

(No Model.)

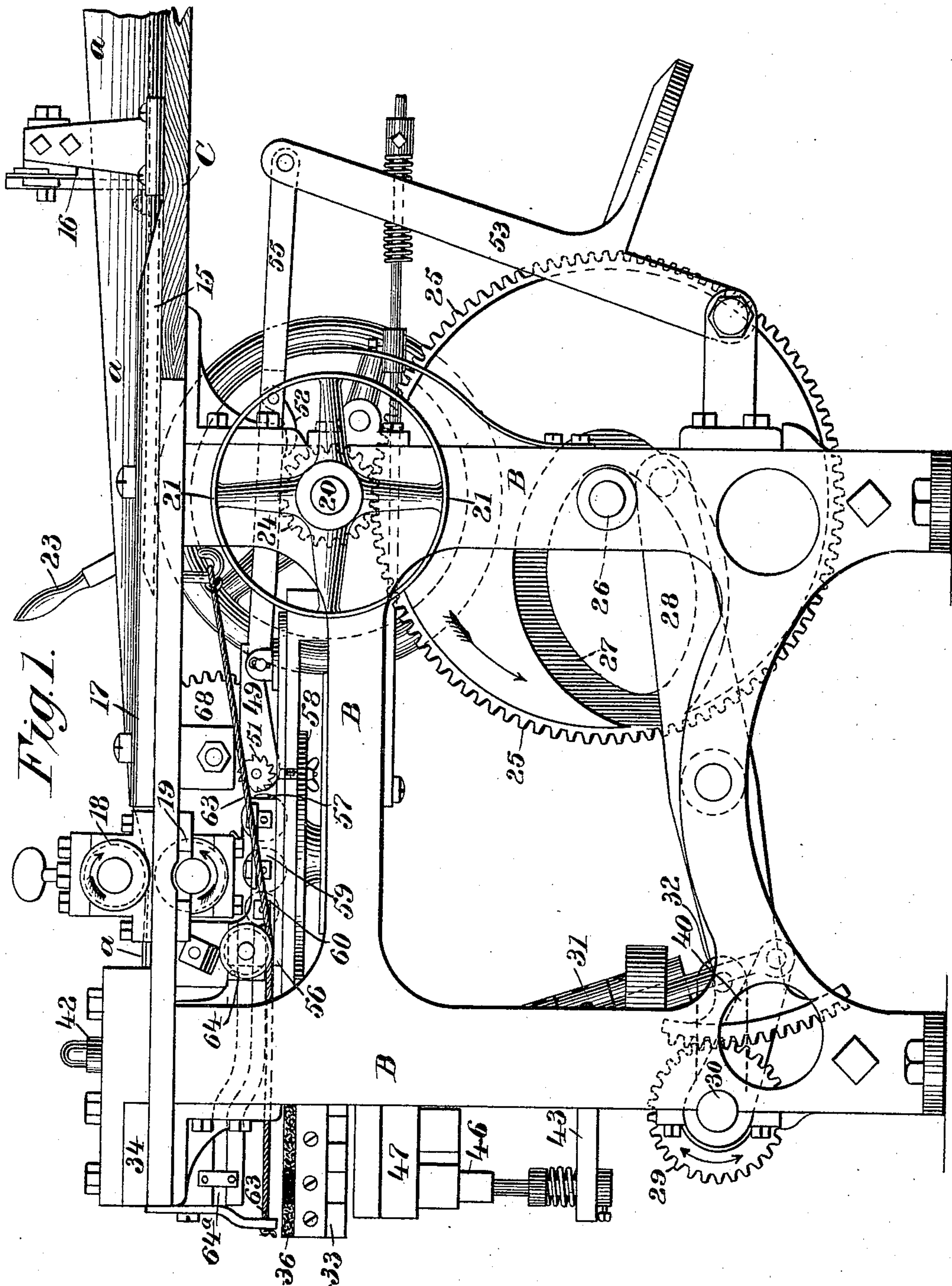
7 Sheets—Sheet 1.

G. M. GRISWOLD.

PRINTING AND SANDING MECHANISM FOR PAPER BOX MACHINES.

No. 441,759.

Patented Dec. 2, 1890.



Witnesses  
Wm. J. Panner  
Wm. B. Kellogg

Inventor  
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L. H. Hubbard



(No Model.)

7 Sheets—Sheet 2.

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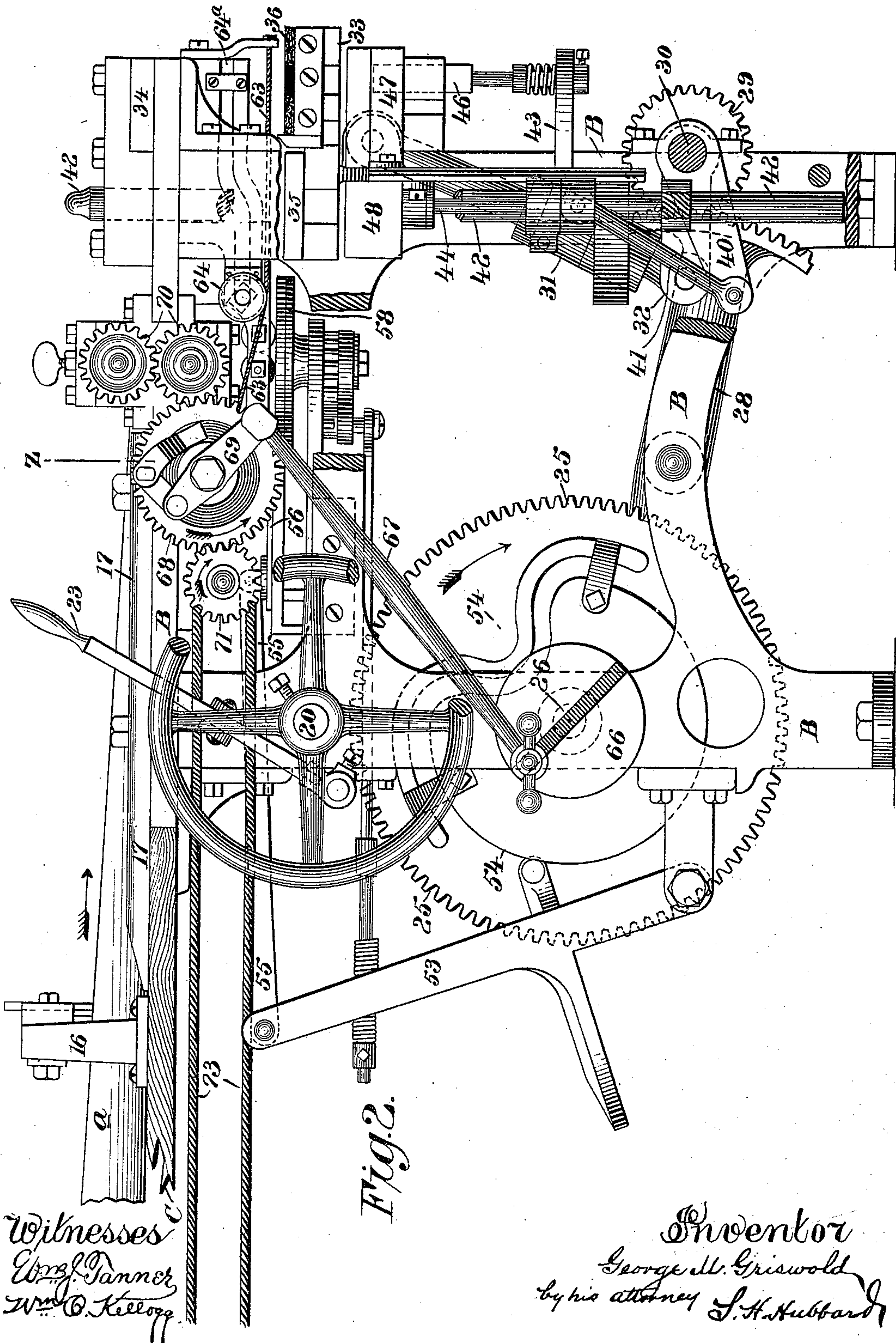


Fig. 2.

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(No Model.)

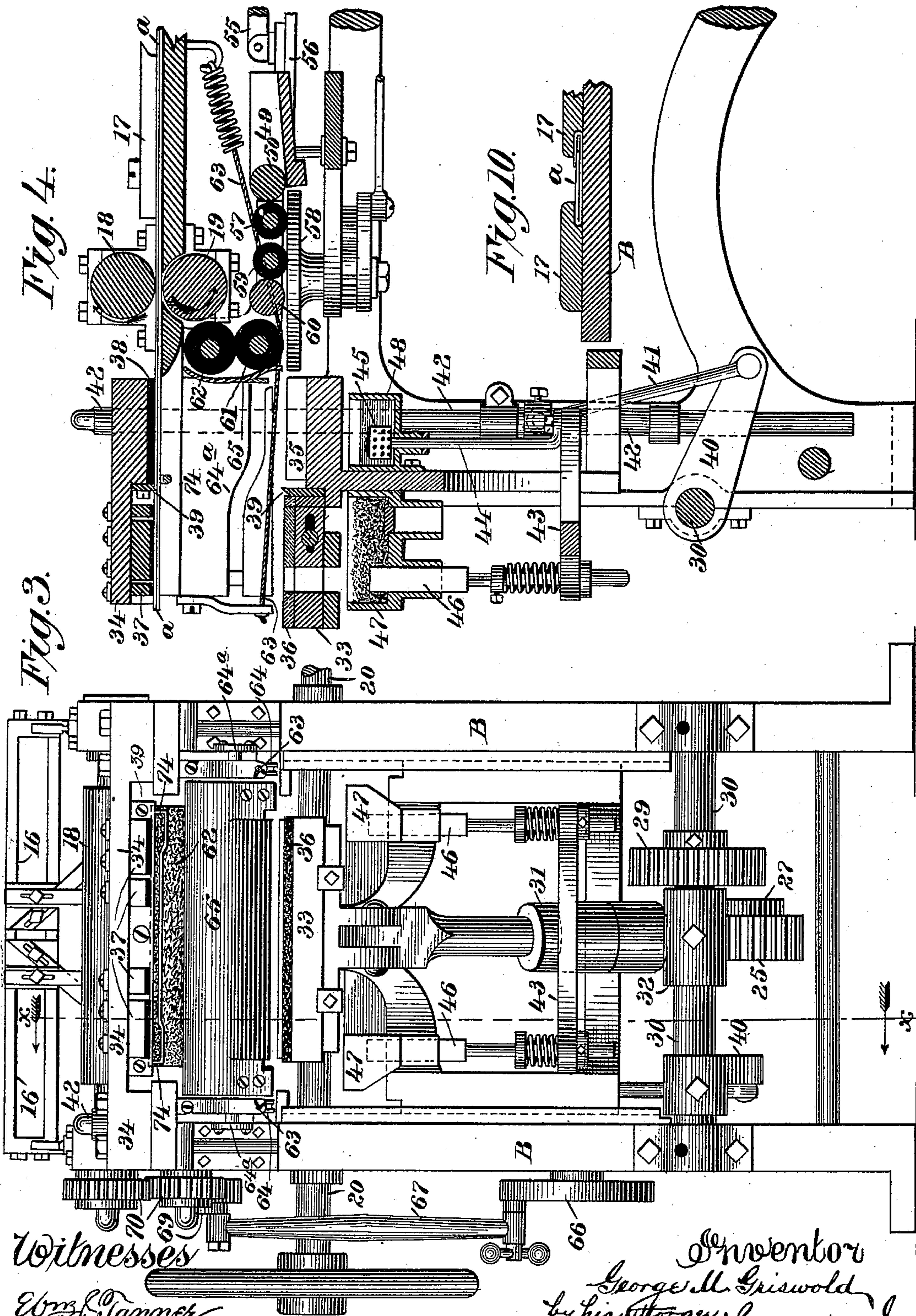
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(No Model.)

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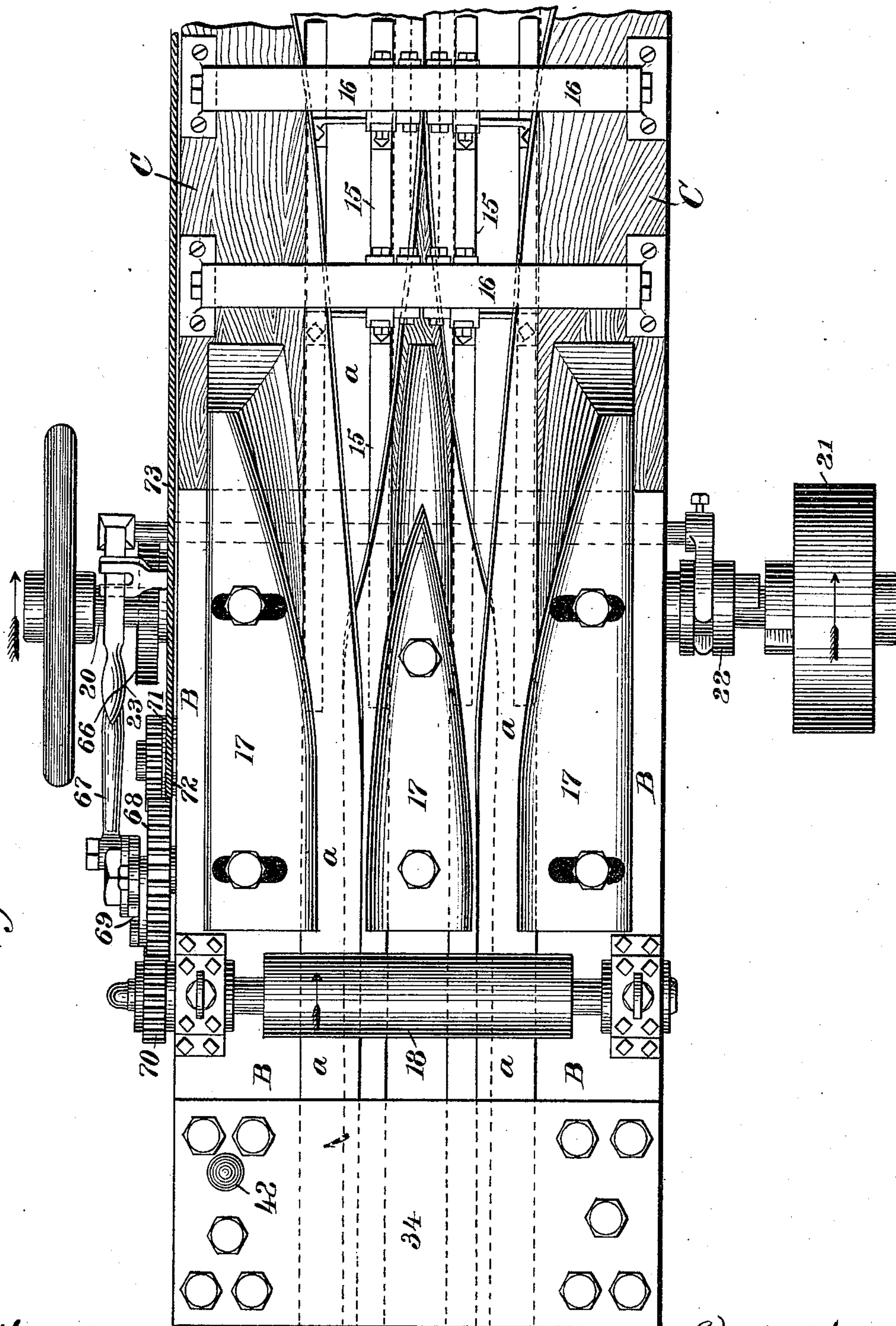
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Fig. 5.



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(No Model.)

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G. M. GRISWOLD.  
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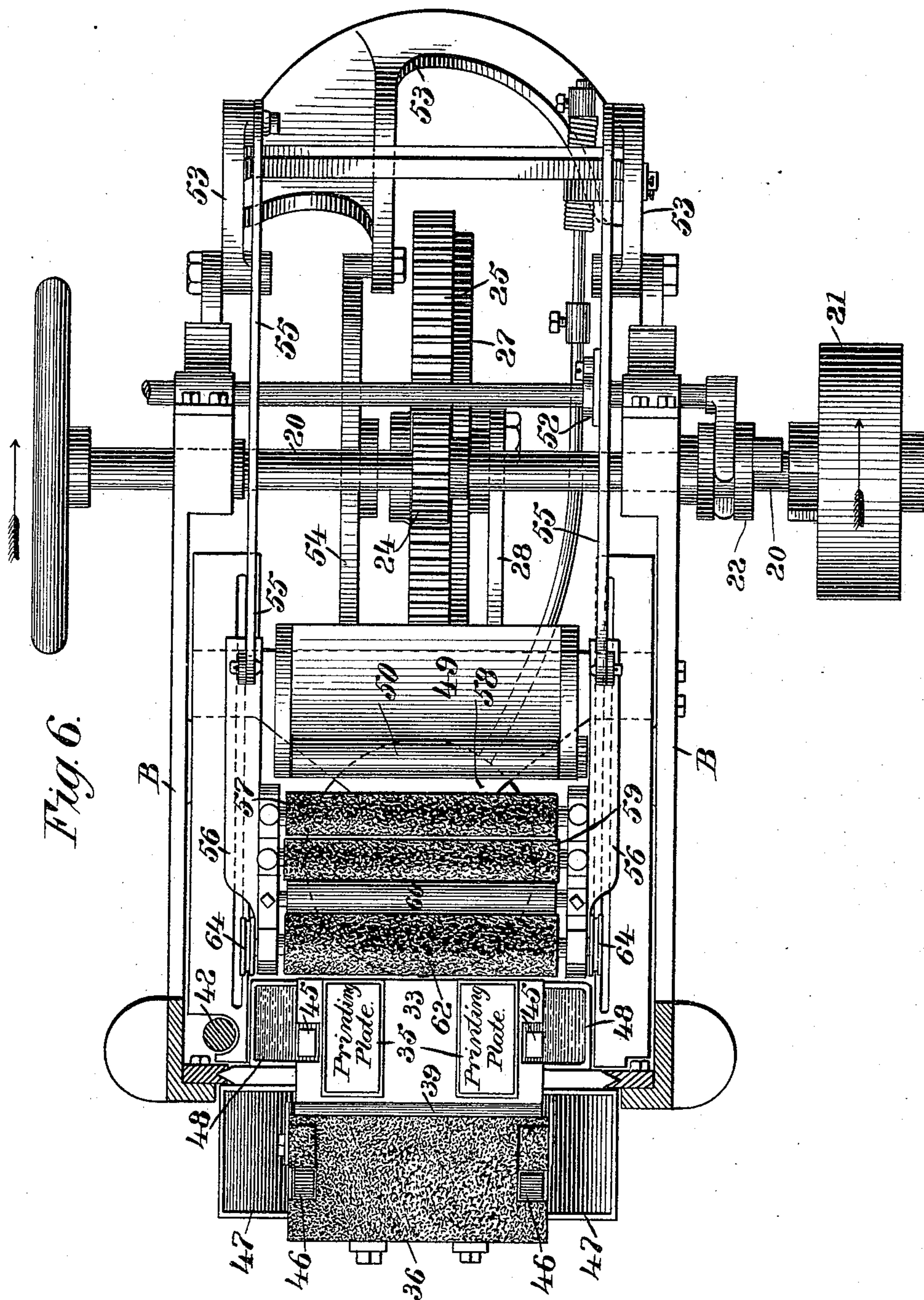


Fig. 6.

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(No Model.)

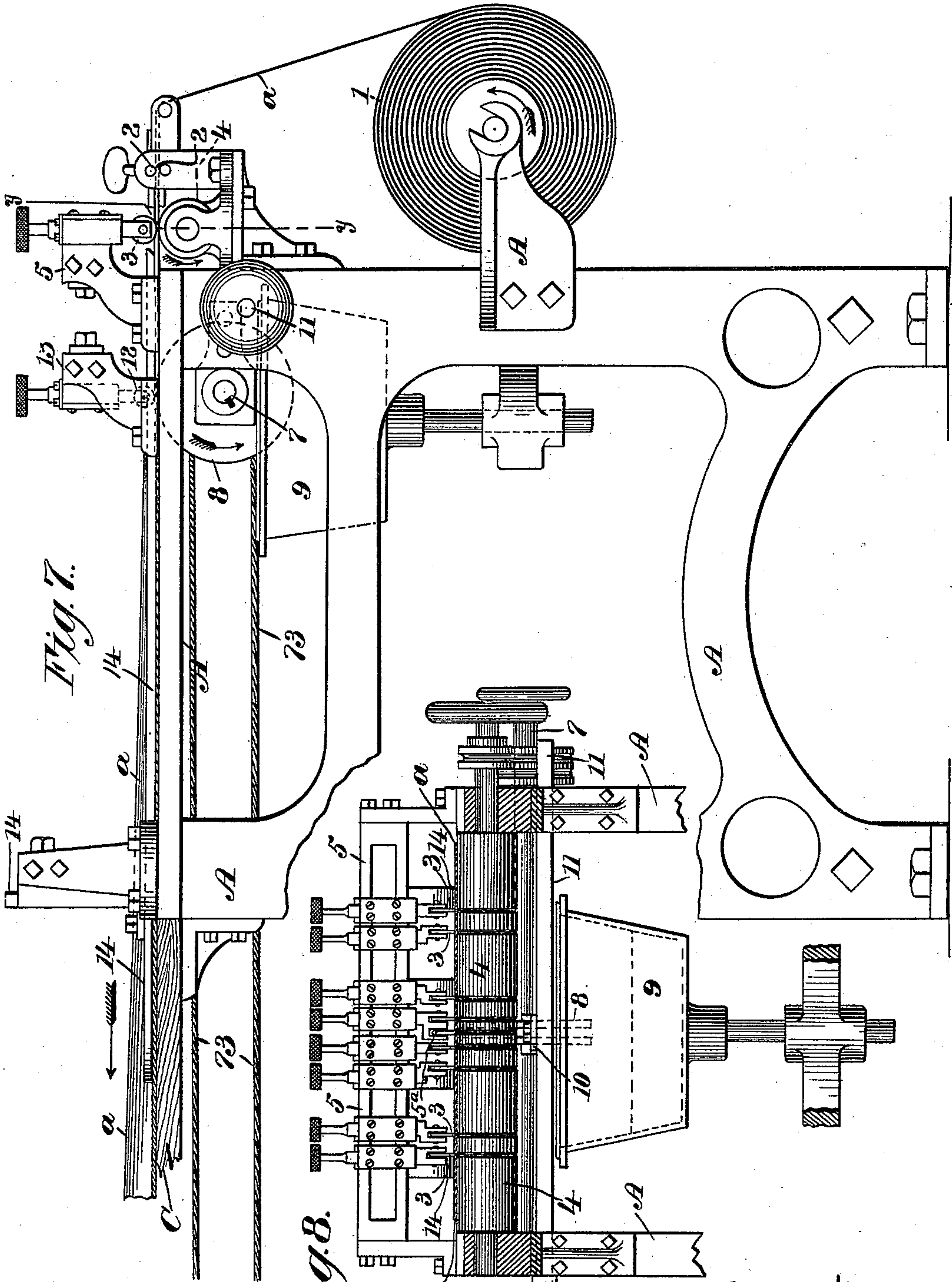
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Fig. 8.

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(No Model.)

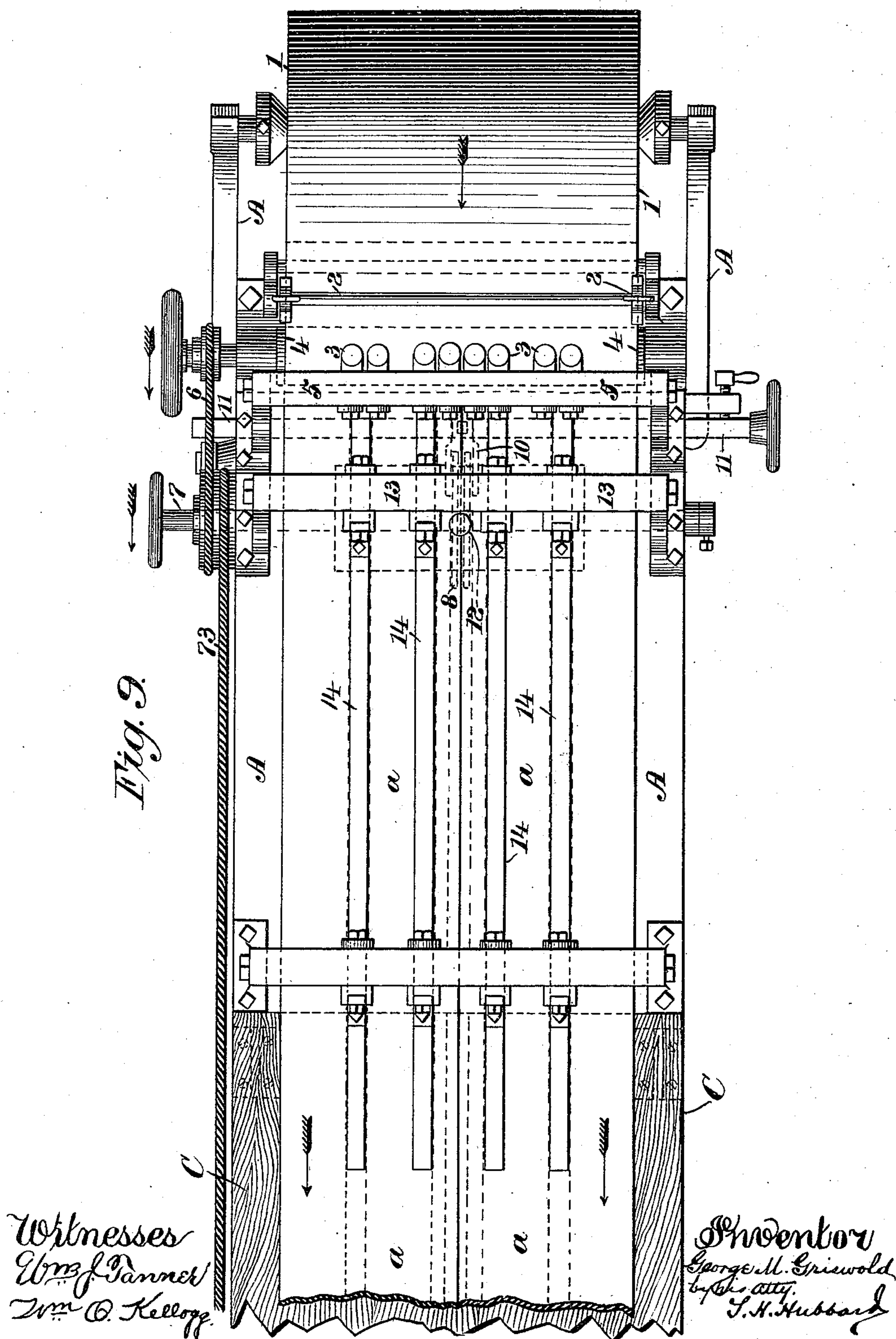
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G. M. GRISWOLD.

# PRINTING AND SANDING MECHANISM FOR PAPER BOX MACHINES.

No. 441,759.

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# UNITED STATES PATENT OFFICE.

GEORGE M. GRISWOLD, OF NEW HAVEN, CONNECTICUT.

PRINTING AND SANDING MECHANISM FOR PAPER-BOX MACHINES.

SPECIFICATION forming part of Letters Patent No. 441,759, dated December 2, 1890.

Application filed November 24, 1888. Serial No. 291,771. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE M. GRISWOLD, a citizen of the United States, residing at New Haven, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Printing and Sanding Mechanism for Paper-Box 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.

This invention relates to certain new and useful improvements in paper-box machines, but more particularly to mechanism forming part of such machine, whereby the box or shook may be suitably printed, and whereby sand or other abrasive substance may be affixed to the surface of said box or shook.

This invention is in some part an improvement upon the machine shown and described in certain Letters Patent of the United States No. 387,953, granted to me the 14th day of August, 1888.

The particular objects of my invention are to imprint upon the shook, and preferably both upon the top and bottom thereof, any desired matter, such as the name and address of the manufacturer or description of contents.

It is also an object of said invention to apply to a definite area of the surface of each shook an adherent coating of sand or other substance useful for igniting matches.

With these ends in view my invention consists in the combination and arrangement of mechanical elements, and in the construction, which will be hereinafter fully and in detail set forth, and then recited in the claims hereunto annexed.

In order that such as are skilled in the art to which my invention appertains may more fully understand my improved machine and how to make and use the same, I refer to the following description, and to the drawings which form a part of the specification, and to the figures of reference marked upon said drawings, in which—

Figure 1 is a side elevation of that part of my machine in which the folding, printing, &c., are accomplished; Fig. 2, a similar view from the other side of the machine; Fig. 3, an

end view of the portion of the machine shown at Figs. 1 and 2; Fig. 4, a longitudinal vertical section at the line *x x* of Fig. 3; Fig. 5, a plan view of the forward end of the machine; Fig. 6, a similar view with the top plate or table removed and partly in transverse horizontal section; Fig. 7, a side elevation of the rearward end of the machine; Fig. 8, a transverse vertical section at line *y y* of Fig. 7; Fig. 9, a plan view of the rearward end of the machine; Fig. 10, a detail transverse section through the folding-dies, showing a folded blank therein—line *z z* of Fig. 2.

Like letters and numerals denote the same parts in all the figures.

In the drawings a machine is exhibited in which by a duplication of parts two box-shooks are made simultaneously, and I have thus shown it because the machine in duplicate is my preferred construction. Said machine can, however, as is obvious, be made single or treble or quadruple without in any way departing from its mode of operation, as here shown. Furthermore, in the drawings I have not shown the entire machine upon one sheet. Figs. 1 and 7, however, placed together, show it in elevation, and Figs. 5 and 9 in plan view.

The description as worded, for simplicity of description, is made to apply to a single machine.

A is that part of the frame of the machine upon which the paper and the mechanism which first operates thereon is mounted.

B is that portion of the frame carrying the devices which feed, print, sand, fold, and cut and eject the shook.

C is a table or bed extending between the two frames aforesaid and across which the paper strip travels in its passage from one frame to the other.

1 is a roll journaled at the end of the frame A, said roll carrying the paper or straw board from which the shooks are made, and 2 are gages or guides above the roll, through which the paper passes to the creasing-disks 3, between which latter and a crease-roll 4 it is then drawn. The creasing-disks indent upon the paper the lines upon which the shook is subsequently folded, and said disks are adjustable upon a standard or bridge 5 toward



and from each other, whereby the width between the crease-lines may be varied.

In this machine a slit 5<sup>a</sup> (shown in Fig. 8) divides the paper into two longitudinal strips of equal width. The crease-roll is revolved by a belt 6 from the glue-wheel shaft 7, which in its turn is driven by a belt 73, from a pulley at the forward end of the machine.

8 is the glue-wheel mounted by a spline upon the shaft 7, and running as to its lower edge in a glue-pot 9, suitably secured beneath it.

10 is a yoke embracing the edge of the glue-wheel and mounted upon a slide-bar 11, which passes across the frame and has bearings therein.

In the machine as shown the glue-wheel is grooved on its periphery, so as to apply two separate but parallel stripes of glue to the paper. The wheel is set with its groove astride the line of severance of the paper, and by means of the slide and yoke the wheel may be moved on its spline so as to print its stripes of glue exactly where wanted. The adjustment of said wheel when making match-box tubes will not be more than, say, a quarter of an inch. A wheel presser-foot 12 on a standard 13, and adjustable like the creasers, insures close contact of the strip with the glue-wheel.

14 are pressure-bars adapted to keep the strip flat upon the table after it leaves the glue-roll.

15 are further pressure-bars, so disposed upon the strip and held thereon from standards 16 as to secure the center of said strip, while its edges receive their initial curve from the inclined tapering folding-dies 17, which are secured on top of the table over the frame B. Said dies fold the strip on two of the crease-lines thereof, so that its glued edge comes properly in contact with the other edge. A pair of rolls 18 and 19—the one above and the other below the bed—then press the folded blank flat and cause the adhesion of the glued edges. Said rolls also serve to feed the paper along, and their method of operation and source of power will presently appear.

Journaled across the frame B is a pulley-shaft 20, adapted to be driven by a belt applied to pulley 21. A suitable clutch 22 serves to connect the pulley and shaft, and a lever 23 and a connecting-rod actuate the clutch.

24 is a gear mounted on the pulley-shaft and meshing with a large geared wheel 25 on the main shaft 26 beneath it. In the face of the geared wheel is cut a cam-groove 27, and 28 is a pivoted lever, whose rear end, through a stud or shoe, is engaged and operated by said cam-groove. The forward end of this lever carries a geared segment which meshes with and actuates a small gear 29 on a journaled rock-shaft 30, whose bearings are in the frame. A pitman-rod 31 is pivotally secured upon a rock-arm 32 on said shaft, and this pitman imparts vertical reciprocatory move-

ment to a combined platen and type-bed 33, which slides in ways on the frame. Above this movable part 33 is a stationary combined platen and type-bed 34, bolted to the frame, and upward toward said plate the movable part 33, just referred to, is forced by the pitman. Each of the parts 33 34 bears an electrototype and also a plane surface. On the lower movable printing elements 33 the electrototype 35 is at the rear end thereof, and the plane surface 36, preferably coated with rubber, is at the front. On the upper printing member 34 the electrototype 37 is at the front and the surface 38 at the rear, so that each electrototype is opposed to a plane surface.

Secured upon the parts 33 34 and about midway thereof are two co-operating blades 39 for the severing of the shook, as will be hereinafter explained.

The gluing and sanding devices for the production of the abrasive surface co-operate with the printing devices, and are as follows, reference being had particularly to the sectional Fig. 4: Upon the same rock-shaft that carries the pitman of the movable printing device is mounted a rock-arm 40, smaller and lighter than that for the pitman, and for the purpose of greater movement than the pitman-arm a little longer than the latter. This arm, through a rod 41, imparts vertical reciprocation to a slide-bar 42, upon which is mounted a frame 43. Said frame carries respectively a rod 44, having a glue-printing head 45 thereon and a sand-applying plunger 46, the former extending upwardly through a stuffing-box into a glue-pot 48, and the latter similarly extending up through the bottom of a sand-box 47. Both the glue-pot and the sand-box are secured to and carried by the casting on which the lower combined platen and impression-plate 33 is arranged, as is shown at Fig. 4. Said box is tapered or pyramidal in shape, the plunger entering at the apex. These glue and sand printing appliances are raised upward simultaneously, and at the same time as the moving printing element 33; but as they are operated by a longer arm their travel is greater than said printing element. They ascend to the same level as said printing element, and descend to a lower level. They pass through said printing element, the glue-printer alongside the electrototype and the sand-printer through the plane surface.

Ink is applied to the electrotypes by an inking mechanism, which is as follows:

A font 49 is supported on the frame beneath the bed, as seen at Fig. 4, and a roller 50, arranged at the end of the font, takes the ink therefrom in its intermittent rotation, which is accomplished by ratchet 51 on the roller and a pawl 52, engaging and turning it step by step.

53 is a lever actuated with a rocking movement about its pivotal point on the frame by a large cam 54 on the main shaft. At the upper end of this lever a horizontally-arranged



connecting-rod 55 extends into the frame and actuates a carriage 56, in which the inking-rollers are journaled. These rollers comprise a plate-inker 57, which, at each backward movement of the carriage, makes contact with the font-roller, and taking ink therefrom applies it during its forward movement to the rotatable plate 58, a plate-roller 59, which takes ink from the plate and applies it to the transfer or intermediate roller 60, and the two form-rollers 61 and 62, the latter of which derives ink from the roller 60. The roller 62 is inked by its constant contact with the roller 61. Of the rollers above enumerated the font-roller 50 and the transfer-roller 60 are preferably of metal. The others are of any approved roller composition. The rollers 61 62 apply the ink to the faces of the electrotypes, and the roller 61 is caused to rotate by means of cords 63, whose ends are fast, and which encircle grooved pulleys 64 on the ends of said roller. This movement of roller 61 revolves roller 62. The carriage in which the rollers are supported during its forward movement enters ways 64, which at a point about midway of the length of the combined platen and impression-plates rise slightly and then extend horizontally for the remainder of their length. The purpose of this is as follows: As the roller-carriage moves forward in the rear lower plane of the ways, the size of the roller 61 is such that its periphery will apply ink to the whole surface of the electrotypes 35. Meanwhile the upper roller 62 passes the surface 38 without touching it. When the rise in the ways is reached, the carriage lifts, so that for the remainder of its forward movement the upper roll 62 inks the electrotypes 37, and the lower roll 61 passes over the surface 36 without touching it. The rollers at the rear of the roller 62 are of too small diameter to touch the surface 35 after the carriage has entered the ways. Upon the front end of the carriage is a shield or apron 65, whose lower edge as the carriage moves forward passes close to the surface of the movable member 33 of the printing mechanism. While other means for the ejection of the finished shook may be provided, this shield answers very well as an ejector, and particularly is this the case since the completed shook, after being cut off, will open sufficiently, so that as it descends with the movable printing element its top edge is within the field of the lower edge of the said shield. The movement of the pressing and feeding rolls 18 and 19 is intermittent, so as to give the printing and other mechanisms an opportunity to act alternately therewith.

66 is a crank-disk secured on the end of the main shaft, and 67 is a pitman pivoted to said disk.

68 is a gear journaled on a hub on the frame, and between said gear and the pitman is a suitable clutch mechanism 69 for the intermittent actuation of the former by the latter. Said gear 68 drives a pair of inter-

meshed gears 70, secured, respectively, on the rolls 18 19, whereby is imparted to said rolls an intermittent rotary movement. The gear 70 68 also drives another gear 71, whose hub carries a band-wheel 72, and the latter a belt 73. Said belt drives the mechanism at the rear end of the machine, as hereinbefore recited.

74 is a wire-guard between which and the impression-plate the length of tube passes and whereby it is supported.

In order that the paper may be readily identified, the letter *a* is used to denote it.

The operation of my invention is as follows: First of all, the alternation of the several operations should be understood. The feeding and pressing rolls, the folding and creasing devices, the glue-wheel, and the inking mechanism for the electrotypes operate substantially together, and while the printing, gluing and sanding, and the cutters are at rest. During the operation of the printing, gluing, sanding, and cutting devices no feeding, inking, creasing, or folding takes place. The rolls 18 19 in drawing forward the strip of paper cause it to be operated upon by the creasing, the gluing, and the folding mechanisms, substantially as in the Patent No. 387,953, hereinbefore referred to, and then the strip now formed into a tube is flattened by said rolls. Each feeding movement of the rollers pulls the strip forward the length of one shook. When, say, a length equal to two shocks has been flattened by the rolls and projected beyond them, the feed ceases and the movable printing element actuated by the pitman, rock-shaft, &c., rises and squeezes the double-length blank between itself and upper stationary printing element. This prints the top surface of the outer shook and the under surface of the inner shook. At the same time the glue-printer rises and imprints an area of glue on the surface of the rear shook and the sander carries up a quantity of sand against the forward shook. At the same time the cutters sever the outer shook from the length. These operations half complete each of two shocks. The forward one is simply printed on one side and no sand adheres to it, since no glue is applied. The rear shook receives the imprint of the lower electrotypes and an application of glue to its edge. Then the platen and gluing and sanding devices recede, the inking-rollers slide forward and ink the plates, the shield 65 meanwhile ejecting the severed shook, and the feeding takes place, thereby projecting outward close to the surface of the impression-plate another length equal to one shook. Now, the double length which extends over the impression-plate is, as to its rear half, blank on both sides. As to its forward half, it is printed on the lower side thereof, and has a dab of glue applied to said side. Now, as the platen ascends the blank rear half is printed and gets the proper application of glue, and the forward half is printed on its blank side against the upper electrotypes, and has applied there-



to, on its lower side and over the moist glue, a quantity of sand raised on the end of the plunger from the sand-box. Then the platen recedes, the ink-rollers come forward, and the shield carries with it and throws out the completed shook. Simultaneously the feeding again takes place.

In my invention I do not wish to be confined to the precise details of construction which I have therein shown and described, since many changes involving only mechanical skill may be made therein without departing from the spirit and aim of my invention, the gist whereof is as hereinbefore set forth.

Having thus described my invention, I claim—

1. In a machine of the character described, the combination, with the stationary combined platen and type-bed, of the movable combined platen and type-bed complementary to the one first described, means for imparting vertical reciprocation to the movable printing element, and cutting mechanism secured to the respective printing elements and adapted to sever the shook transversely to its length, whereby the shook is divided from the tube simultaneously with the completion of its printing, substantially as described.

2. In a machine of the character described, the combination, with means for feeding the blank to be printed, of the stationary combined platen and type-bed, the movable platen and type-bed having its printing and plain surfaces reversed relative to those upon the stationary printing element, the pitman whereby the movable printing element is actuated, and a pair of blades secured to the respective printing elements at their center and transversely to their length.

3. The combination, in a machine of the character described, with the stationary printing element, of the reciprocating combined platen and type-bed, the pitman whereby said movable printing element is operated, and the rock-shaft, the gear, the geared segment, and the lever and cam whereby the pitman is operated, substantially as set forth.

4. In a paper-box machine, the combination, with the stationary printing element and the movable printing element, of glue-printing and sand-applying devices adapted to operate through and conjointly with the movable printing element, and suitable means for applying power to said glue printing and sanding devices, substantially as described.

5. In a paper-box machine, the combination, with means for feeding the blank, of the stationary combined platen and type-bed, the movable combined platen and type-bed and means for operating the latter, the glue printing and applying devices operating through and conjointly with the movable combined platen and type-bed, and means whereby said gluing and sanding devices are operated in proper time, substantially as set forth.

6. In a paper-box machine, the combina-

tion, with suitable means for feeding the blank and the printing devices, of sand and glue receptacles secured beneath the movable printing element, plungers arranged to slide in said receptacles, and means whereby said plungers are operated upward against the stationary printing element, substantially as set forth.

7. In a paper-box machine, the combination, with means for feeding the blank and with the stationary and the movable printing elements, of sand and glue receptacles arranged beneath the movable printing element and in the same longitudinal plane, printing-plungers arranged to slide vertically in said receptacles, and means for imparting to said plungers a properly-timed vertical movement through the movable printing element and against the blank, substantially as described.

8. In a paper-box machine, the combination, with the feeding and printing mechanism, of the sand and glue receptacles secured beneath the movable printing element and in the same longitudinal plane, plungers arranged to slide in said receptacles and upward through the movable printing element, and means for imparting to said plungers a vertical movement greater than the vertical movement of the movable printing element, substantially as described.

9. In a paper-box machine, the combination, with the main shaft, of the large gear carrying the cam mounted upon said shaft, the pivoted lever operated by said cam, the geared segment on the lever, the gear and rock-shaft operated by said lever and the pitman, and the movable printing element and gluing and sanding devices operated by said rock-shaft, substantially as set forth.

10. In a paper-box machine, the combination of two printing-frames, one stationary and one movable, each provided with a form and a platen, the form of each frame being placed opposite to the platen of the other frame, and mechanism for imparting the appropriate movement to said movable frame, substantially as described.

11. In a paper-box machine, the combination, with the stationary combined type-bed and platen, the movable combined type-bed and platen, and means for operating the latter, of a reciprocating carriage provided with suitable inking-rollers arranged in a plane below the stationary printing element, and a track or way having different sections of its length in different horizontal planes, whereby said carriage is guided and its inking-rollers caused to operate upon both the upper and the lower type, substantially as described.

12. In a paper-box machine, the combination, with the stationary printing element provided with a type-bed and platen and the movable printing elements similarly furnished, of a reciprocating inking-carriage having rollers for the distribution of ink, means for reciprocating said carriage between said printing elements, and a track or guideway



in which said carriage is mounted and adapted to slide, whereby the inking-rollers are caused to operate upon the type-bed of each printing element and to pass freely over the platen of each printing element, substantially as set forth.

13. In a machine of the character described, the combination, with the stationary and movable printing elements, arranged as described, of the inking-carriage having suitable distributing-rollers, the track or guideway whereby the position of said carriage is varied during different sections of its traverse, and cords fast at either end and encircling pulleys on one of the rollers, whereby the rotary movement of the inking-rollers is effected, substantially as set forth.

14. In a machine of the character described, the combination, with the main shaft and the cam in the large wheel thereof, of the printing mechanism and the devices intermediate between the platen and large cam-wheel on the main shaft, whereby said printing mechanism is operated, the inking carriage and rollers, the rocking lever and connections whereby said carriage is caused to reciprocate alternately with the movable printing element, and the cam on the main shaft, whereby the movements of the rocking lever and carriage are effected, substantially as set forth.

15. In a machine of the character described, the combination, with the stationary printing element, the movable printing element, and means whereby the latter is operated, of the glue and sand reservoirs arranged beneath the movable printing element, the vertically-reciprocating frame and the slide-bar upon which it is supported, plungers mounted on said frame and projecting upward into and through the sand and glue reservoirs, and means, as described, whereby appropriate vertical movement is imparted to the frame.

16. In a machine of the character described, the combination, with the stationary and movable printing elements, of a pair of feeding-rollers adapted to operate alternately to the operation of the printing mechanism, glue printing and sanding devices operating substantially at the same time as the printing mechanism, and inking devices, such as rollers, and means for operating them simultaneously with the operation of the feeding mechanism, substantially as specified.

17. In a machine of the character described, the combination of the following instrumentalities, namely: a printing mechanism consisting of a stationary and a movable printing element, glue printing and sanding devices operating substantially at the same time as the printing mechanism, a feeding mechanism for the blank, and a reciprocating inking carriage and means for actuating the same between and into contact with both the printing elements, said feeding mechanism and inking devices operating during the time that the printing, gluing, and sanding devices are idle, substantially as described.

18. In a machine of the character described, the combination, with the printing mechanism and means for operating the same, of the frame arranged beneath the bed and having the inking-rollers journaled therein, ways or tracks in which said frame is adapted to travel longitudinally, said ways being as to their outer ends in a higher plane than their inner ends, whereby said frame is raised and ink applied to the upper type-bed, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE M. GRISWOLD.

Witnesses:

S. H. HUBBARD,  
C. G. COOKE.