

(No Model.)

3 Sheets—Sheet 1.

S. S. PUTT & J. NEEFF.
PAPER BOX MACHINE.

No. 452,317.

Patented May 12, 1891.

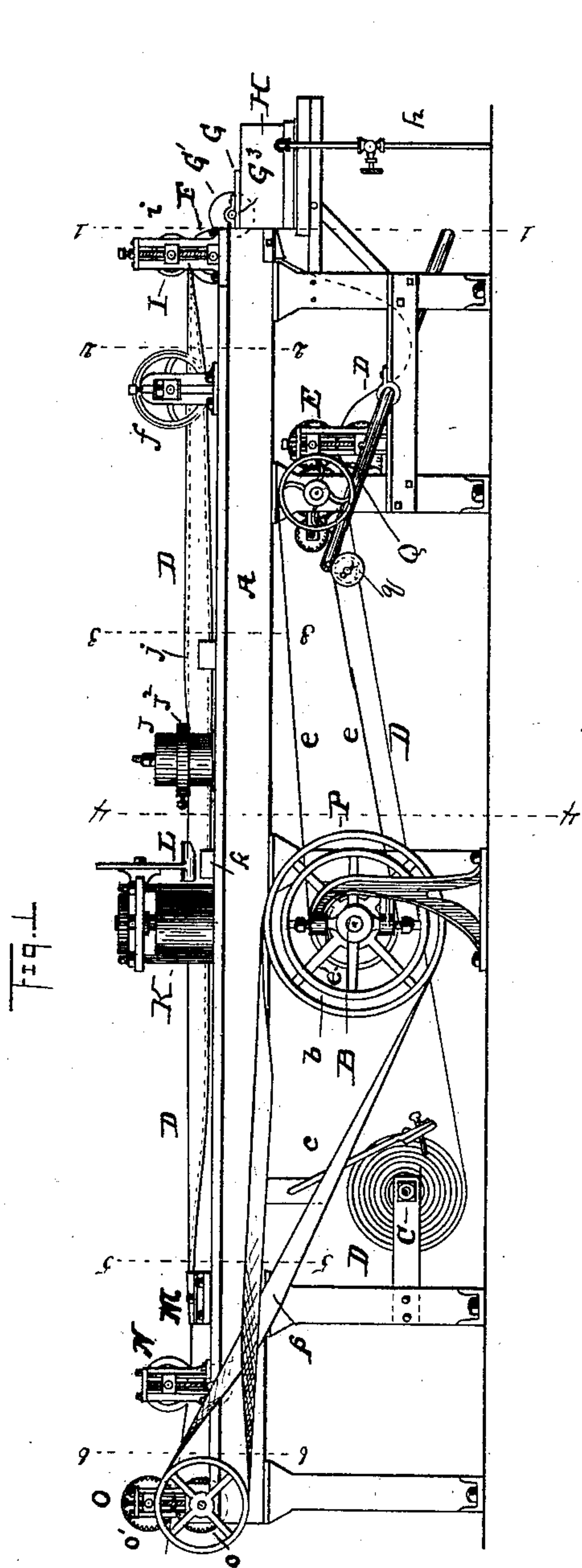
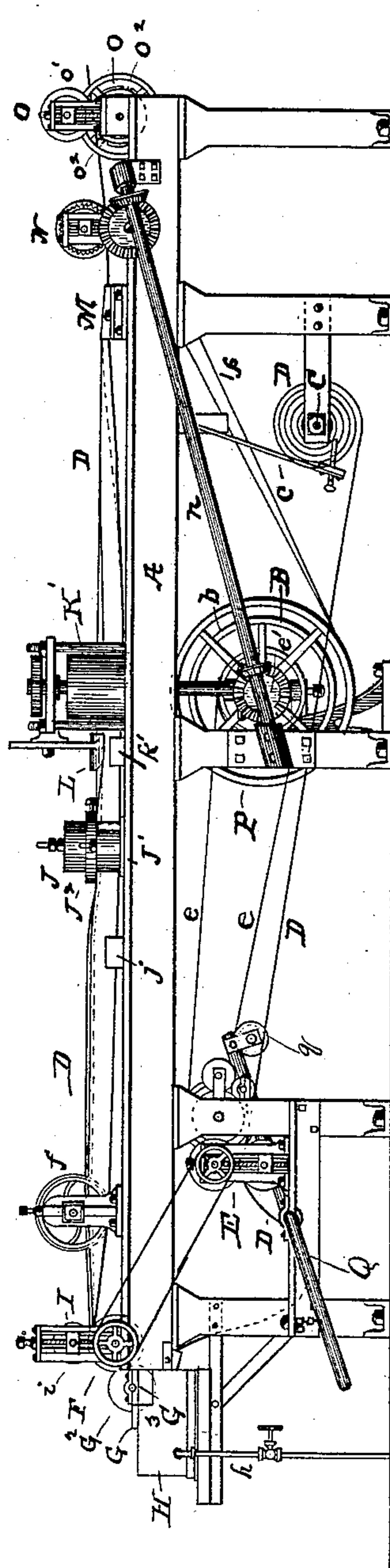


Fig. 1



Witnesses

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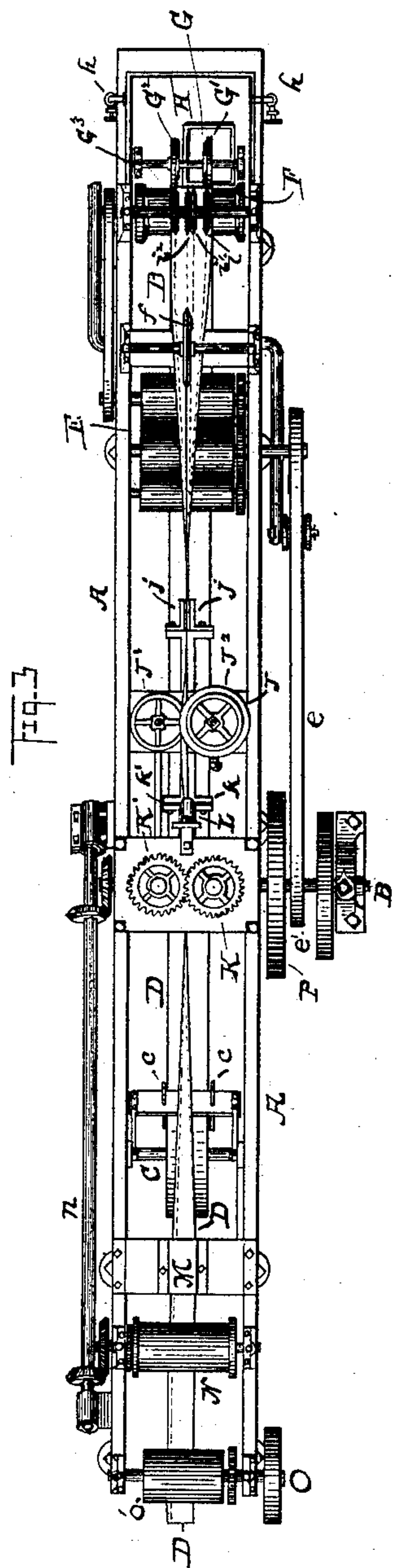
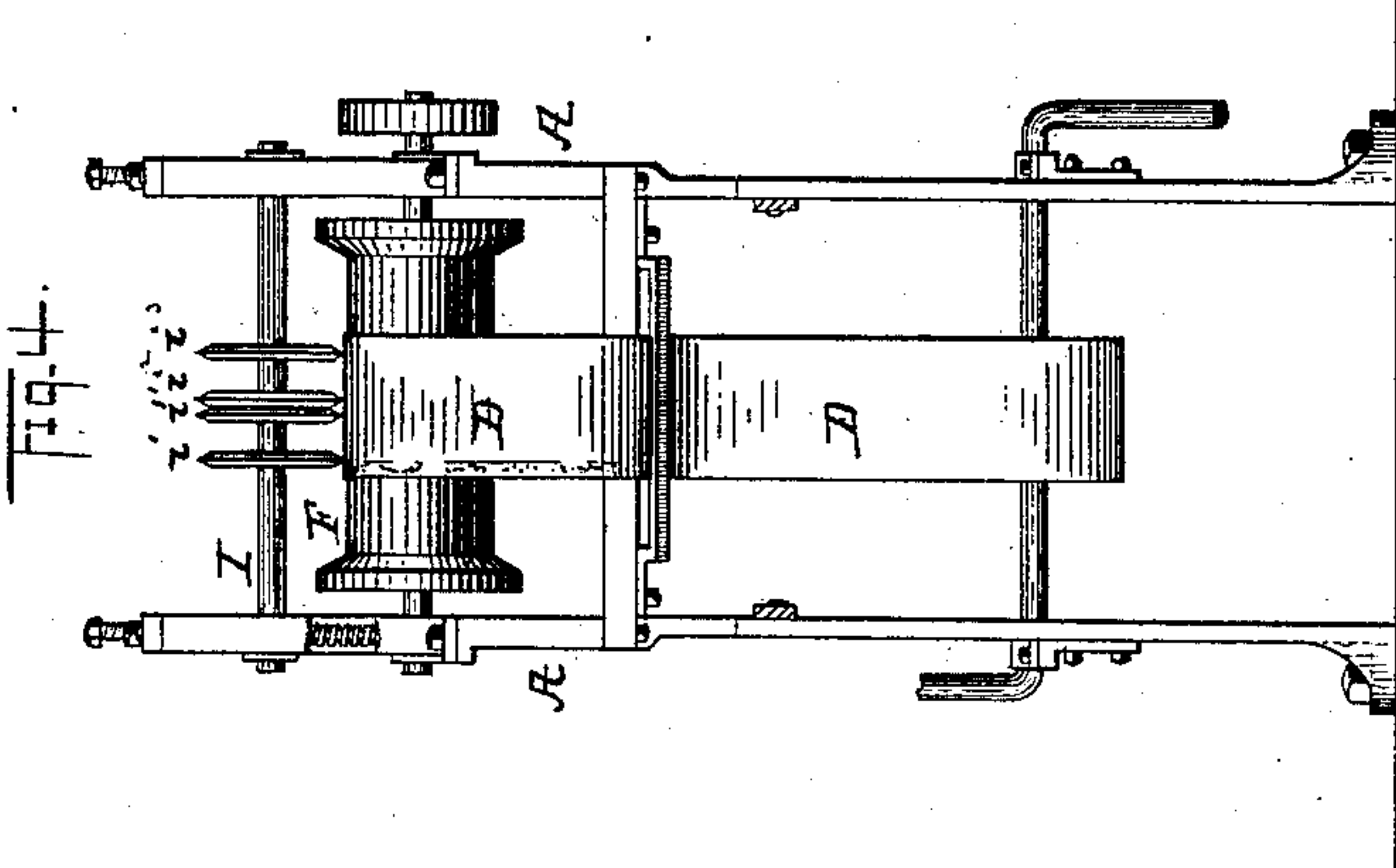
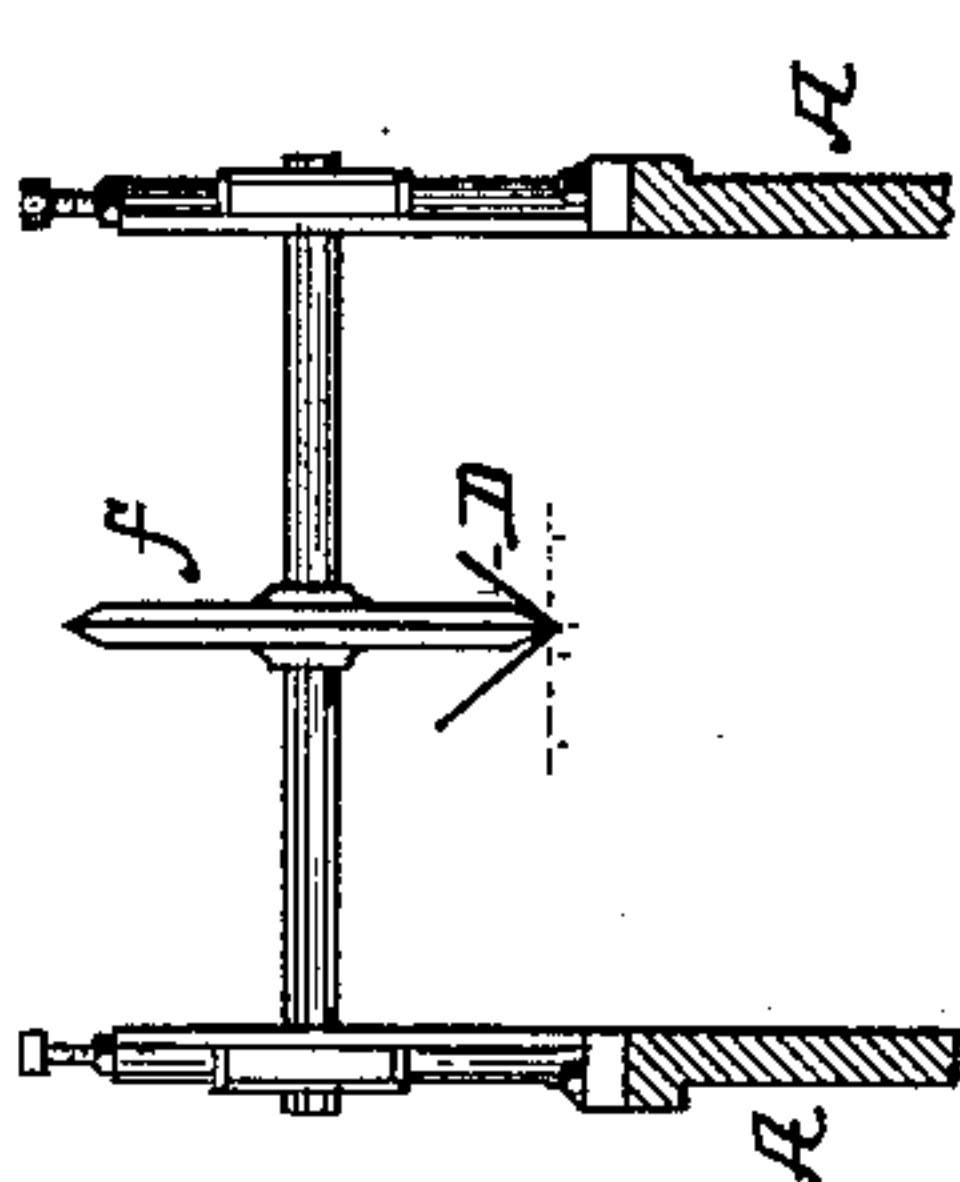
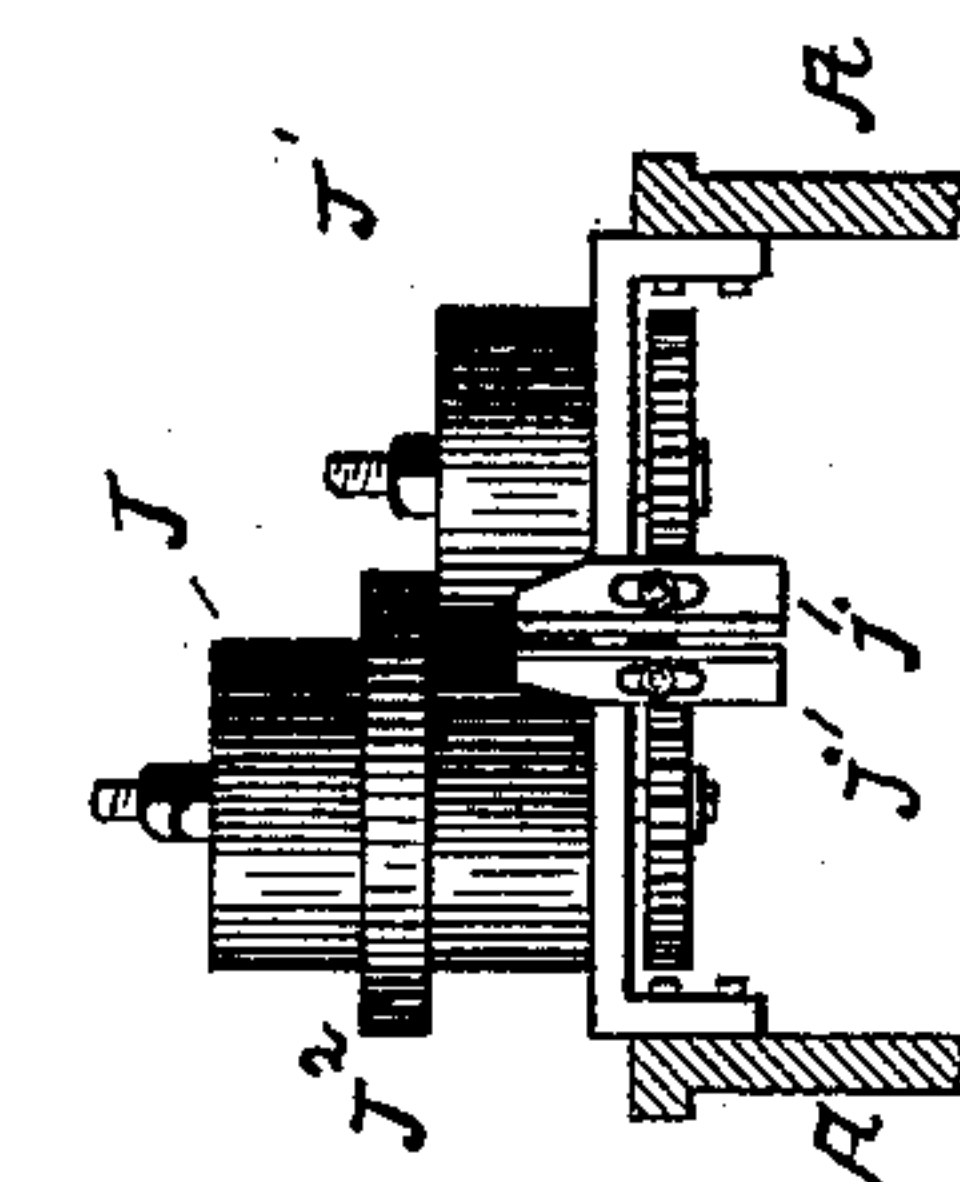


Fig. 3

Fig. 4

Fig. 5

Fig. 6



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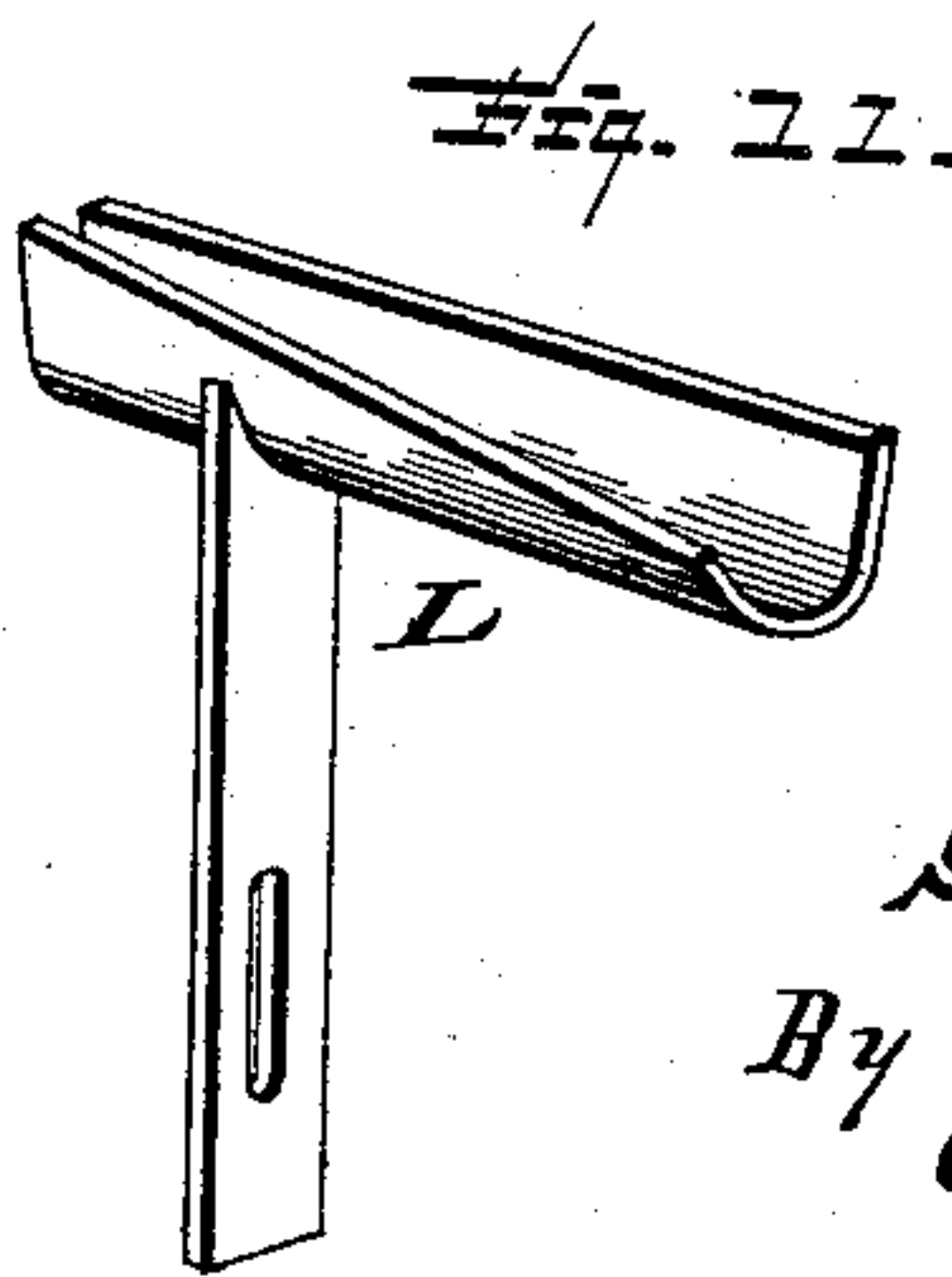
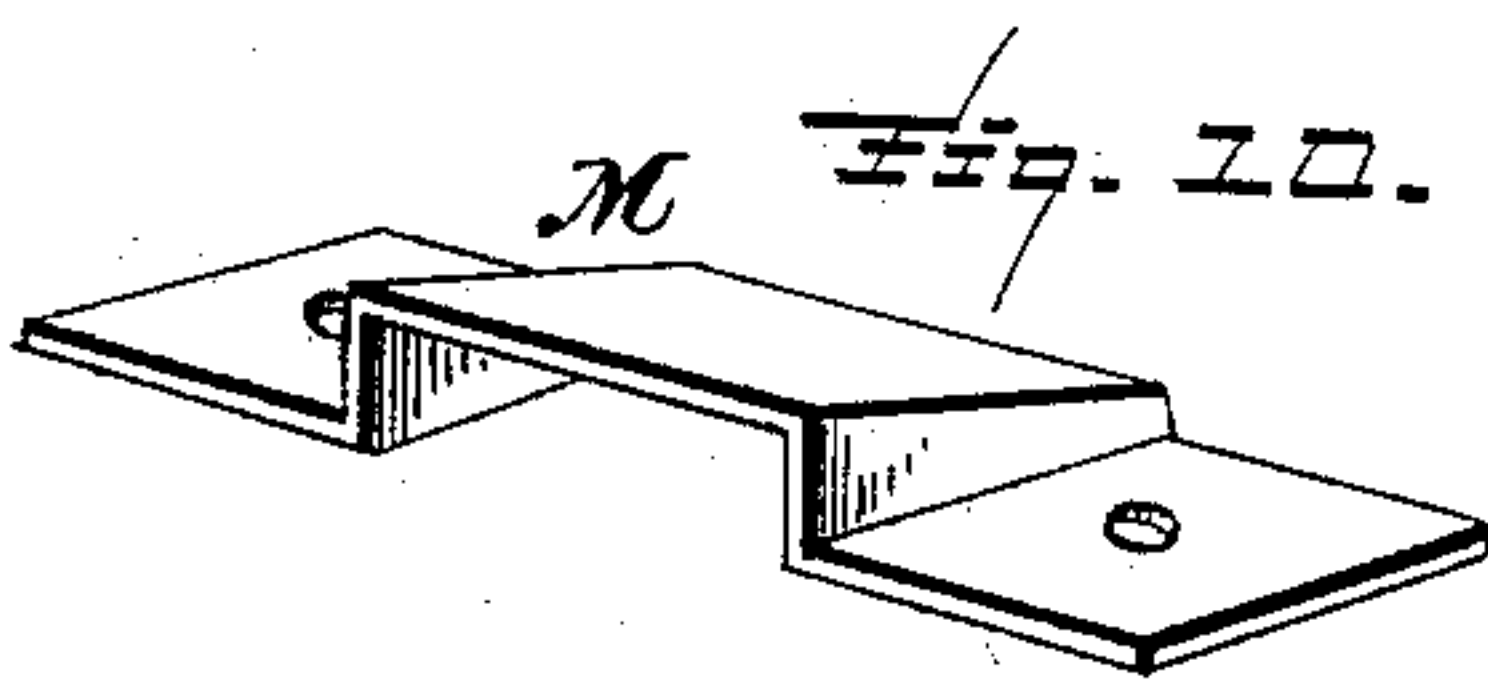
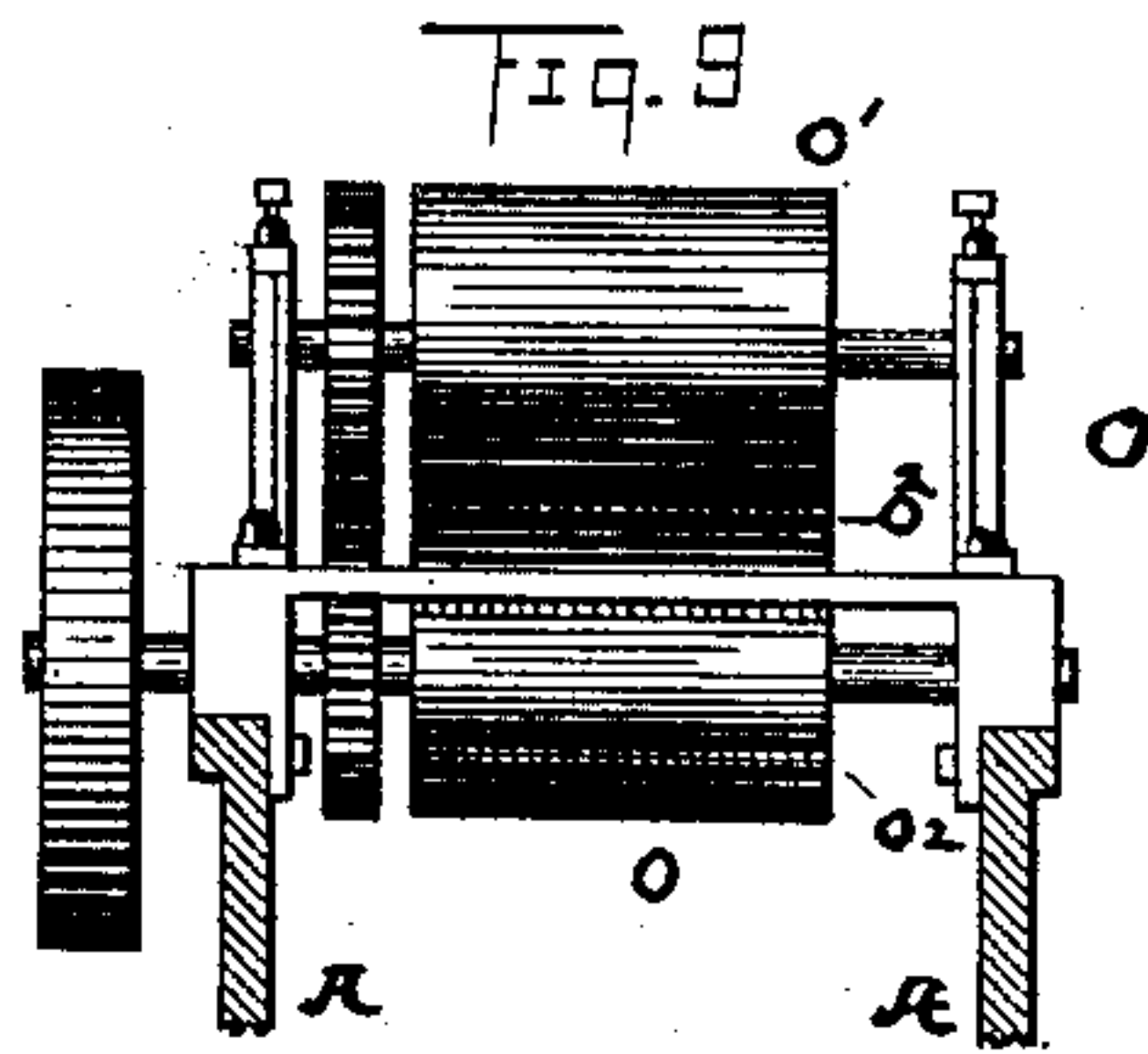
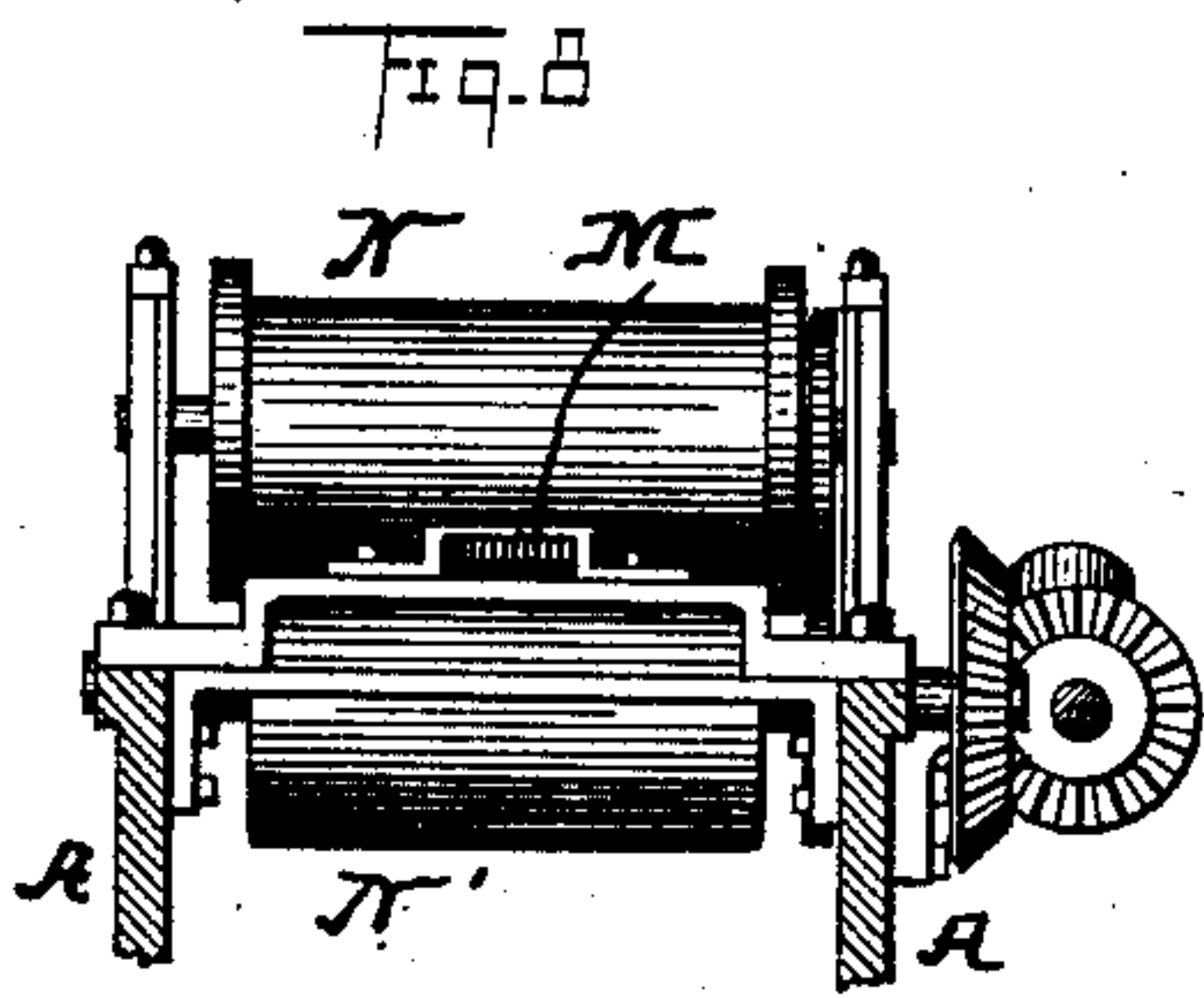
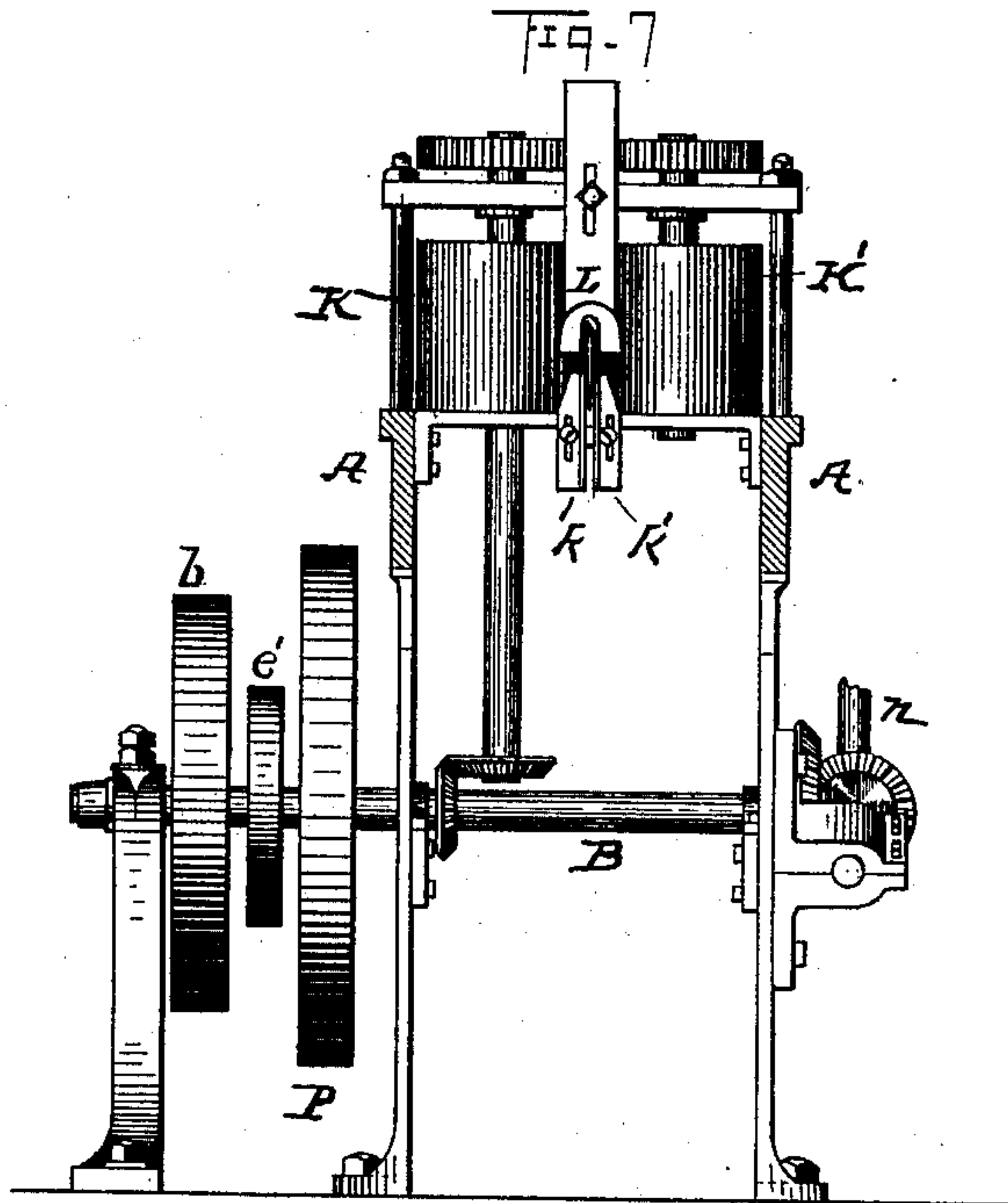
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UNITED STATES PATENT OFFICE.

SAMUEL S. PUTT AND JOHN NEEFF, OF AKRON, OHIO; SAID PUTT ASSIGNOR
TO THE MILLER MATCH COMPANY, OF SAME PLACE.

PAPER-BOX MACHINE.

SPECIFICATION forming part of Letters Patent No. 452,317, dated May 12, 1891.

Application filed June 10, 1889. Serial No. 313,733. (No model.)

To all whom it may concern:

Be it known that we, SAMUEL S. PUTT and JOHN NEEFF, citizens of the United States, residing at Akron, in the county of Summit and State of Ohio, have invented a certain new and useful Paper-Box Machine, of which the following is a specification.

Our invention relates to improvements in machines for making drawer cases for match-boxes; and it has for its object a simple and effective mechanism whereby a continuous strip of stock, as straw-board, is printed, glued, creased, folded, fastened, and cut into suitable lengths and delivered complete and ready for use.

To this end it consists of the peculiar construction, arrangement, and combination of parts hereinafter described and specifically pointed out in the claims, reference being had to the accompanying drawings, which form a part of this specification.

In the accompanying drawings, in which similar letters of reference indicate like parts, Figure 1 is a side elevation of our improved machine; Fig. 2, a similar elevation from the opposite side; Fig. 3, a plan of the same. Figs. 4 to 9 represent, respectively, sections of the frame at the lines 1 1, 2 2, 3 3, 4 4, 5 5, and 6 6 of Fig. 1 and elevations of the next adjacent parts, looking toward the discharge end of the machine, which parts are hereinafter fully described; and Figs. 10 and 11 are perspective detail views of the folders, Fig. 11 being inverted.

In the accompanying drawings, A is a metallic frame, which supports the operative mechanism, and in which is journaled a shaft B, upon which is mounted a pulley *b*, to which the power which operates the machine is primarily communicated by means of a belt, and on which shaft are also mounted other wheels which convey the power to the operative mechanism, as shown and hereinafter described.

C is a shaft detachably journaled in the frame A, which supports the coiled strip or roll of stock D, which by successive operations hereinafter described is converted into the drawer-cases, which strip is held in place by adjustable guides *c c*, suspended from said

frame. The strip of stock is first led to the printing device E, where it is printed in any desired manner.

The printing device E consists of two rolls journaled in the frame A, one whereof is smooth and the other contains the type, emblem, or design to be printed, said rolls running in unison by means of gear-wheels, between which rolls the strip of stock D passes and is printed.

A series of inking-rolls spread the ink and place it on the type-roll, details of which are not shown, as they do not differ, essentially, from inking-rolls in common use.

From the printing apparatus the strip of stock D passes from below around a smooth roll F, journaled in the frame A, the strip being slack between the roll F and the printing apparatus, as shown in Figs. 1 and 2, to permit the ink to dry or be absorbed by the strip, and also to prevent tearing of the strip from excessive tension between the two parts. In its passage around the roll F the strip D is glued and creased for folding.

The gluing apparatus consists of a glue-tank G, suspended in a hot-water tank H, provided with steam-heating pipes *h*, across which tank is journaled in suitable bearings a short shaft G³, on which are mounted two disk-wheels G' G², the former within and the latter without the tank, which wheels press against the strip D in its passage around the pulley F and are thereby revolved, one of which wheels G' dips into the glue in the tank G and conveys it thence on its edge to the strip D in a continuous line. Immediately above the roll F, with their edges resting on the strip D, are creasing-wheels *i i'* *i*² *i*³, mounted on a shaft I, journaled in suitable supports attached to the frame A. These wheels have each a V-shaped rim and continually press on the strip D, which is thereby creased in four parallel lines where it is desired to bend it to form the case, thereby making five parallel continuous panels, the first of which, commencing at the left of the wheel *i*, (see Fig. 4,) contains the glued surface. The second, between the wheels *i i'*, constitutes one of the wider sides of the box or case. The third, between the wheels *i' i*², 100

constitutes one of the narrow sides or edges of the case. The fourth, between the wheels i^2 i^3 , forms the other wide side of the case, and the fifth, at the right of the wheel i^3 , is similar to the first, and against which it is pressed and glued, as hereinafter described, and which together constitute the other narrow side of the case. The strip is then folded on the crease made by the wheel i^2 and led between two guides j j to the first vertical pressing-rollers J J.

Between the roll F and guides j j is a wheel f , mounted on a shaft journaled in supports attached to the frame A, and which wheel has a V-shaped face, which is adjusted to run along the crease made by the wheel i^2 and afford a support against which the strip is bent preparatory to folding. The guides j j , which direct the strip to the rolls J J', also assist in folding the strip D before it enters the rolls, and consist of angle-plates made vertically and laterally adjustable by slots and screws, as shown in Fig. 6, the vertical slots being wide enough to permit of the necessary lateral adjustment.

The rolls J J' are mounted on vertical shafts and run in unison by gearing, as shown in Fig. 6, being moved by friction with the moving strip, which is drawn forward from the roll F by the second set of vertical rolls K K.

The office of the rolls J J' is to press the fold in the crease made by the wheel i , and also to commence folding it on the line made by the wheel i , and to this end the roller J' has a square upper face, which registers vertically with the crease made by the wheel i' , and the roll J has an adjustable collar J², which extends over the upper face of the roll J', and which as the strip D passes bends its upper edge down on the crease made by the wheel i upon the upper face of the pulley J.

Between the rollers J J' and K K' are a set of guides k k' , similar in construction to the guides j j , adjustably connected with the support of the rolls K K', which serve to retain the fold already made in the strip D and direct said strip so folded to the rolls K K. Immediately above these guides is a folder L, whose office is to complete the folding commenced by the rolls J J' and collar J². This folder is adjustably connected with the upper support of the rolls K K' by means of a vertical slotted bar, and consists of a horizontal block supported lengthwise of the machine and having in its lower face a laterally-tapering horizontal groove or channel widest toward the rolls J J', and thence decreasing in width until at the other end of the block it is only sufficient to permit three layers of the stock to pass. The upper fold of the strip D enters this groove from the rolls J J', and in its passage is bent down and against the fifth panel of the strip hereinbefore specified, against which its glued face is firmly pressed by the rolls K K', thereby fastening the strip in a flat tube on the two fold-lines made by the wheels i i^2 . The tube thus formed is, as

it first emerges from the rolls K K', opened by pressing the already-folded edges by hand, which causes the sides to separate, and it is refolded again into a flattened tube on the creases made by the wheels i' i^3 and carried to a second folder M. This folder is supported by a bridge which extends across the frame A, and consists of a block attached to the top of the bridge and having in its lower face a horizontal channel or groove laterally of sufficient width to permit the passage of the flattened tube and vertically widest at the end toward the rolls K K', whence it tapers vertically until at the opposite end it is only sufficient to permit the flattened tube to pass between its inner upper face and the top of the bridge. In passing from the rolls K K' to the folder M the flattened tube is twisted one-fourth way around, so that the broad panels which stand vertically between the rolls K K' lie horizontally in the folder M. The effect of this torsion is to open the tube as it emerges from the rolls K K' in the same manner as was done by hand, as hereinbefore described, and permit it to be refolded on alternate fold-lines by the folder M. From the folder M the strip passes to the horizontal folding-rolls N N, which press it upon the new lines. Motion is communicated to the rolls N N' by a shaft n , journaled in bearings attached to the frame A by means of bevel-gears at each end, which mesh with bevel-gears on the shaft B and the shaft of the roll N, respectively. This exact construction is, however, not essential to the operation of our machine, as any other of the ordinary means of transmitting motion may be employed. From the rolls N N' the flattened and completed tube passes to the cutting device O, which is at the discharge end of the machine, and consists of two rolls o o' , provided on the ends of the shafts on which they are mounted with similar gear-wheels, which mesh together and are driven by a belt p from a pulley P on the shaft B. The lower roll o is provided on its periphery with a series of longitudinal knives o^2 , which project radially from said periphery, and the spaces between which correspond with the lengths of the desired drawers to be cut from the tube D, the edges of which knives press against the roll o' and sever said tube as it passes between them into suitable lengths.

The printing apparatus E is operated by a belt e from a pulley e' on the shaft B. The belt e is normally slack on the pulleys and is tightened to move the printing device by a tightener, which consists of a rod Q, mounted in the frame A, the ends of which are turned at a right angle in opposite directions, one whereof, resting under the belt e , bears at its end a roller q , arranged to engage said belt when raised, and the other, extending rearwardly on the opposite side of said machine, furnishes a lever by which the opposite arm is raised to tighten the belt and actuate the printing device.

Having thus described our invention, what we claim, and desire to protect by Letters Patent, is—

1. The combination, with means for advancing a folded strip of stock, of two rollers J J, a collar J², adjustably secured to one of them and overlapping one end of the other roller for partially bending one edge of the strip of stock over the other edge, and means for completing the fold, substantially as described.

2. The combination, with means for advancing a folded strip of stock, of a wheel *f*, constituting a support against which to begin folding the strip, two rollers for completing the fold, and two angle-plates adjustably secured between the wheel and rollers to guide the strip to the rollers and assist in the folding, substantially as described.

3. The combination, with means for advancing a folded strip of stock and bending one edge of the strip over the other edge, of a vertically-adjustable folder above the strip having on its lower face a tapering groove or channel, the narrowest portion of which is substantially the same as the two thicknesses of the stock, pressure-rollers adjacent to the end of the folder having the narrowest portion of the groove, and two guides directly below the folder adjustably secured to the support of the pressure-rollers, substantially as described.

4. In a machine for making drawer-cases from a continuous strip of stock, the combination, with means for continuously advancing the creased strip folded on one line, with the lap extending beyond the opposite edge, of revolving rolls to receive and press the

folded strip, and a collar mounted on and revolving with one of said rolls to bend the lap over the opposite edge of the strip, substantially as shown and described.

5. In a machine for making drawer-cases from a continuous strip of stock, the combination of the gluing apparatus F, creasing-wheels *i i' i² i³*, wheel *f*, bending-rolls J J', collar J², folder L, and compression-rolls K K' for converting said strip into a flattened tube on alternate fold lines, all constructed and arranged substantially as shown and described.

6. The combination of the rolls K K', the rolls N N', journaled at a different vertical angle therefrom to draw and partially twist the flattened tube, and the folder M to refold the tube, substantially as shown and described.

7. The combination, with means for advancing a continuous strip of stock and providing one edge with a line of paste, of a set of creasers and two sets of rollers, the axes of the two sets of rollers being at an angle to each other, whereby the tube is twisted part way round, and means between the two sets of rollers for refolding the stock on alternate fold-lines, whereby the sets of rollers flatten the tube upon alternate creases formed therein by the creasers, substantially as described.

In testimony that we claim the above we hereunto set our hands.

SAMUEL S. PUTT.
JOHN NEEFF.

In presence of—

C. P. HUMPHREY,
H. F. MILLER.