(No Model.) 3 Sheets—Sheet 1.

W. L. C. NILES.

PATTERN BINDING MACHINE.

No. 543,777. Patented July 30, 1895.

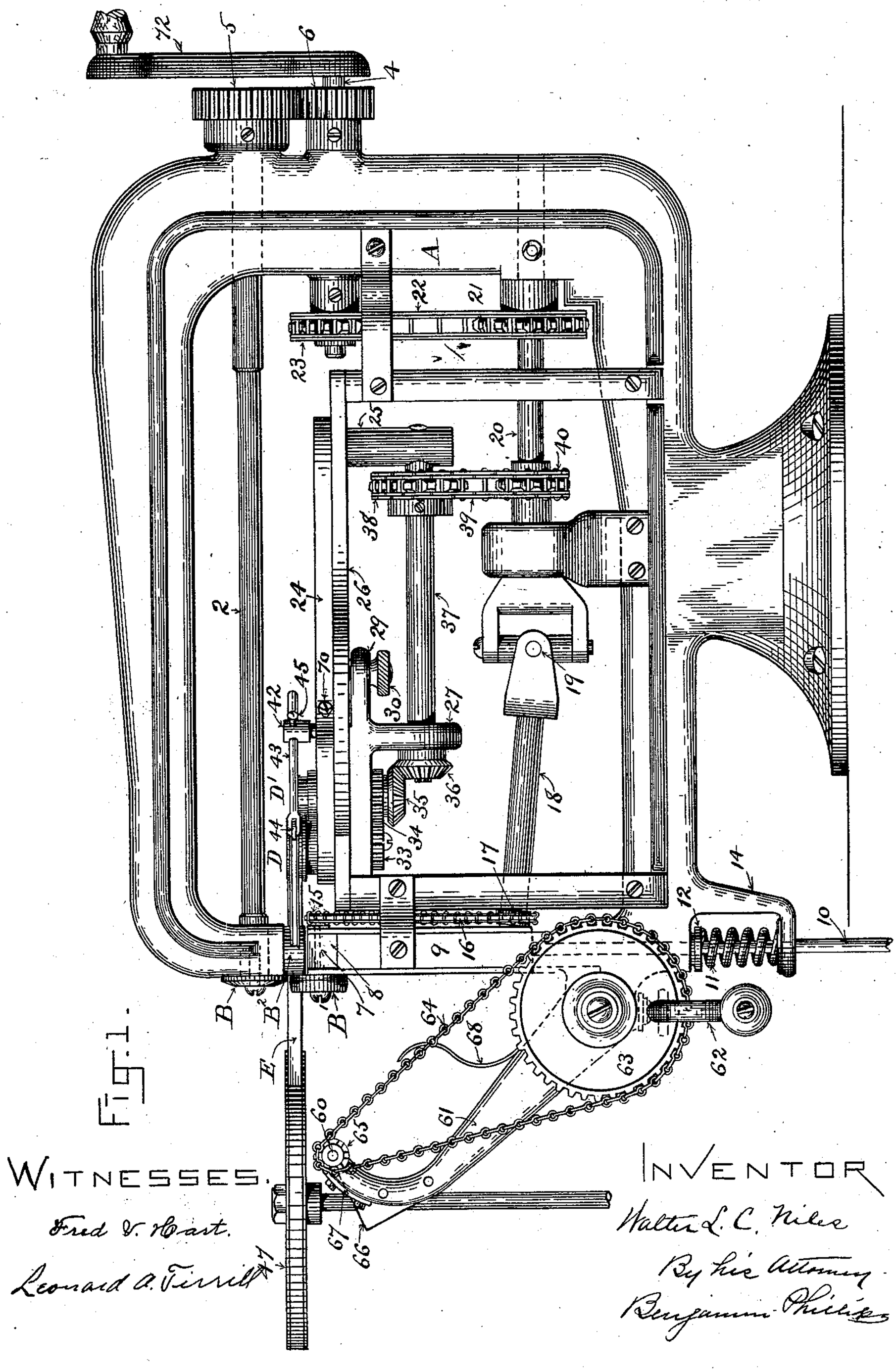

Fig. 1.

WITNESSES.

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(No Model.) 3 Sheets—Sheet 2.

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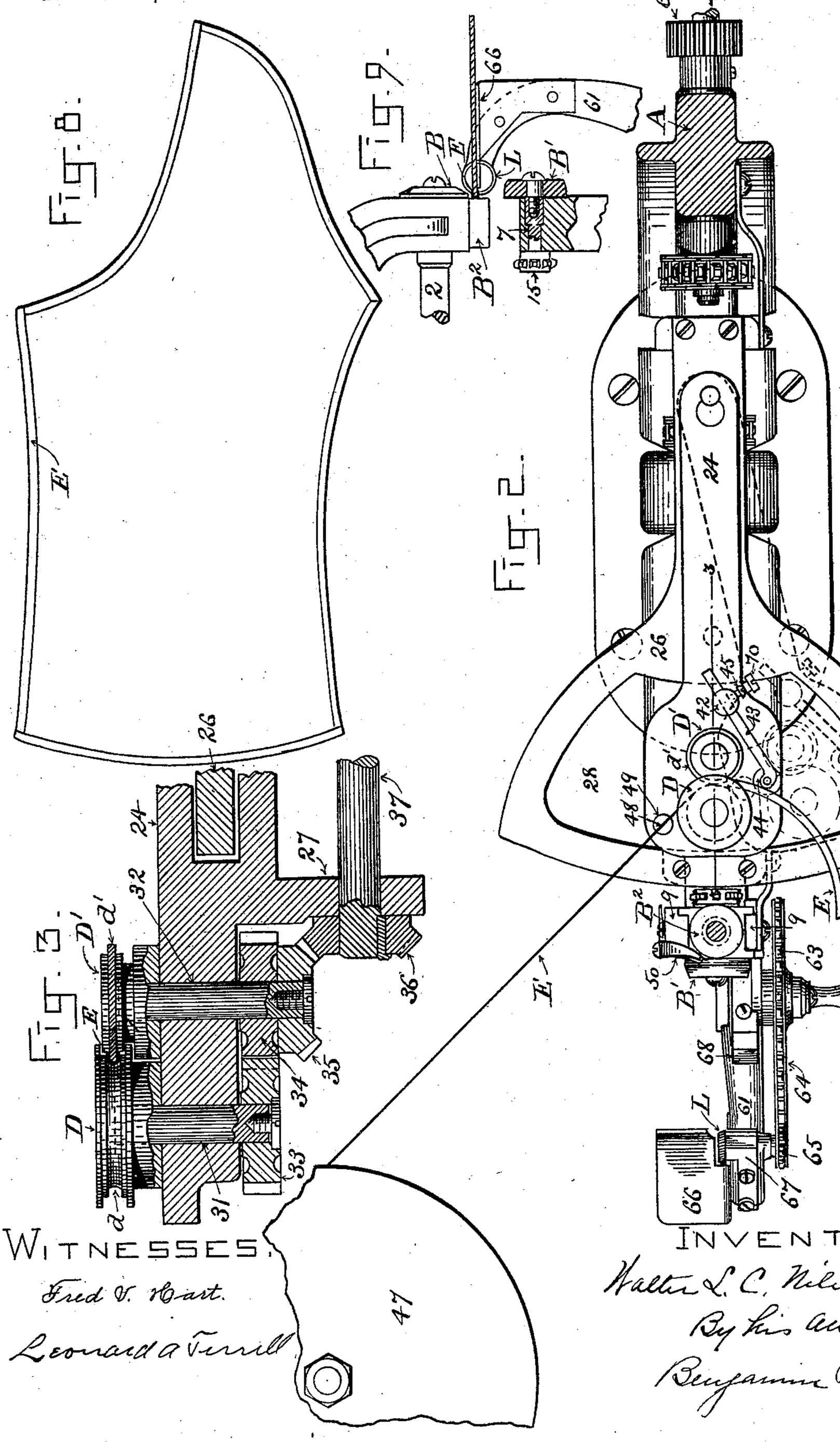

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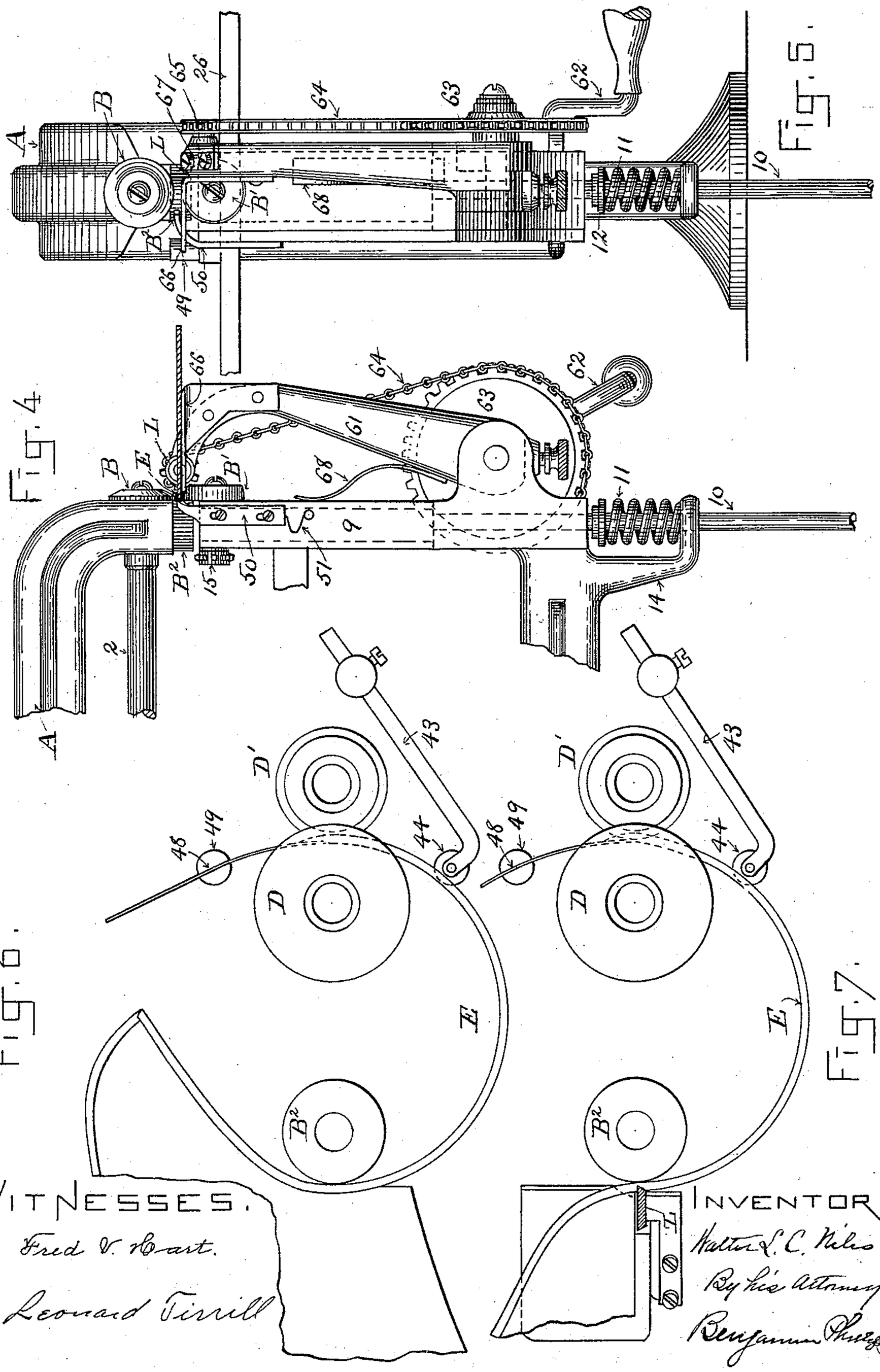

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

WITNESSES.

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UNITED STATES PATENT OFFICE.

WALTER L. C. NILES, OF SAUGUS, MASSACHUSETTS.

PATTERN-BINDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 543,777, dated July 30, 1895.

Application filed April 22, 1895. Serial No. 546,618. (No model.)

To all whom it may concern:

Be it known that I, WALTER L. C. NILES, a citizen of the United States, and a resident of Saugus, in the county of Essex and Commonwealth of Massachusetts, have invented a new and useful Improvement in Pattern-Binding Machines, of which the following, taken in connection with the accompanying drawings, is a specification.

This invention relates to improvements in machines for binding the edges of shoe-patterns and similar devices with an edging of brass or other suitable material.

Shoe-patterns have heretofore been made of some form of paper or compressed pulp-board or other suitable material capable of being cut to the required shape. As the art of pattern-making has been heretofore practiced the pattern is first cut out on the required lines by hand, after which three separate machines are commonly employed to perform the operations of molding the edging and fitting and securing it to the pattern. The first machine above referred to is commonly called the "molding-machine," and by the operation of the same a strip of flat sheet-brass or other suitable material of sufficient width is bent laterally to a uniform U-shaped section. The edging so molded is substantially straight and is cut into rods of convenient length and so sold to the trade. The next machine commonly employed is the binding-machine, which compresses the concave edging onto the edge of the pattern over which it is placed by the operator with sufficient pressure to secure the edging in position. In the operation of the binding-machine, whenever a corner is reached upon the pattern it becomes necessary to make a niche on the inside of the edging by removing a substantially wedge-shaped piece, so that the edging may be bent around the corner without fullness at the corner. For the above purpose the third machine above referred to is commonly brought into operation, the pattern and edging being removed from the binding-machine for that purpose. The third machine is commonly called a "cutter," and by its operation a triangular or wedge shaped piece is cut from the (concave) side of the edging adjacent to the pattern for the purpose above explained. In connection with the machines above referred to it is common in the trade to employ a device for molding or bending the edging longitudinally to fit the re-entrant curves upon the pattern. The device commonly used for this purpose is a conically-shaped form around which the edging is bent to give it the desired curvature. Such device has heretofore been aggregated with the parts of the binding-machine, being for convenience secured to some fixed part thereof, but has never been placed in operative connection with any of the working parts of the binding-machine.

The foregoing brief review of the art shows that there are several marked objections to the heretofore-existing method by which the same has been practiced, the most important of which would appear to be the waste of time necessitated in changing from one machine to another, and the waste of material in the remnants or ends of the rods or strips hereinbefore referred to, which are left after binding one or more patterns and which are commonly utilized only as scrap metal.

The object of the present invention is to combine the functions of the several machines above referred to in a single machine in which the pattern may be bound from a continuous strip; and to this end it consists of a set of molding-rolls, whereby the edging is molded to the proper lateral section, a set of binding-rolls, whereby the edging is compressed upon the edge of the pattern, and means for feeding the molded edging from the molding-rolls to the edge of the pattern while the same is passing through the binding-rolls.

This invention further consists of means for forming the molded edging upon a longitudinal curve while passing from the molding-rolls to the pattern, of the form and arrangement of the cutter, of means for adjusting the relative lateral position of the molding and binding rolls, and of the devices and combinations of devices hereinafter more specifically set forth and claimed.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 is a side view of machine embodying the same. Fig. 2 is a top plan view with upper portion of the frame and upper shaft removed to show underlying parts. Fig. 3 is a section on line 3 3, Fig. 2. Fig. 4 is a par-

tial side view showing cutter approaching its operative position. Fig. 5 is an end view. Figs. 6 and 7 are diagrammatic views showing the edging passing from the molding-rolls to the pattern. Fig. 8 is a top plan view of the finished pattern. Fig. 9 is a partial side view showing cutter in operative position.

Similar letters and figures of reference refer to similar parts throughout the several views.

In the drawings, A represents a frame suitable to support the working parts of the machine.

The binding-rolls are represented by B and B′, and as shown in the drawings are arranged as follows: The roll B is rigidly mounted upon and rotates with a shaft 2, which is provided with suitable bearings in the frame A, across which it extends, being operatively connected with the power-shaft 4 by the gears 5 and 6. The roll B′ is mounted upon a trunnion 7, provided with suitable bearings in the block 8, arranged to reciprocate vertically along the vertical guide-rods 9 9, secured to the frame A. To the lower end of the block 8 is secured a rod 10, which extends through suitable bearings in frame A, along which it is free to reciprocate vertically, being guided and held in position thereby. A suitably-placed spring 11, conveniently consisting of a coiled spring surrounding the rod 10, and arranged to bear upon the collar 12 on said rod, and a bracket 14 on the frame A is arranged to approximate the rolls B and B′ with sufficient pressure to compress the sides of the edging against the pattern and secure it thereto. The rod 10 extends below the frame A, and is conveniently connected with a suitable treadle (not shown) whereby the rod 10 may be depressed against the action of the spring 11, and the rolls B and B′ separated for the insertion or removal of the work. A rotary motion is imparted to the roll B′ by suitable connection with the power-shaft 4, the form of which as shown in the drawings I will now describe.

The trunnion 7 carries a sprocket-wheel 15, which is connected by the sprocket-chain 16 with the sprocket-wheel 17 on the shaft 18, which is connected by a universal joint 19 with the shaft 20, provided with suitable bearings in the frame A and carrying a sprocket-wheel 21, which is connected by the sprocket-chain 22 with the sprocket-wheel 23 on the power-shaft 4. The shaft 18 is provided with suitable bearings in the vertically-reciprocating block 8, suitable provision being made in said bearing to allow for the vertical movement of block 8.

Upon the frame A, adjacent to the roll B, is mounted a horizontally-disposed idle-roli B^2, against which the edging is pressed by the pattern while the pattern is passing between the rolls B and B′, the roll B^2 acting as a gage to keep the roll B B′ upon the edging and in position to properly compress the same.

In connection with the foregoing description of the form and arrangement of the binding-rolls, I desire to say that I do not consider my invention limited to the details of mechanism as described, for it is evident that the same may be modified by any one of ordinary skill in the art without any departure from the essential nature of my invention.

I will now describe the form and arrangement of the molding-rolls, as shown in the drawings.

The molding-rolls are represented by D and D′, the roll D having a U-sectioned groove *d*, extending around its peripheral face, and the peripheral face of the roll D′ being provided with an annular tongue *d′*, correspondingly shaped and arranged to engage the groove *d*. As shown, the tongue *d′* is corrugated and cooperates with the groove *d* to form a feed mechanism, the arrangement being such that if the end of a strip of suitable material of suitable width is inserted between the rolls D and D′ it is forced into the groove *d* by the tongue *d′* and fed along between the roll D and D′, by which it is bent laterally to shape it to a U-shaped lateral section and prepare it for application to the edge of the pattern.

For convenience in applying the edging to the pattern I find it desirable to provide for changing the relative lateral position of the molding and binding rolls, which, in the form shown, is accomplished by mounting the rolls D and D′ upon a horizontally-swinging arm 24, swinging with a vertical shaft 25, having suitable bearings in the frame A. The arm 24 is supported by a suitable supporting-bed 26, over which it is free to slide, and which is secured to or forms part of the frame A. A bracket 27, secured to or made integral with the arm 24, is projected through a recess 28 (see Fig. 2) in the bed 26 and carries a shoulder 29, extending along the under side of the bed 26, in which is placed a set-screw 30, arranged to bear against the bed 26 and provided with a suitable threaded bearing in the shoulder 29. By means of the set-screw 30 the arm 24 may be clamped in any desired position on the bed 26.

Rotation of the rolls D and D′ is conveniently secured as follows: The rolls D and D′ are respectively mounted upon the vertical shafts 31 and 32, (see Fig. 3,) which are provided with suitable bearings in the arm 24. The shafts 31 and 32 are projected through their bearings and carry upon the under side of the arm 24 the engaging-gears 33 and 34. The shaft 32, below the gear 34, carries a bevel-gear 35 in mesh with the bevel-gear 36 on the shaft 37. The shaft 37 is provided with suitable bearings in the bracket 27 and in the vertical shaft 25 with which the arm 24 is arranged to swing. Upon the shaft 37 is a sprocket-wheel 38, connected by the sprocket-chain 39 with the sprocket-wheel 40 on the shaft 20, which, as hereinbefore described, is in operative connection with the power-shaft 4. The sprocket-chain connection 39 will allow sufficient play for the swinging motion of shaft 37.

I find it of great importance in machines of this class to present the edging to the pattern in a longitudinally-curved form of substantially the same or greater degree of curvature than the sharpest re-entrant curve upon the pattern, for when so curved the edging can be formed to any curve on the pattern by inward pressure of the pattern toward the rolls, since the pattern is held upon the outside of the curve, (see Figs. 6 and 7,) and the curve of the edging, if not of the right degree of curvature, must be flattened or reversed, either of which results can be secured by an inward pressure of the pattern toward the rolls. The reversal of the longitudinal curve of the edging occurs upon outward curves of the pattern, as illustrated in Fig. 7, and the flattening of the longitudinal curve of the edging occurs in binding a flatter re-entrant curve upon the pattern, as illustrated in Fig. 6.

To form the molded edging upon a longitudinal curve of the desired degree of curvature I have provided the following device: Adjacent to and conveniently back of the rolls D and D′ upon the arm 24 is a post 42, from which is projected a rod 43, preferably bent laterally and provided with a friction-roll 44, which is projected toward the rolls D D′ beyond the normal path of the molded edging as it leaves the molding-rolls, the arrangement being such that the roll 44 may be engaged in the groove in the edging, and as the edging is fed along by the molding-rolls bends the same around the roll D, curving the edging longitudinally toward the rolls B B′. The amount of the curvature given to the edging, as above stated, may be varied by a radial adjustment of the rod 43, and for that purpose the post 42 is arranged to rotate in its bearings in arm 24, and a set-screw 70 is provided by means of which it may be clamped in the required position. I also find it convenient to provide for a longitudinal adjustment of rod 43 by means of a set-screw 45 in post 42.

E represents the edging, which is carried by a suitable reel 47 conveniently mounted adjacent to the machine, and which in practice I have provided with a frictional tension (not shown) to prevent the loosening of the coil of edging upon the same.

The edging E is conveniently led from the reel through a vertical slot 48 in a post 49 on the arm 24, the function of said slot being to insure the proper presentation of the edging E to the molding-rolls D and D′. I wish also to say in regard to the form and arrangement of the rolls D and D′ and associated mechanisms, as hereinbefore described, that I do not consider my invention limited thereto, for in so far as I am aware of the art the features as hereinafter defined in the claims are broadly new and do not depend upon the details of mechanism to distinguish them from the prior art; and to avoid repetition it may be said that the above statement applies to any further description of parts herein given.

In connection with the description of the binding-rolls B and B′, I should have called attention to what I term the "edge dog" 50, the function of which is to keep the edging E from springing away from the edge of the pattern when the same is turned away from the rolls B and B′—as, for example, in binding an outward curve.

As shown in the drawings, the edge dog 50 is arranged to reciprocate vertically along the rod 9, being secured thereto by suitable bolts passing through vertically-elongated bolt-holes in the dog 50. The dog 50 is bent forward and laterally to bring its bearing-point into proper longitudinal and lateral position with reference to the binding-roll B, and is sustained at the proper elevation with reference to the same when the roll B′ is in operative position by means of the spring 51. The shape of the dog 50 adjacent to its bearing-point is such that when the pattern is turned against the same in binding a re-entrant curve the dog 50 is depressed out of the way against the action of spring 51.

I will now describe the form and arrangement of the cutter as shown in the drawings.

The cutter is represented by L and is mounted upon a trunnion 60, provided with suitable bearings in the vertically-swinging arm 61 mounted upon the frame A. The cutter L may be rotated by suitable connections with the power-shaft 4, (not shown,) or independently thereof by means of an operating-handle 62, which actuates a sprocket-wheel 63 connected by a sprocket-chain 64 with a sprocket 65 on the trunnion 60. Upon one side of the cutter L, I place a table 66, which supports the pattern while the edging is being cut, and upon the other side of cutter L I place a gage 67, which regulates the depth of the cut made by the cutter. The table 66 and gage 67 are both secured to the arm 61. A spring 68 is conveniently provided, which bears against the frame A and throws the cutter out of operative position after the cut is made.

As shown in the drawings, the power-shaft 4 is driven by a suitable operating-lever 72; but it is evident that with slight variations in details of mechanism and the addition of any suitable form of clutch mechanism for stopping and starting, the machine could be readily adapted to be operated by power, and such changes would involve no departure from the essential features of my invention.

The operation of my invention as embodied in the machine of the drawings is described as follows: A coil of edging E being placed in the reel 47, and the tension (not shown) on the reel being properly adjusted, the edging E is led through the slot 48 in post 49 and the free end inserted between the molding-rolls D D′. The rolls D and D′ are then set in rotation by means of the operating-lever 72 and the connections hereinbefore described, and

the edging E is fed between the same and molded by the groove *d* and tongue *d'*. After a sufficient length of the molded edging has been passed through the rolls D D', the rod 43 having been radially adjusted to secure the desired degree of curvature, the wheel 44 is engaged in the groove of the edging, and the molded edging as it passes from the roll D D' is curved longitudinally toward the binding-rolls B B'. As the free end of the molding edging E approaches the rolls B B', the edge of a pattern is inserted in the groove therein and the pattern and edging inserted between the binding-rolls B B'. While the pattern is passing between the rolls B B' the edging is adjusted upon the edge thereof by an inward pressure of the pattern against the curved edging, the roll B^2 acting as a gage to insure the proper operation of the rolls B B' to compress the edging onto the edge of the pattern. When a corner of the pattern is reached, the rotation of the molding and binding rolls is stopped and the arm 61 swung inward until the table 66 is in position to support the pattern, when the binding-roll B' is depressed by the treadle (not shown) and the cutter still farther advanced until it is in contact with the edging, which is backed by the idle-roll B^2. The cutter L is then rotated to make the cut by means of the lever 62, the gage 67 regulating the depth of the same. After the cut is made the cutter is released and the spring 64 carries it out of the way while the roll B' is allowed to rise, and the pattern and edging again held between the binding-rolls, which are again set in operation, and by a substantial repetition of the operations, as hereinbefore described, the operation of binding the pattern is completed.

The operation of the several auxiliary devices has been sufficiently described in connection with the description hereinbefore given. I wish, however, to say in this connection that the relative rate of rotation of the molding and binding rolls is such that the edging is molded and fed to the edge of the pattern at substantially the same speed that the pattern is carried between the binding-rolls.

I claim as my invention and desire to secure by Letters Patent—

1. In a pattern binding machine the combination of a set of molding rolls, a set of binding rolls, means for feeding the molded edging from the molding to the binding rolls, and connected mechanisms for rotating the molding and binding rolls, substantially as described.

2. In a pattern binding machine the combination of a set of binding rolls, a set of molding rolls having provision for feeding the molded edging to the binding rolls, and connected mechanisms for rotating the molding and binding rolls, substantially as described.

3. In a pattern binding machine the combination of a set of binding rolls, a set of molding rolls, means for feeding the molded edging to the binding rolls, mechanism for longitudinally curving the molded edging between the molding and binding rolls, and connected mechanisms for rotating the molding and binding rolls, substantially as described.

4. In a pattern binding machine the combination of a set of binding rolls, a set of molding rolls, means for feeding the molded edging from the molding rolls to the binding rolls, means for changing the relative lateral position of the molding and binding rolls, and connected mechanisms for rotating the molding and binding rolls, substantially as described.

5. In a pattern binding machine the combination of a set of binding rolls, a set of molding rolls, means for feeding the molded edging from the molding rolls to the binding rolls, a cutter supported adjacent to the binding rolls and movable to and from an operative position, and connected mechanisms for actuating the molding and binding rolls, substantially as described.

6. The combination, with associated parts of a pattern binding machine, of a set of binding rolls, a cutter supported adjacent to the binding rolls, means for moving said cutter to and from an operative position, and a table movable with said cutter arranged to support the pattern while the cut is being made, substantially as described.

7. The combination, with associated parts of a pattern binding machine, of a set of binding rolls, a cutter supported adjacent to the rolls, means for moving said cutter to and from an operative position, and a gage movable with said cutter for determining the depth of the cut made thereby, substantially as described.

8. The combination, with associated parts of a pattern binding machine, of a set of binding rolls, and a vertically movable spring supported edge dog adjacent to said rolls, substantially as described and for the purposes specified.

9. In a pattern binding machine the combination of a set of binding rolls, a set of molding rolls, means for feeding the molded edging from the molding rolls to the binding rolls, a device for longitudinally curving the molded edging between the binding and molding rolls, and means for adjusting said device to regulate the curve imparted to the edging thereby, substantially as described.

10. The combination, with associated parts of a pattern binding machine, of a set of molding rolls, and a device supported adjacent to said rolls adapted to receive the molded edging from said rolls and bend it to form a longitudinal curve in said edging, substantially as described.

11. The combination, with associated parts of a pattern binding machine, of a set of molding rolls, and a device supported adjacent thereto, out of the normal path of the

edging, adapted to enter the groove in the edging and bear against the same to form a longitudinal curve therein, substantially as described.

12. In a pattern binding machine the combination of a set of binding rolls, a set of molding rolls whereby the edging is molded and fed to the binding rolls, a device shaped to enter the groove in the edging and arranged to bend the same longitudinally toward the binding rolls and connected mechanisms for actuating the molding and binding rolls, substantially as described.

In testimony whereof I have hereunto set my hand, at Lynn, this 18th day of April, 1895, in the presence of two attesting witnesses.

WALTER L. C. NILES.

Witnesses:
BENJAMIN PHILLIPS,
ERASTUS E. WINKLEY.