 19 and in these are fulcrumed the lever-structures 20. Each of the latter comprises an arbor 21 journaled in the brackets 19 and formed with a cam 22; two wires 23 projecting rearwardly and carrying a slat 24 arranged under the fallers, and two other wires 25 projecting rearwardly at an incline and carrying an adjustable weight 26. This weight is so adjusted that the slat 24 will be retained in its horizontal position, that is, in contact with a stop 23^a depending from the reed frame, so long as the

weight of a faller or fallers is not imposed upon it; otherwise it is forced into the position shown by dotted lines in Fig. 7. In each bracket 19 is also fulcrumed a detent device 27 comprising an arbor 28 carrying a hook 29 having the rearwardly and upwardly projecting arms 30 and 31, the arm 31 being engageable by the cam 22.

Suspended from the reed frame in alignment with the hooks 29, are the vertically slotted guides 32, the length of the slot in each being rendered adjustable by plates 33 having vertical slots 34 and secured to the guide by the screws 35 penetrating their slots. Each guide is penetrated by a lever 36 which is fulcrumed in a bracket 37 in such manner that a relatively small portion of the length thereof is forward of its fulcrum. At its rear end each lever carries an upright 38 having a hook 39 whereby the lever may be suspended from the hook 29 and a projection 40 to engage the arm 30 of hook 29.

In the frame *a* are fulcrumed bell-crank levers 41 each having a pin 42 underlying the corresponding lever 36; each lever 41 is connected with another bell-crank lever 43 by a flexible connection 44; and each lever 43 is connected with a treadle 45 by a flexible connection 46.

As will be explained, when a faller drops and actuates the lever structure 20, the corresponding lever structure 27 is moved to release lever 36, and the latter acts to disestablish the clutch for the beam corresponding to it. To this end the forward end of each lever 36 is penetrated by a vertically movable stud 47 having a collar 48 resting on the lever and surmounted by a disk 49. Said stud is guided in the lower one of two superposed plates 50 and 51 which bridge an opening 52 formed in the front table *b* over lever 36, the former being above and secured directly against the table and the latter being below and secured to the under side of the table with the interposition of spacers 53. The plate 51 is formed with recessed uprights 54 in which slides the shank 55 of a U-shaped strap 56 receiving an eccentric 57 on the shaft *h*, the shank being kept in place by cap-pieces 58. In the plates 50 and 51 is journaled a shaft 59 carrying a crank 60 at its upper end, and a crank 61 which is disposed in a plane below that of the shank 55. The crank 61 projects over the disk 49 and in it slides vertically a pin 62 adapted to be received by a longitudinal slot 63 in the shank, said slot being wide enough so that in any position of the crank the pin may be received by the slot when the pin is raised by the disk. Each crank 60 is so arranged with relation to the lower end of the corresponding lever

s that the movement of the crank will actuate the lever to cause it to disestablish the clutch.

The operation is as follows: Should a faller drop, through the breaking of a thread, the lever structure 20 will be moved and its cam 22 will move the detent device 29 so that the rear end of lever 36 may fall by gravity. The front end of lever 36 raises disk 49, and this in turn elevates the pin 62 into the slot 63 of the shank of the eccentric strap. In the next rearward movement of the eccentric strap, the shoulder 64 at the forward end of its slot 63 will strike the pin and through it turn the bell-crank lever formed by the shafts 59 and cranks 60 and 61 so that crank 60 will engage the lever s and disestablish the clutch. The corresponding beam now ceases to rotate. As soon as this is observed, the attendant locates the broken thread by the faller which has dropped, and having pieced the thread the faller will be again held elevated. (The affected faller may be readily raised by the attendant by placing the finger against the bent-off portion 18 thereof.) The operator now depresses lever 45, causing lever 41 to raise the lever 36. The projection 40 on upright 38 now engages arm 30 of the detent 29 and turns the latter on its fulcrum, the pressure of the arm 31 acting on the cam 22 to reset the lever structure 20 in its horizontal position. If no faller remains resting on the slot 24, as soon as the pressure on the treadle has been released, lever 36 falls and its hook 39 rests on the hook 29; if a faller should be left resting on the slot 24, lever structure 20 will return toward its dotted line position in Fig. 7 and so throw the hook 29 out of the path of hook 39 so that lever 36 will not be suspended. The operator will thus at once detect that there are one or more additional threads to be pieced. As soon as the lever 36 is reestablished in its suspended position, the winding is again started by moving the lever s so that the clutch members will be reestablished. It should be noted that lever s will not remain in the position to which it is thus moved unless lever 36 is suspended by the hook 29 and thus allows pin 62 to stand clear of the shoulder 64 on the reciprocating shank 55. The downward movement of lever-structure 20 is preferably limited by a suitable stop 65 attached to guide 32.

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

1. The combination of the frame, a rotary beam, a rotary driving part for the beam, disconnective connecting means between the beam and said driving part, mechanism controlling said means and comprising a part

normally movable in one direction, fallers, a pivoted detent having a hook engaging and normally restraining said part against movement, and a lever-structure projecting beneath the fallers and fulcrumed in the frame, said lever-structure being movable upon the impact of a faller therewith into actuating contact with the detent, substantially as described.

2. The combination of the frame, a rotary beam, a rotary driving part for the beam, disconnective connecting means between the beam and said driving part, mechanism controlling said means and comprising a gravity actuated part, fallers, a pivoted detent having a hook engaging and normally restraining said part against movement, and a lever-structure projecting beneath the fallers and fulcrumed in the frame, said lever-structure being movable upon the impact of a faller therewith into actuating contact with the detent, substantially as described.

3. The combination of the frame, a rotary beam, a rotary driving part for the beam, disconnective connecting means between the beam and said driving part, mechanism controlling said means and comprising a part normally movable in one direction, fallers, and mechanism for controlling the position of said part comprising a faller-controlled detent pivoted in the frame and having a hook and an arm projecting in substantially opposite directions therefrom, the hook being adapted to engage said part to restrain the same and the arm being adapted to be engaged by said part and effect the movement of the detent into restraining relation to said part upon resetting the mechanism, substantially as described.

4. In a stop-motion mechanism for a warping machine or the like, the combination of a frame, fallers, a part normally movable in one direction, and a pivoted detent controlled from the fallers and having a hook and an arm projecting in substantially opposite directions therefrom, the hook being adapted to engage said part to restrain the same and the arm being adapted to be engaged by said part and effect the movement of the detent into restraining relation to said part upon resetting the mechanism, substantially as described.

5. The combination of the frame, a rotary beam, a rotary driving part for the beam, disconnective connecting means between the beam and said driving part, a continuously moving part, a member arranged to rotate and move longitudinally of its axis in said frame and having a crank engageable by said continuously moving part and another crank engageable with said means to actuate the same, and mechanism, controlled from

the thread, for effecting the longitudinal movement of said member, substantially as described.

6. The combination of the frame, a rotary beam, a rotary driving part for the beam, disconnective connecting means between the beam and said driving part, a continuously moving part, a member arranged to rotate and move longitudinally of its axis in said frame and having a crank engageable by said continuously moving part and another crank engageable with said means to actuate

the same, and mechanism, controlled from the thread and comprising a lever engaging said member, for effecting the longitudinal movement of said member, substantially as described. 15

In testimony, that I claim the foregoing, I have hereunto set my hand this second day of July 1909.

ARTHUR MURPHY.

Witnesses:

JOHN W. STEWARD,
WM. D. BELL.