3 Sheets—Sheet 1.

C. SPOFFORD.

Paper-Collar Machine.

No. 209,628. Patented Nov. 5, 1878.

Fig. 1.

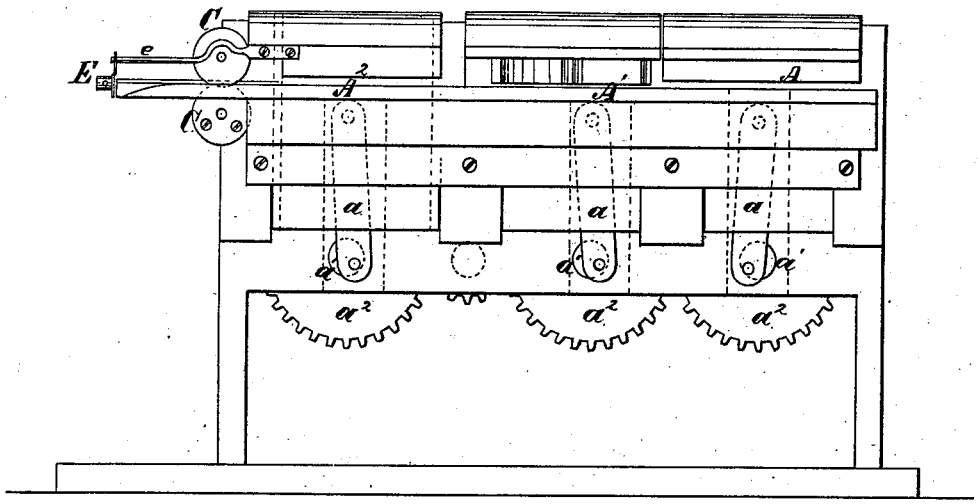
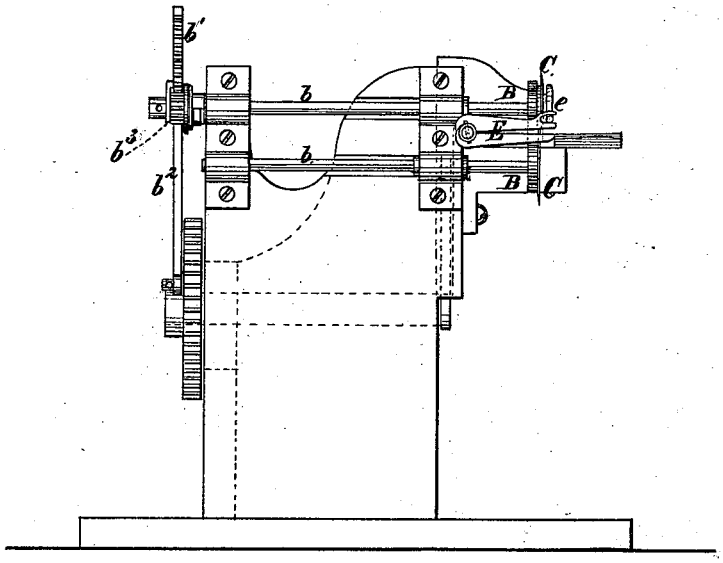


Fig. 2.



Witnesses:
Henry Eidlitz
B. C. Clarke

Inventor:
Charles Spofford
per J. P. Fitch
Atty

C. SPOFFORD.

Paper-Collar Machine.

No. 209,628. Patented Nov. 5, 1878.

Fig. 3.

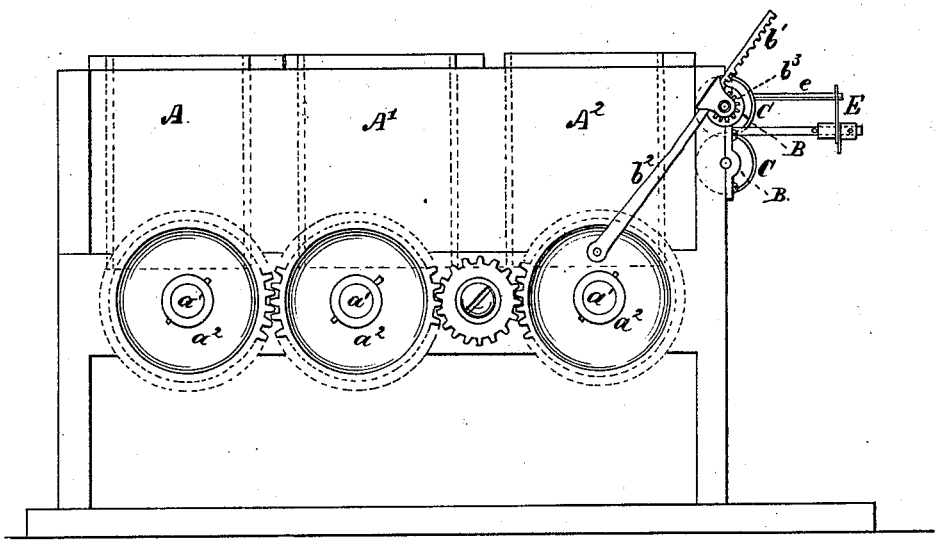


Fig. 4.

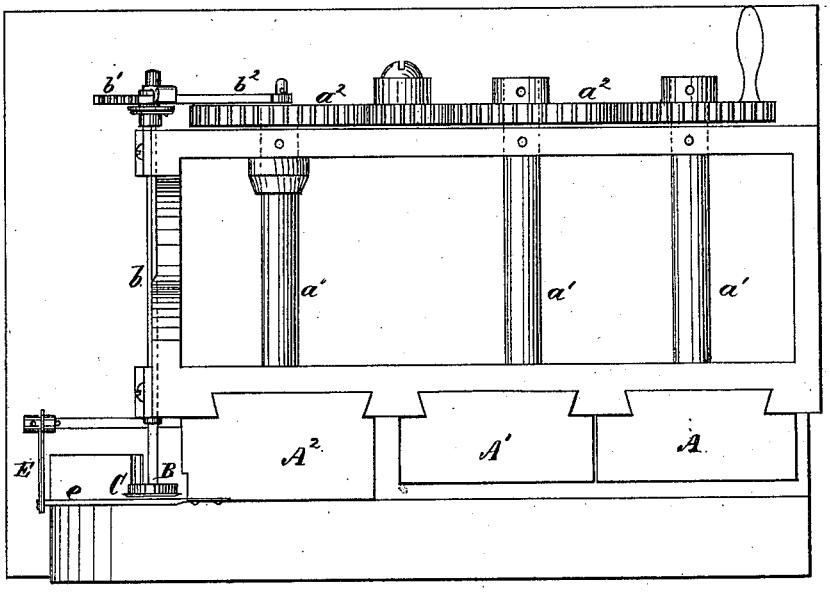


Fig. 5.

Witnesses:

Henry Eichling.

B. S. Clark

Inventor:

Charles Spofford

per D. P. Fitch Atty

3 Sheets—Sheet 3.

C. SPOFFORD.

Paper-Collar Machine.

No. 209,628. **Patented Nov. 5, 1878.**

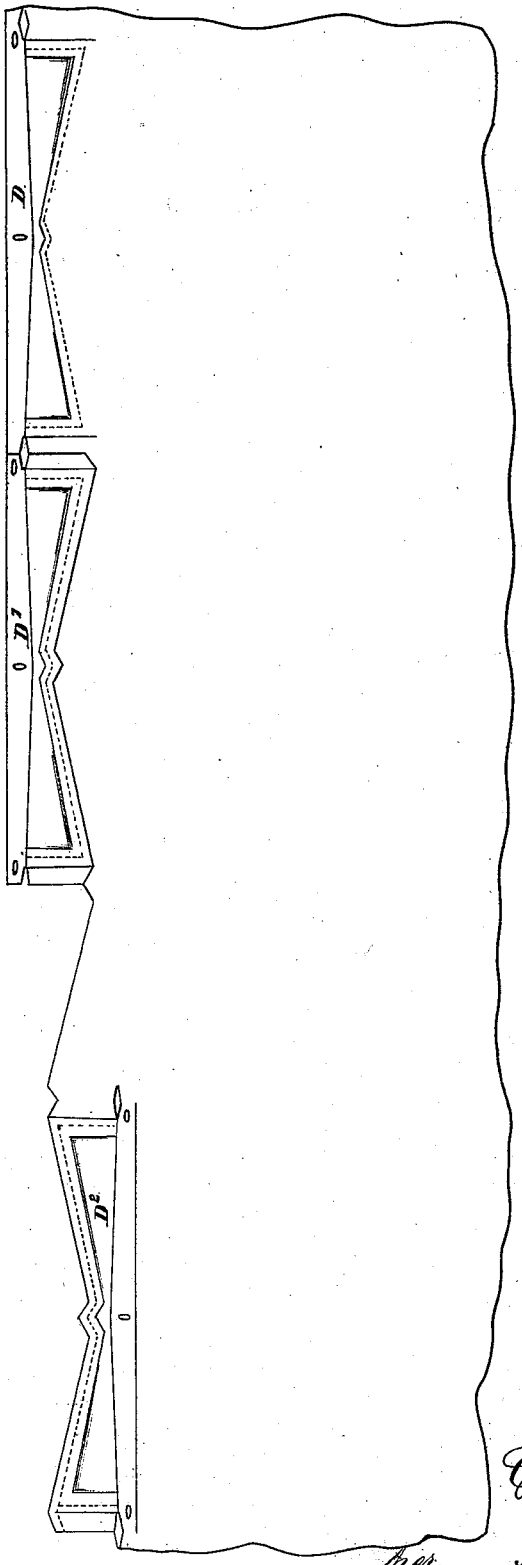


Fig. 6.

Witnesses:

Henry Eichling.

B. C. Clark

Inventor:

Charles Spofford

per J. P. Fitch. Atty

UNITED STATES PATENT OFFICE.

CHARLES SPOFFORD, OF NEW YORK, N. Y.

IMPROVEMENT IN PAPER-COLLAR MACHINES.

Specification forming part of Letters Patent No. **209,628**, dated November 5, 1878; application filed June 27, 1878.

To all whom it may concern:

Be it known that I, CHARLES SPOFFORD, of the city, county, and State of New York, am the inventor of certain Improvements in Machines for Making Paper Collars, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to a machine for making paper collars, in which the collars are stamped and cut from strips of paper by dies provided with reciprocating plungers; and my invention consists in the combination, with the collar-forming dies, of the rotary cutters, hereinafter described and shown, whereby the strips from which the collars are formed by the dies are cut from sheets of paper employed conjointly with the forming of the collars by the dies, the cutters being actuated by the same motive-gear which drives the other parts of the machine, as hereinafter described; and my invention also consists in the peculiar arrangement of the dies, in their relation to each other, whereby at the same time that a collar is stamped by one die, and the collar just previously stamped by said die is cut out by another die, longitudinally adjacent to said first-named die, on one edge of a strip of a width equal to the sum of the greatest and least width of the collars produced. A collar is stamped by a third die upon the other edge of the strip, and laterally adjacent to the cut made by said second-named die in forming the collars upon the opposite edge of the strip, as hereinafter particularly set forth.

And my invention further consists in the feed-rollers, hereinafter described, in combination with the rotary cutters, and arranged to operate as specified.

Figure 1 is a front elevation of a paper-collar machine embodying my invention. Fig. 2 is an end elevation of the same. Fig. 3 is a rear elevation of the same, showing the driving-gears. Fig. 4 is a plan of the same. Fig. 5 is a view in detail of the loose pinion, with its ratchet and pawl and its engaging rack, which I employ to communicate from the driving-gears to the feed-rollers and rotary cutters the desired intermittent rotary motion; and Fig. 6 is a plan of the sheet of paper fed to my machine, showing the manner in which the collars are formed thereon by the dies, arranged as described.

A, A^1, and A^2 are dies, provided with suitable plungers, and mounted on a frame or table, as shown. The plungers are given a vertical reciprocating motion in their dies by means of the rods *a*, eccentrically connected with the shafts a^1, which are driven by the gears a^2, as shown.

At B are shown the feed-rollers. These are arranged one above and one below the table, and their rims meet in a slot in the table on the line of the top thereof. The rollers are mounted on the shafts *b*, and are given an intermittent rotary motion from the gears a^2 by means of the rack b^1 on the rod b^2, which is operated by one of the gears, a^2, as shown, engaging the loose pinion b^3, on one of the shafts, *b*, the said pinion having a ratchet, with which engages a spring-pawl on a hub-piece fixed on the shaft. The movement of the rack on the pinion will, by this arrangement, operate to rotate the shaft *b* intermittently in the same direction, and the arrangement is such that this rotation of the rollers will occur while the plungers are raised from the dies and cease while the plungers are in the dies.

At C are shown my improved rotary cutters. These cutters are in the form of disks, and may be conveniently fixed upon the perimeters of the feed-rollers B, as shown, their cutting-edges being arranged to lap each other. By this means the cutters C are given the rotary motion necessary to accomplish the cutting of the strip from which the collars are formed from the paper sheet.

It is obvious, however, that the cutters may be mounted on shafts of their own, and driven by gearing suitably connected with the motive-gear of the machine. The cutters should be arranged and adjusted in their relation to the dies, so as to cut from the sheet fed to the machine a strip equal in width to the sum of the greatest and least width of the collars to be produced.

The feed-rollers are placed at that end of the table of the machine toward which the paper strip travels in being fed to the machine

and beyond all of the dies, and hence the paper is drawn along the table through the machine, and thus fed to the dies successively, and thereby the crumpling of the paper on the table, and consequent waste, which occurs when the paper is pushed along the table in feeding the dies, is wholly avoided.

It is evident that by means of my rotary cutters the strip from which the collars are formed will be cut from the sheet of paper fed to the machine conjointly with the forming of the collars by the dies, the rotary cutters being actuated by the same motive-gearing, a^2, as the dies, and that hence the cutting of the paper sheets into strips before being fed to the machine by a separate and distinct operation is avoided, and the paper employed may be used and fed to the machine in the wide-sheet form in which it is usually manufactured.

The dies in my machine are arranged as follows: The die A is placed at one end of the table, as shown, and stamps the collar (seen at D, Fig. 6) upon one edge of the paper strip formed by the rotary cutters from the sheet fed to the machine. The die A^1 is placed longitudinally adjacent to the die A, and cuts out the collar stamped by the die A, as seen at D^1, Fig. 6.

The collars cut by the die A^1 fall through said die, and are thus carried out of the machine, an opening in the table of the machine, below said die, and extending through said die, being provided for this purpose.

The die A^2 is arranged to stamp a collar upon the opposite edge of the strip formed from the sheet by the rotary cutters, and the said die being placed, as shown, at a distance from the die A^1 equal to one-half the length of a collar formed by the dies, the collar stamped by said die A^2, laterally adjacent to the cut made by the die A^1, has one edge thereof formed by the said cut of the die A^1, as seen at D^2, Fig. 6.

The other edge of the collar, stamped by the die A^2, is formed or cut by the rotary cutters, which, as hereinbefore specified, are arranged and adjusted to cut the strip from which the collars are formed equal in width to the sum of the greatest and least width of the collars formed thereon by the machine.

The collars stamped by the die A^2 are severed from the strip in which they are formed by the cross-cutting shears E, which are placed on the table of the machine at a distance from the die A^2 equal to the length of a collar.

The shears E are arranged at right angles to the paper strip, and one blade is given a vertical vibrating motion by the rod *e*, fixed on the plunger of said die A^2, and engaging the end of said blade, to accomplish the severing of the collars D^2 from the strip.

When the machine is in operation it is evident that at each movement of the plungers of the dies A A^1 A^2 a collar will be stamped by the die A, and the collar stamped immediately before by said die will be cut by the die A^1 on one edge of the strip formed by the cutters C from the sheet, said collar thus formed being dropped through the die A^1, and through the opening in the table below said die, and thus out of the machine, and a collar will be stamped by the die A^2 upon the opposite edge of said strip, laterally adjacent to the cut made by the die A^1, and said cut constituting one edge of said collar, while the shears E will sever from the strip the collar stamped immediately before by the die A^2; and that the cut made by the die A^1 is made to constitute one edge of the collar stamped by the die A^2, by the placing of said die A^2 at a distance from the die A^1 equal to one-half the length of a collar formed by the dies.

It is obvious that the dies, arranged as specified, will perform their functions, forming the collars, as described, when the rotary cutters C are dispensed with, the paper sheet employed being cut into strips of proper width by a separate operation before being fed to the machine.

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

1. In a machine for making paper collars, the combination of the collar-forming dies with the rotary cutters C, actuated by the motive-gearing of the machine, and arranged to cut the strip from which the collars are formed from the sheet employed conjointly with the forming of the collars, as described.

2. In a machine for making paper collars, the dies A and A^1, longitudinally adjacent to each other, and arranged to form a collar on one edge of a paper strip of a width equal to the sum of the greatest and least width of the collar produced, and the die A^2, placed at the distance of one-half a collar from the die A^1, to stamp a collar upon the opposite edge of the strip, as and for the purpose specified.

3. In a machine for making paper collars, the intermittently-rotating feed-rollers B, carrying the cutters C, arranged on the table of the machine on the end toward which the paper travels when fed, whereby the paper, in feeding the machine, is drawn along the table by said rollers to the dies successively, and the strip from which the collars are formed is cut therefrom, as and for the purpose specified.

CHAS. SPOFFORD.

Witnesses:
A. S. FITCH,
M. F. CLIFTON.