

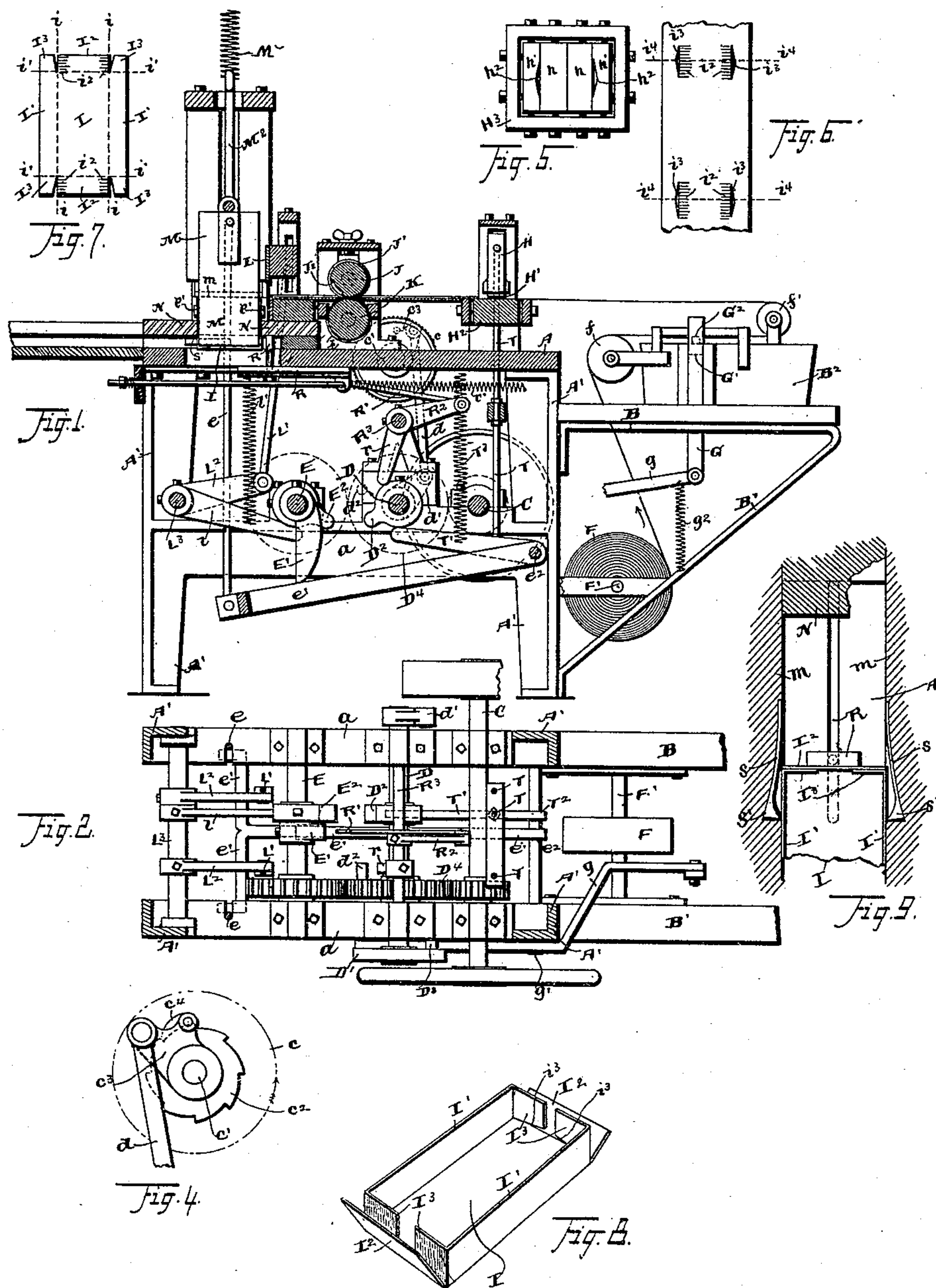
(No Model.)

2 Sheets—Sheet 1.

J. NEEFF.  
BOX MACHINE.

No. 488,086.

Patented Dec. 13, 1892.



WITNESSES.

*N.S. Amstutz*

*Geo. W. King*

*John Neff* INVENTOR.

By  
*Siggitt & Siggitt*  
ATTORNEYS

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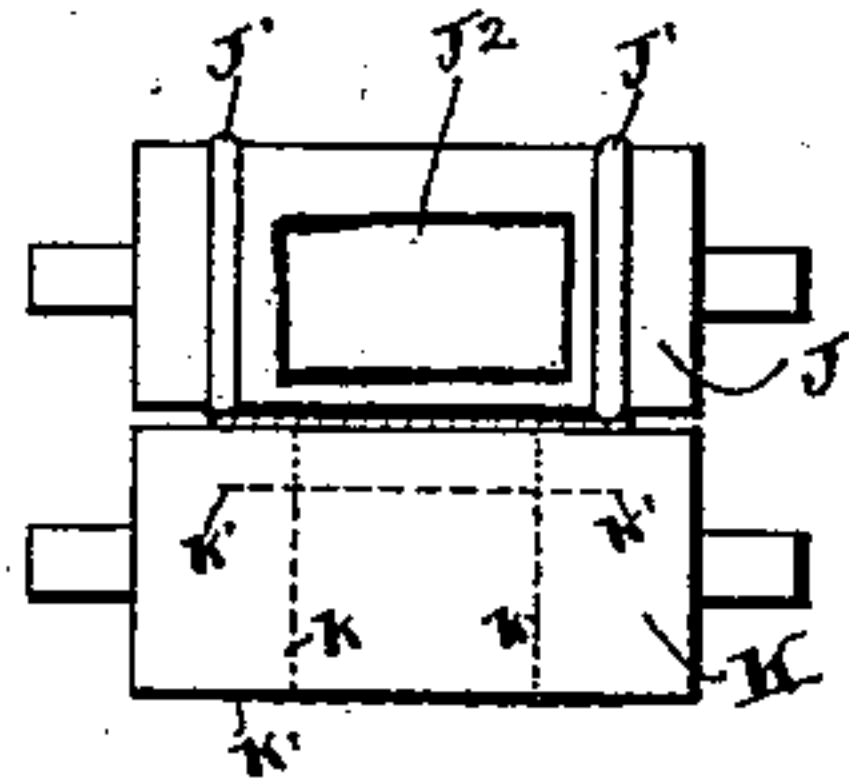


Fig. 10.

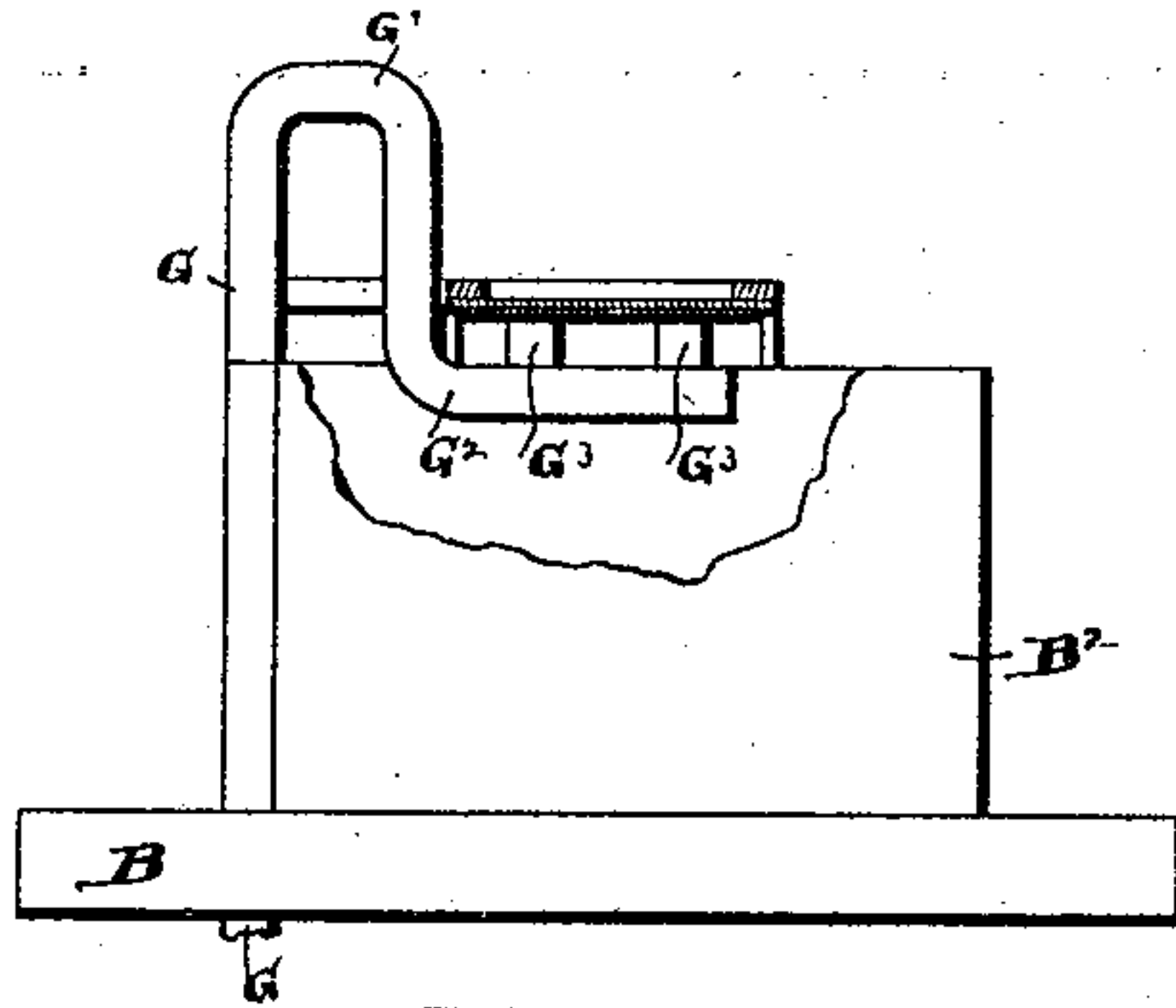


Fig. 11.

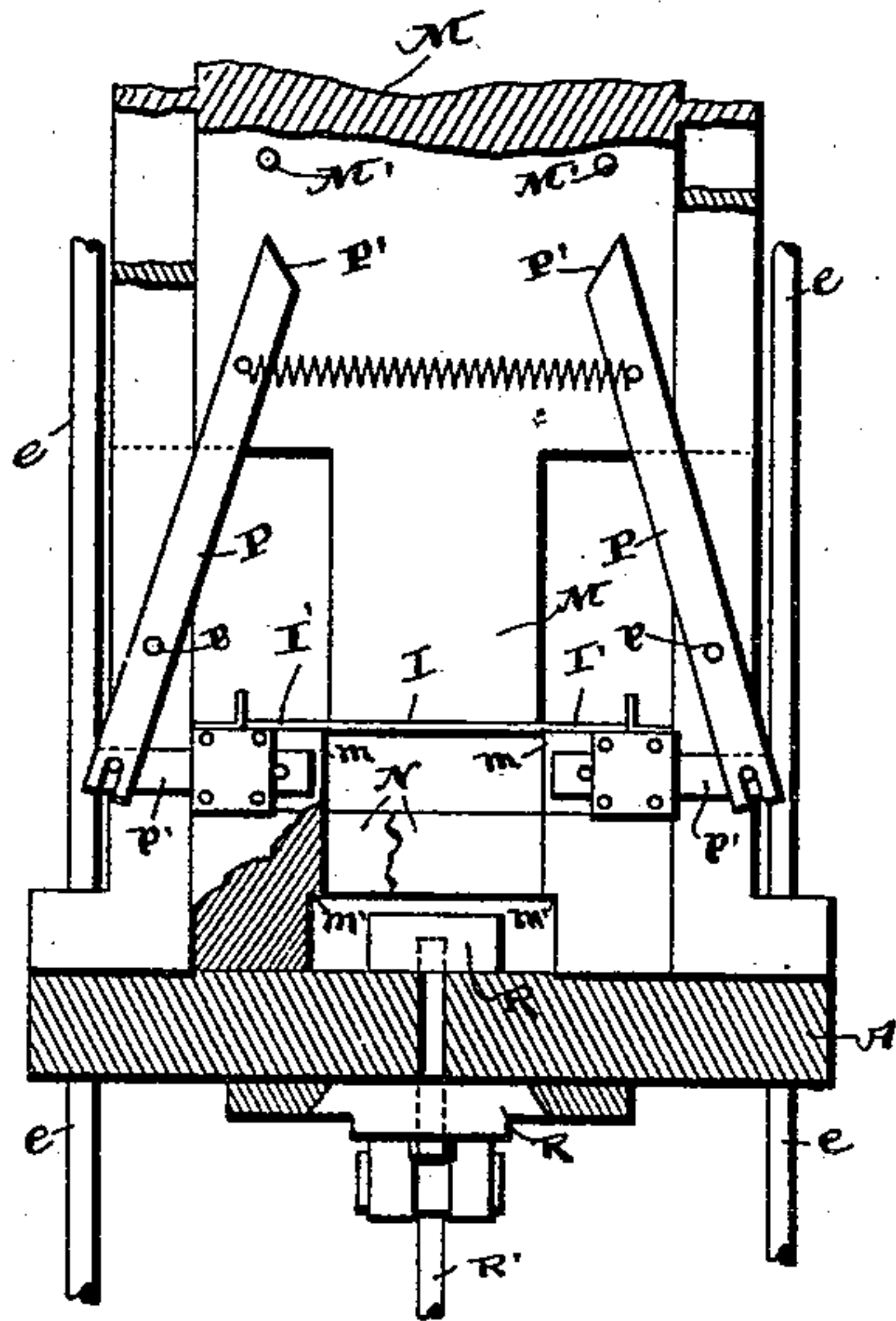


Fig. 12.

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# UNITED STATES PATENT OFFICE.

JOHN NEEFF, OF AKRON, OHIO.

## BOX-MACHINE.

SPECIFICATION forming part of Letters Patent No. 488,086, dated December 13, 1892.

Application filed November 14, 1888. Serial No. 290,810. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN NEEFF, of Akron, in the county of Summit and State of Ohio, have invented certain new and useful Improvements in Box-Making 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 pertains to make and use the same.

My invention relates to improvements in box-making machines designed more especially for manufacturing paper boxes for matches; and it consists in certain features of construction and in combination of parts hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is an elevation in longitudinal section through the center of the machine. Fig. 2 is a plan taken below the table. Fig. 3 is an enlarged elevation in section through the center of the forming-dies, taken at right angles to the view shown in Fig. 1. Fig. 4 is an enlarged side elevation of the feed-roll-driving mechanism. Fig. 5 is a plan of the punching-dies. Fig. 6 shows a section of material having been punched. Fig. 7 is a plan of a blank before folding. Fig. 8 is a view in perspective of a folded box. Fig. 9 is a plan of the mechanism for discharging the box from the machine. Figs. 10 and 11 are front elevations, respectively, of feed-rolls and glue-box.

A represents a table supported on legs A', with suitable braces and cross-bars a, these members constituting a suitable supporting-frame for the machine.

B is a shelf located somewhat lower than the table and supported by brackets B', the shelf supporting the glue-pot B<sup>2</sup>. Journaled in suitable boxes connected with cross-bars a are, first, the driving-shaft C, intermediate shaft D, and shaft E, the three shafts being intergeared, as shown, and the driving-shaft having, of course, the necessary driving-pulleys, fly-wheel, &c. A roll of paper F is mounted on roller F', and from thence the paper leads first around guide-roller f, and from thence passes over the glue-pot and under and around roller f', and from thence is drawn back into the machine by means of feed-rollers J and K, hereinafter described.

A bar G reciprocates vertically in ways lo-

cated outside the glue-pot. The upper end of this bar is provided with a goose-neck G', that leads down into the glue-pot and connects with a head G<sup>2</sup>, extending crosswise of the glue-pot. This head is provided with upwardly-projecting lugs G<sup>3</sup>, that with the downward movement of bar G are submerged in the glue, and with the upward movement of bar G these lugs deposit glue on the under side of the material in such position on the end flaps of the blank as will unite these flaps with the corner flaps when the box is folded. The glued sections are shown in shaded lines i<sup>2</sup>, Fig. 6.

I represents the bottom of the box; I', the side flaps; I<sup>2</sup>, the end flaps, and I<sup>3</sup> the corner flaps. After passing roller f' the glued surface of the material is and remains on top. Next the material passes under plunger H, the same having suitable punches H', that correspond with the female dies underneath, by means of which small angular slots i<sup>3</sup> are cut out of the material, the latter being afterward severed on transverse lines i<sup>4</sup> i<sup>4</sup> through the center of these slots.

Dies H<sup>2</sup> are constructed as follows: Blocks h h and h' h' are secured by set-screws in band H<sup>3</sup>. Blocks h h abut each other and are smooth and rectangular in form. Blocks h' h' are of similar size and form, but are recessed at h<sup>2</sup> to receive the punches. With such construction the blocks are easily made or repaired and may be blocked apart more or less, if need be, to fit the punches. In punching out slots i<sup>3</sup> so much of the material is removed that the corner flaps I<sup>3</sup> aforesaid can fold without colliding with the bottom section I. The material next passes between feed-rolls J and K. The lower roll K has circular knives k, that score the material on line i i. This roller has also transverse knives k', that score the blank laterally on line i' i', such scoring causing the material to fold easily on the lines aforesaid. As the scoring-knives cut only part way through the material, rollers J K are of course separated a trifle, and the upper roller is provided with bands J', that engage the material on top, these bands traveling along the margin of the paper to feed the same. The top roller has a depression J<sup>2</sup> on the periphery thereof located in position to span the glued sections aforesaid, so that the glue does not come in contact with this roller.



Instead of employing a single depression, as shown, two smaller depressions—one for each glued section—could be employed. The material next passes under the severing-knife L, of ordinary construction, where the material is severed on lines  $i^4 i^4$ , aforesaid, the severed blank in advance of knife L being in position under folding-plunger M. This plunger has a head or lower end adapted to fit inside the folded box. The downward movement of the plunger first depresses the blank between folding blocks or dies  $m m$ , that fold the side flaps  $I' I'$  up alongside the plunger, and just as this occurs projecting pins  $M'$  of the plunger engage the inclined ends  $P'$  of levers  $P$  and distend the upper ends of these levers in pairs. These levers are pivoted at  $p$ , and of course are four in number. The lower end of the levers have attached blades  $p'$ , arranged in pairs presenting toward each other, and as these blades are forced inward by the action of the connected levers the blades each engage a corner flap  $I^3$  and fold the same against the plunger. The further downward movement of the plunger causes the end flaps  $I^2$  to engage dies or blocks  $N$ , by means of which these end flaps are folded, the end flaps of course coming outside the corner flaps, thus bringing the glued sections  $i^2$  of the end flaps against the outside of the corner flaps, gluing the same, and thus completing the box. Blocks  $m$  extend downward some little distance below blocks  $N$ , the latter being secured between the former. Blocks  $N$  have gains  $m'$ , the upper edges of which are flush with the under side of blocks  $N$ . As the folded box is pressed down below blocks  $N$  the side flaps will expand a trifle, so as to engage the under edges of these blocks on the upstroke of the plunger. The end flaps engage shoulders of blocks  $N$ , so that the four sides of the box are simultaneously engaged, by means of which the box is not cramped, broken, or injured in stripping it from the plunger. The boxes as they are disengaged from the plunger are received by the table, and a reciprocating bar  $R$  pushes the boxes from under the plunger, the boxes at the rear moving the boxes in advance, and thus discharging the boxes successively from the machine.

Springs  $S$  are arranged alongside of the boxes as they fall upon the table, the springs being shown more clearly in Fig. 9. These springs have inwardly-projecting toes  $S'$ , inclined on the side that receives the thrust of the moving box by reason of which the springs are pushed back by the passing box. The outer faces of these toes are about flush with the face of the push-bar when the latter is at the extreme of its outward movement, and the recoil of the springs causes the toes to approach each other and to overlap the end flaps of the box to support the latter while the glue is setting. As these toes are retired by the next box the abutting end flaps of the two boxes hold each other in place during their passage through the discharging-spout, and

the latter may be extended indefinitely to give the glue time to set. Plunger  $M$  has attached rod  $M^2$ , the latter extending above the housings and being provided with spring  $M^3$  for elevating the plunger. The plunger is connected by rods  $e$  with lever  $e'$ , the latter being pivoted at  $e^2$ . This lever is actuated by cam  $E'$ , the latter being mounted on shaft  $E$ , the cam of course depressing the lever to give the downstroke of the plunger. Knife  $L$  is connected by rods  $L'$  with rock-arms  $I^2$ , the latter being mounted on rock-shaft  $L^3$ . On the same shaft is mounted rock-arm  $l$ , the same being engaged and depressed by cam  $E^2$ , mounted on shaft  $E$ . The upward movement of the knife is effected by spring  $l'$ , the latter being attached to arm  $L$  and to the under side of the table. Push-bar  $R$  is connected by rod  $R'$  with rock-arm  $R^2$ , the latter being mounted on rock-shaft  $R^3$ . On the same shaft is also mounted arm  $r$ , the latter being engaged by pin  $d^2$  of intermediate gear  $D^4$ , by which arrangement the push-bar is thrust rearward. The push-bar is returned by the recoil of spring  $r'$ . Plunger  $H$  is connected by rods  $T$  with lever  $T'$ , the latter being pivoted at  $T^2$  and engaging cam  $D^2$ , by which engagement the plunger is depressed, the return of the plunger being caused by the recoil of spring  $T^3$ , the latter being attached to arm  $T^2$  and to the under side of the table, as shown. Bar  $G$  is pivoted to lever  $g$ , the latter being fulcrumed at  $g'$ . This lever extends alongside of disk  $D'$ , the latter being mounted on shaft  $D$ . This disk has a laterally-projecting pin  $D^3$ , that engages and depresses the free end of lever  $g$ . This lever is reversed by the action of spring  $g^2$ .

For actuating the feed-rolls the following mechanism is provided: The trunnion of feed-roll  $K$  is provided with a pinion (not shown) that engages gear  $c$ , mounted on stud  $c'$ . On this stud is secured ratchet-wheel  $c^2$ , and by the side of the latter and journaled on the stud is lever  $c^3$ , to which is pivoted pawl  $c^4$  for actuating the ratchet wheel. Lever  $c^3$  is connected by pitman  $d$  with crank  $d'$ , the latter being mounted on shaft  $D$ . With each revolution of shaft  $D$  the feed-rolls are actuated so as to move the material the length of the blank. The different parts of the machine are of course timed to co-operate with each other to produce the general result. As the greater part of the machine is well known, it is believed that the different members will be readily understood without further description.

What I claim is—

1. In box-making machines, the combination, with vertically-reciprocating punches, substantially as indicated, of co-operating dies consisting of four blocks adjustably secured in a band, the outer blocks at their intersection with the inner blocks having vertical recesses for receiving the punches, substantially as set forth.

2. The combination of feed-rollers, one of



which is provided with circular and transverse cutters and the other with a depression, and yielding bands located on opposite sides of such depression.

- 5 3. The combination, with stationary folding-dies *m* N, shouldered, as described, to permit the box to expand after it has passed below the shoulders, of a vertically-reciprocating plunger, a stationary seat immediately  
10 below the plunger onto which the box is forced by the plunger, and a horizontally-recipro-

cating push-bar located over the stationary seat for moving the box horizontally from under the plunger, substantially as set forth.

In testimony whereof I sign this specification, in the presence of two witnesses, this 21st day of September, 1888. 15

JOHN NEEFF.

Witnesses:

H. F. MILLER,  
C. S. COBBS.