2 Sheets—Sheet 1.

C. SPOFFORD.

Paper-Collar Machine.

No. 198,424. **Patented Dec. 18, 1877.**

Fig.1.

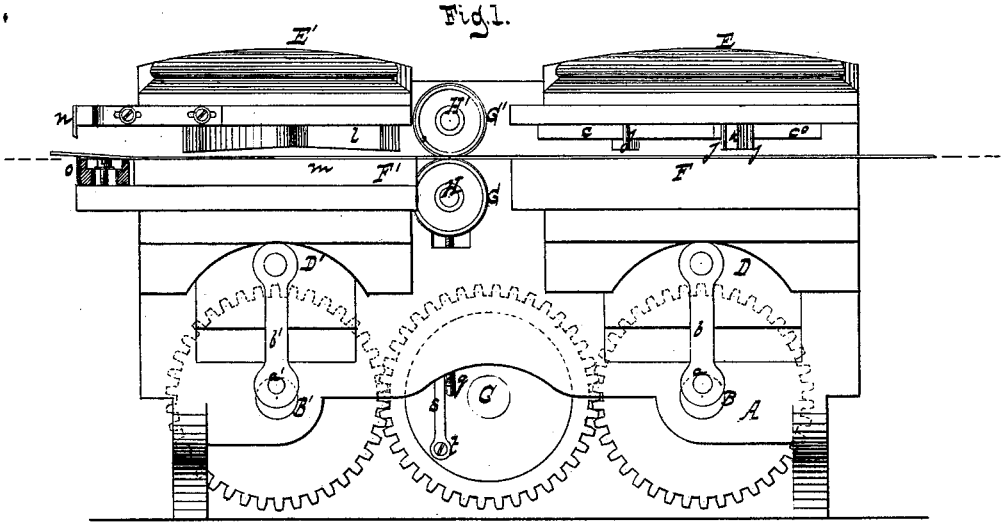


Fig.2.

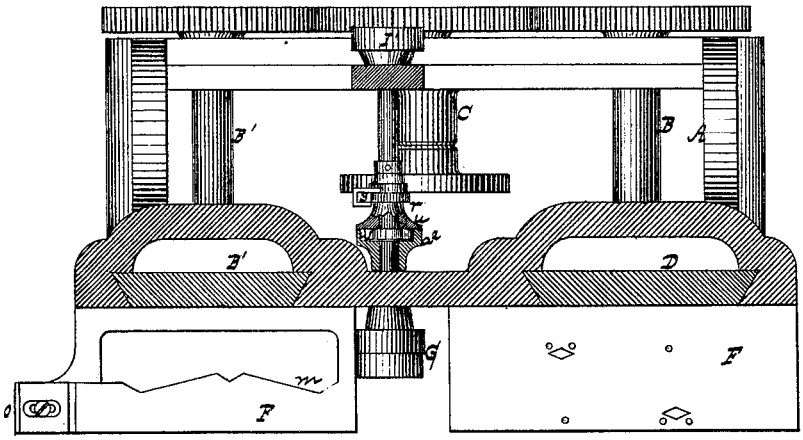


Fig.4.

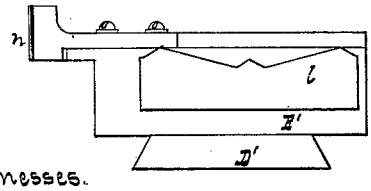


Fig.5

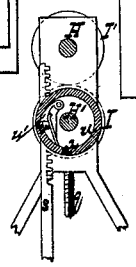
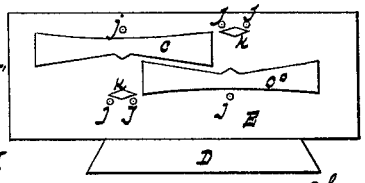


Fig.3.



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Paper-Collar Machine.

No. 198,424. Patented Dec. 18, 1877.

Fig. 6.

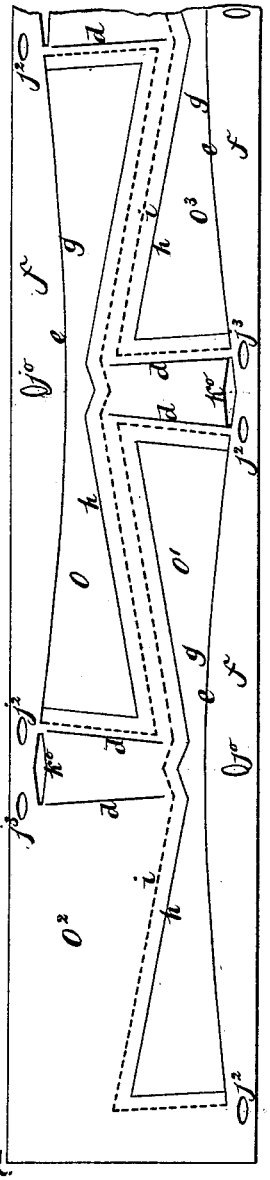
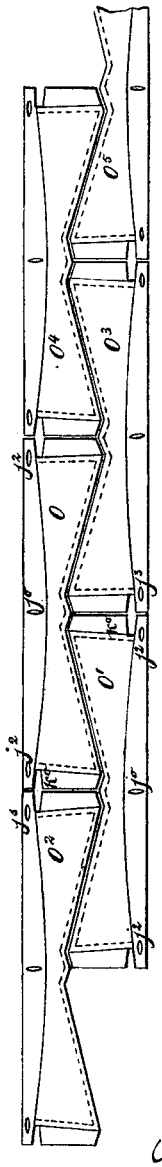


Fig. 7.



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UNITED STATES PATENT OFFICE.

CHARLES SPOFFORD, OF NEW YORK, N. Y., ASSIGNOR TO HIMSELF AND JAMES H. HOFFMAN, OF SAME PLACE.

IMPROVEMENT IN PAPER-COLLAR MACHINES.

Specification forming part of Letters Patent No. **198,424**, dated December 18, 1877; application filed June 6, 1876.

To all whom it may concern:

Be it known that I, CHARLES SPOFFORD, of the city, county, and State of New York, have invented a new and useful Improvement in Machines for Manufacturing Paper Collars and other Articles, which improvement is fully set forth in the following specification, reference being had to the accompanying drawing, in which—

Figure 1 represents a sectional front view of my machine. Fig. 2 is a sectional plan of the same. Fig. 3 is an inverted plan of the embossing and punching die. Fig. 4 is a similar view of the cutting-die. Fig. 5 is a sectional view of the feed mechanism. Fig. 6 is a plan of the strip of paper after the same has passed under the embossing and punching die. Fig. 7 is a similar view of the same after the strip has been acted on by the embossing and punching die, and also by the cutting-dies.

Similar letters indicate corresponding parts.

The object of this invention is the application of dies to the process of embossing, punching, and cutting collars from a strip of material having parallel edges, and of a width equal to the sum of the greatest and least width of the collars to be produced, said dies being arranged and operating in such a manner that by each downward motion of the head carrying the embossing and punching dies the creases and imitation stitches are produced, the middle button-holes and one of the end button-holes for each of these, and also an end button-hole for the collars contiguous to said two collars, are punched out, and at the same time the contiguous ends of two pairs of collars are shaped, and by each downward motion of the cutting-dies the top edge of one and one-half of the top edge of each of two adjoining collars are shaped, and after the second stroke of the machine two complete collars are cut off for each downward stroke of the cutting-dies.

With the embossing and punching dies, and with the cutting dies, are combined two feed-rollers, which bear upon the strip of material from which the collars are to be cut, and the circumferences of these rollers correspond to the length of the collars to be produced, so that for each complete up-and-down stroke of said dies the material is moved forward for a distance corresponding to the length of the collars to be produced, and the operation of creasing, embossing, punching, shaping, and cutting off the collars is carried on automatically, with economy in labor and in stock.

In the drawing, the letter A designates the frame of my machine, which forms the bearings for two shafts, B B′, which are geared together with the driving-shaft C, so that they rotate with the same speed. The shafts B B′ connect, by eccentric wrist-pins a a^1 and pitman-rods b b', with slides D D′, to the upper ends of which are secured the heads E E′.

The head E carries the dies c c^o, which are intended to produce the creases d d, for folding the ends of the collars, the crease e between the neck-band f and the body g of each collar, the embossed lines h, and the imitation stitches i. (See Fig. 6.) In the same head are also secured punches j, for the button-holes, and punches k, for shaping the ends of contiguous collars.

Opposite to the head E, and firmly secured to the frame A, is a platform, F, which supports the material from which the collars are to be cut during the operation of creasing, embossing, and punching, and which is provided with holes to receive the punches j and k.

The surface of the platform F opposite to the creasing and embossing dies may be provided with a cushion of leather or other suitable material.

The head E′ carries the male cutting-die l, which co-operates with a stationary female die, m, secured to a platform or bed-plate, F′, which is fastened to the frame A, and situated opposite to the head E′. The bed-plate or support F′ upholds the series of undivided collars on one side of the strip, while the female die m, which bounds or adjoins the said support, is acting with the male portion l, to sever from the series on the opposite side of the strip a collar, which is dropped through the female part m. To the head E′ is also secured a cutter, n, which co-operates with a cutting-edge, o, secured to the platform F, both the cutter n and cutting-edge o being adjustable, so that their position can be regulated to correspond to collars of different length. Between the

platforms F F′ are situated the feed-rollers G G′.

The roller G′ is mounted on a shaft, H′, which has its bearings in the frame A, while the roller G is mounted on a shaft, H, the bearings of which are in journal-boxes, which move in guide-slots in the frame A, and are subjected to the action of set-screws *q*, so that the roller G can be held in close contact with the roller G′. On the outer or rear ends of the shafts H H′ are secured disks I I′, equal in diameter to the rollers G G′, so that when the journal-boxes are forced upward until the faces of the disks and of the rollers are in close contact, the shafts H H′ are parallel to each other, and the rollers G G′ are brought in contact throughout their entire width.

On the shaft H is mounted a pinion, *r*, which is in gear with a rack-bar, *s*, that connects with an eccentric wrist-pin, *t*, secured in a disk which is mounted on the driving-shaft. With the pinion *r* is combined a clutch, *u*, of such a construction that said pinion is free to revolve in one direction independent of its shaft; but if the same is rotated in the opposite direction, such motion is transmitted to the shaft H, together with the feed-roller G.

The clutch which is shown in the drawing consists of a spring-pawl, *w*′, which is situated in a cavity in the pinion *r*, and which, when the pinion is moved in one direction, engages with a shoulder, *v*, formed in a disk, a^2, which is firmly mounted on the shaft H′; but if the pinion is turned in the opposite direction, the pawl *w*′ slides over the shoulder *v*, and the shaft H′ remains stationary. It is obvious that various devices can be substituted for this clutch without deviating from my invention.

Motion is imparted to the shaft H and feed-roller G by the stroke of the rack-bar *s*, which causes the feed-roller to make one entire revolution. The diameter of the feed-roller corresponds to the length of the collar to be produced, and I use feed-rollers of different diameter in order to produce collars of different length.

The material from which the collars are to be cut is prepared in a long strip equal in width to the sum of the greatest and smallest width of the collars to be produced, and this strip is, by preference, formed into a roll, from which it is drawn through my machine by the action of the feed-rollers G G′.

By the first downstroke of the head E are produced the creases, embossed lines, and imitation stitches of two collars, O O^1; also, the middle button-holes j^0 for both these collars, one of the end button-holes j^2 for each of these collars, one for the end button-holes j^3 for each of the contiguous collars O^2 O^3, and the apertures k^0 for shaping the ends of the contiguous collars O O^2, and also of the contiguous collars O^1 O^3, Fig. 6.

On the first stroke the collars O^1 and O^2 remain incomplete, and the strip of paper does not extend under the cutting-dies. As the head E rises the motion of the feed-rollers takes place, and the strip of paper is carried forward, so that the collar O will be situated under the cutting-die *l*, and the outer end of the collar O^1 under the cutter *n*, and as the two heads E E′ descend, the collar O is cut out, one-half of the top edge of the collars O^1 and O^3 is formed, and the outer end of the collar O^1 is cut off. At the same time the collars O^4 and O^5 are embossed and creased, and provided with holes, as above described, and on the next stroke the machine is in full operation.

The cutting-die *l* cuts off the complete collar O^4, and the cutter *n* cuts off the collar O^1, so that two collars, O^4 and O^1, drop down, while the second half of the top edge of the collar O^3 and the first half of the top edge of collar O^5 are shaped; and as the operation of the machine progresses, two complete collars are formed by each up-and-down stroke of the heads E E′.

The collars from the series O^2 O O^4 are, by the action of the die *l m*, cut one at a time, by a shear-cut, and dropped through the female die *m*. The collars from the opposite series remain in an undivided condition until after they pass the die, being upheld by the support or bed-plate that adjoins the die, and are then severed one by one from the strip by means of the cutter *n*.

During this whole operation only that portion of the material is wasted which is punched out by the punches *k*. The cutting-die *l* cuts off one complete collar and shapes the top edges of the two adjoining collars, and the cutter *n* cuts off a collar previously completed, while the creasing, embossing, and punching die prepares and finishes two additional collars, to be cut off by the next stroke of the cutters.

What I claim as new, and desire to secure by Letters Patent, is—

1. A cutting-die, constructed substantially as described, to shape the top edge of one complete collar and one-half of the top edges of two adjoining collars, the ends of which are opposite to the middle of the first collar, and also to separate two contiguous collars, as set forth.

2. In combination with a cutting-die arranged to shape the top edge of one complete collar and one-half of the top edges of two adjoining collars, the ends of which are opposite to the middle of the first collar, button-hole punches so arranged as to cut four end button-holes and two center button-holes in different collars, substantially as set forth.

3. In combination with a cutting-die arranged to shape the top edge of one complete collar and one-half of the top edge of two adjoining collars, the ends of which are opposite to the middle of the first collar, creasing and stitch-embossing dies, constructed and operating substantially as shown and described.

4. In combination with a cutting-die ar-

ranged to shape the top edge of one complete collar and one-half of the top edge of two adjoining collars, the ends of which are opposite to the middle of the first collar, a cutter, *n*, constructed and operating substantially as set forth.

5. The combination, substantially as set forth, in a machine for making paper collars from a strip of paper by the interlocking method, as described, of a male cutting-die, a bed-plate or support to uphold one series of undivided collars, and an adjoining female die, against which the male die acts to form the longer contiguous edges of the collars of both series, and to sever and drop through the female die, one by one, the collars from that series which is not upheld by the bed-plate or support.

In testimony that I claim the foregoing I have hereunto set my hand and seal this 26th day of May, 1876.

CHARLES SPOFFORD. [L. S.]

Witnesses:
J. VAN SANTVOORD,
E. F. KASTENHUBER.