2 Sheets--Sheet 1.

S. S. GRAY.

Collar and Tag-Cutting-Machines.

No. 145,941. Patented Dec. 30, 1873.

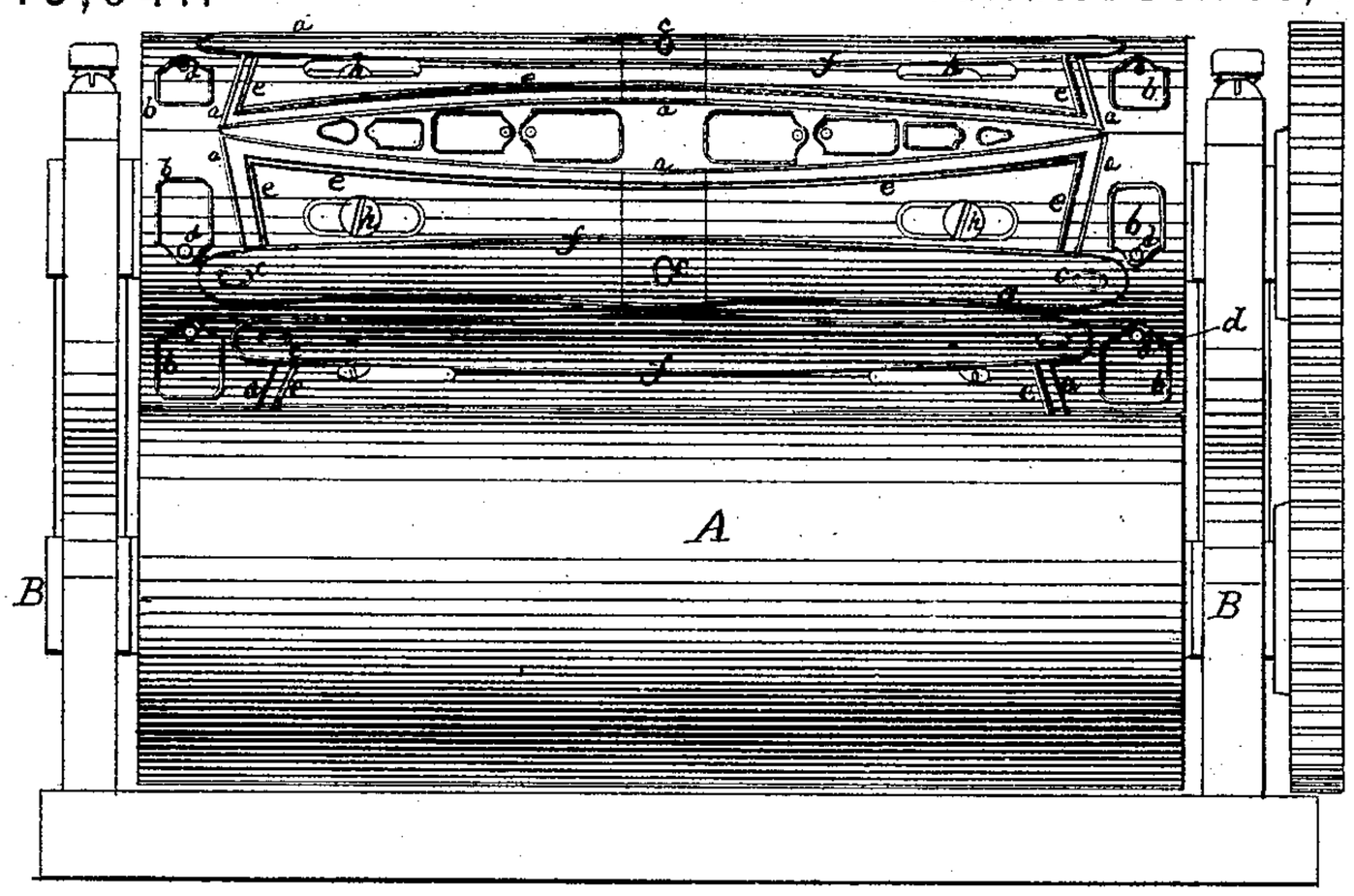

Fig. 1.

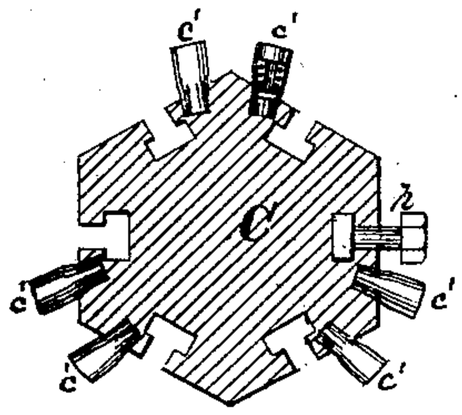

Fig. 15.

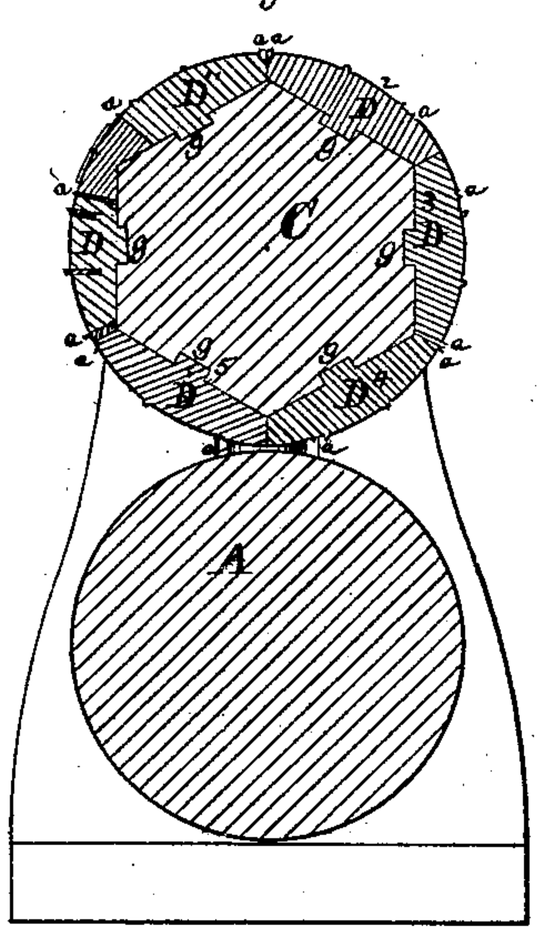

Fig. 2.

Witnesses.

N. C. Lombard

David T. Pray.

Inventor.

Solomon S Gray

2 Sheets--Sheet 2.

S. S. GRAY.

Collar and Tag-Cutting-Machines.

No. 145,941. D

Patented Dec. 30, 1873.

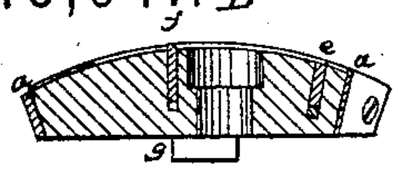

Fig. 9.

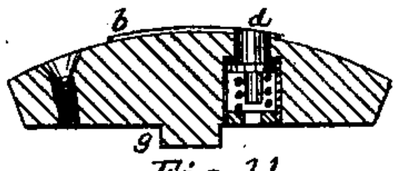

Fig. 11.

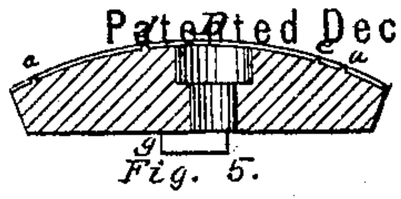

Fig. 5.

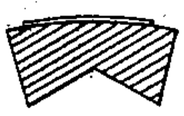

Fig. 13.

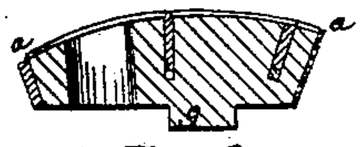

Fig. 8.

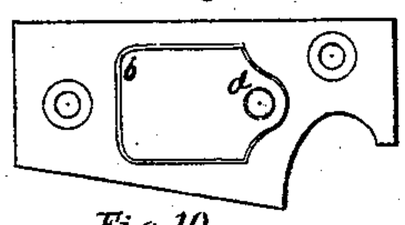

Fig. 10.

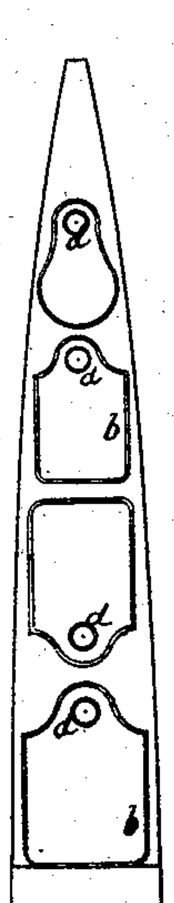

Fig. 12.

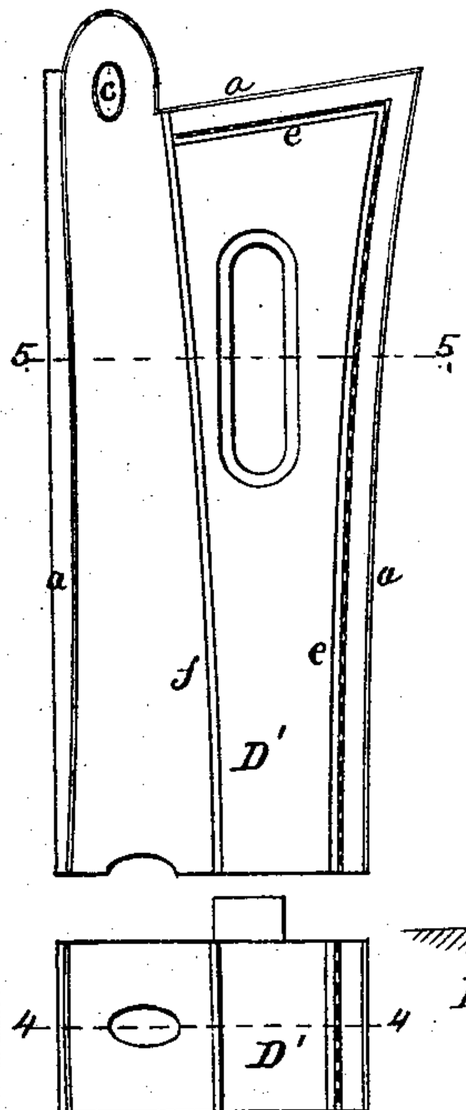

Fig. 6.

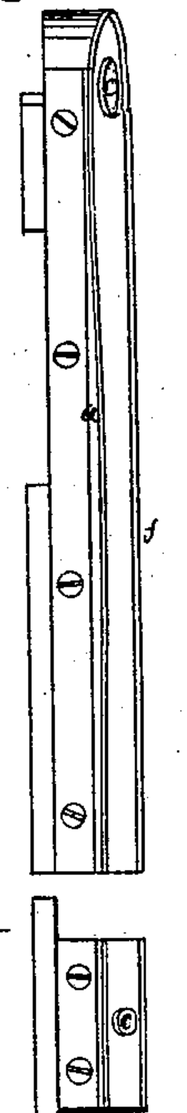

Fig. 7.

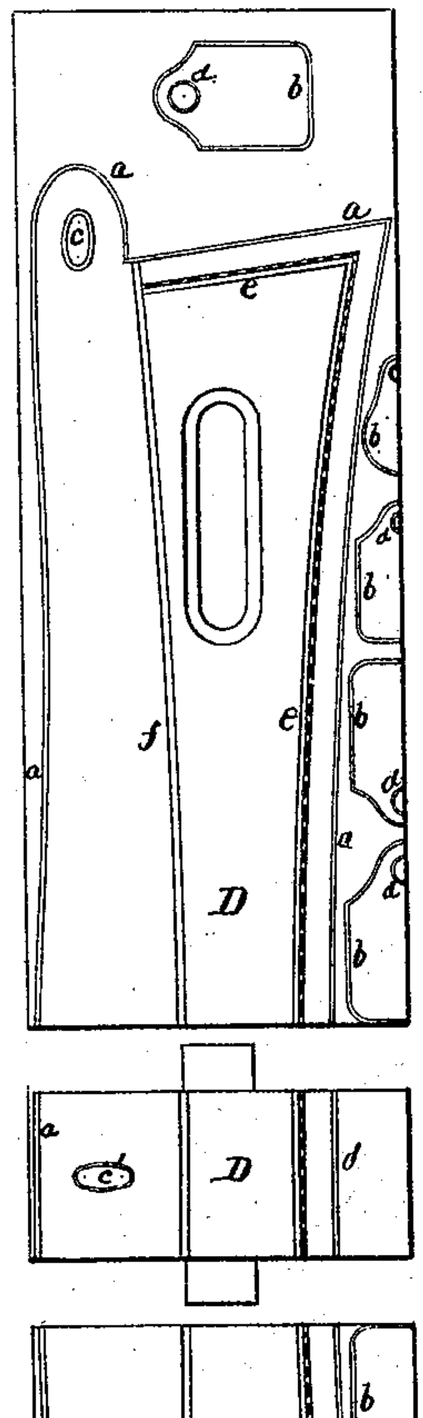

Fig. 3.

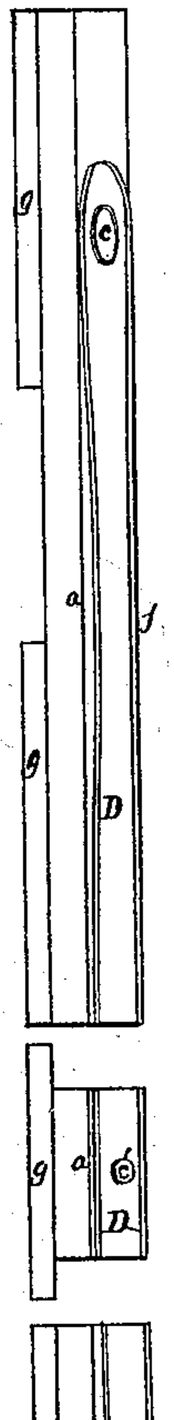

Fig. 4.

Witnesses.

N. C. Lombard

David T. Pray.

Solomon S. Gray Inventor.

UNITED STATES PATENT OFFICE.

SOLOMON S. GRAY, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN COLLAR AND TAG CUTTING MACHINES.

Specification forming part of Letters Patent No. **145,941**, dated December 30, 1873; application filed May 28, 1872.

To all whom it may concern:

Be it known that I, SOLOMON S. GRAY, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Collar and Tag Machines, of which the following is a specification:

My invention relates to a rotary machine for cutting and embossing collars and forming button-holes therein at one operation; and it consists, first, in the use of two cylinders arranged in bearings parallel to each other, so as to rotate in unison with each other, one of said cylinders having a hardened surface made round and straight, while the other has formed upon its periphery a series of steel knives of the proper shape for a collar suitably arranged thereon, as shown, said knives being formed by inserting a thin blade of steel in grooves formed therein for the purpose, or the cylinders may be engraved, leaving the steel to form the cutting-knives of the full diameter of the cylinder, and cutting away or otherwise removing the stock on said cylinder between and around said lines, said cutting-knives or dies having a thin, smooth, square edge reduced nearly to a cutting-knife edge, but left just blunt enough upon the edge to prevent an injurious action of the bed-roll on the cutters. It consists, further, in the formation upon the die-cylinder of an equal number of stitch and fold embossing dies arranged in their appropriate places with relation to the outline cutting-knives, and constructed in the same manner as described for the cutting-knives. It also consists in the formation on said cylinders in their proper relation to the collar-forming knives of button-hole-forming knives, all of which are constructed with a blunt knife-edge arranged to cut onto a hard cylindrical surface.

Figure 1 of the drawings is a front elevation of a pair of cylinders embodying my invention. Fig. 2 is a vertical transverse section on line 2 2 of Fig. 1. Figs. 3 and 4 are, respectively, a plan and edge view of the three pieces which make up one of the sections of the cylinder covering, made of steel and having the collar-forming knives or dies, the button-hole punches, the stitching-dies, the fold-line embossing-dies, and the tag-forming or cutting dies formed thereon by engraving the same or cutting away the surplus stock, and thus forming the necessary raised surface, said three pieces being drawn slightly separated in order to show their construction. Fig. 5 is a transverse section on line 3 3 on Figs. 3 and 4. Figs. 6 and 7 are, respectively, a plan and edge view of another section of the cylinder covering, or so much of it as is occupied by the collar-forming die, in which the dies are made from thin steel and inserted in grooves formed for the purpose in softer metal. Fig. 8 is a section on line 4 4, and Fig. 9 is a section on line 5 5, on Figs. 6 and 7. Fig. 10 is a plan, and Fig. 11 a transverse section, of a portion of the cylinder covering made to fit the end of the portion shown in Figs. 6 and 7, and provided with the tag-cutting die. Figs. 12 and 13 are, respectively, a plan and a transverse section of a portion of the die-surface which fits between the curved sides of two collar-dies, when constructed as shown in Figs. 6 and 8, said piece to be made in three pieces, as indicated by the lines *x x*. Fig. 14 is an enlarged transverse section of the cutting-knives. Fig. 15 is a transverse section of the core of the die-cylinder, showing a modification of the manner of securing the die-segments in position and the cutters for forming the center button-holes.

In the drawings, A is the lower or bed cylinder having a hardened surface, and mounted in the bearings B in the frame of the machine. C is the core of the upper cylinder made with any suitable number of sides, and having fitted to each side thereof a segment of the cylinder covering D, D^1, D^2, D^3, D^4, and D^5, the outer surface of said segments being turned round and straight, and having engraved or otherwise formed thereon the collar-cutting die *a*, the tag-cutting dies *b*, the button-hole dies *c*, and the eyelet-punch *d*, all parts of the edges of which are equidistant from the center of the cylinder, and made with a thin knife-edge, the converging sides of which do not meet in a point or sharp cutting-edge, but the edge is ground off blunt, as shown in Fig. 14. As these dies or knives cut directly on a hardened steel or chilled-iron cylinder, it is evident that a sharp knife-edge could not be used to advantage, but an edge of the kind

shown in Fig. 14, made just thick enough to resist abrasion by its contact with the hard cylinder A, with sufficient pressure thereon to force said knives through any paper that may be passed between said rolls, will make a clean cut through said paper, and the dies will be kept in good condition by their contact with the cylinder A. The segments D, D^1, D^2, D^3, D^4, and D^5 are also provided with the stitching-dies *e* and the fold-line embossing-die *f* engraved or otherwise formed thereon, said dies being made somewhat shallower, or with their outer edges somewhat nearer to the center of said cylinder, than the cutting-dies, so as not to cut the paper, but only to emboss it.

Two modes of constructing the dies and their supporting-segments are illustrated at D and D^1, as shown in Figs. 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, and 13.

The segment D, (shown in Figs. 3, 4, and 5,) illustrating one of the modes of construction, is made of steel, and engraved upon its curved surface by cutting away the stock, so as to leave the cutting dies or knives of the desired shape for a collar, and various sizes and styles of tags projecting beyond the other portions of said segment, and also the die for embossing the fold, and the stitching-dies, as shown. The segment D is made in three parts, as shown in Figs. 3 and 4, the two end pieces each having formed thereon a cutting-die, stitch and fold embossing dies, of proper shape and length to form just one-half of the shortest collar without the use of the intermediate piece, with cutting-dies for forming one or more tags from the stock that would otherwise be wasted in forming the ends of the collars, and also one-half of a series of tag-cutting dies, of different sizes and styles, for utilizing the waste that would otherwise be made between the curved tops of two contiguous collars, the other half of said dies being formed on the contiguous edge of the next segment, as shown in Fig. 1.

The segment D^1 is made up of the parts shown in Figs. 6, 7, 8, 9, 10, and 11, and one-half of the piece shown in Figs. 12 and 13. This segment is made of soft metal, and the cutting-die *a* is made of steel, and secured to the edge of the segment in any suitable manner, the edge projecting above the level of the surface of the segment. The stitching-dies *e* and the fold-line embossing-die *f* are inserted in grooves formed in the segment for the purpose; as shown in Figs. 8 and 9, as are also the end button-hole dies *c* and the tag-cutting dies *b*, all of said dies being made of steel and tempered. That part of the segment D^1 bounded by the collar-cutting dies is made in three parts, only two of which are used in making the shortest collar; but the third piece is used for every other size of collar, its length being varied according to the length of the collar to be made.

The segments D, D^1, D^2, D^3, D^4, and D^5 are each provided with a tongue, *g*, which fits into a groove provided for the purpose in the core C, and parallel to the axis thereof, the tongue upon the middle portion of the segment being made long enough to extend under the end portions of the same, so that it may be held in position on the core by said end portions, which are secured to the core by means of the screws *h h* passing through slots in the segments, and screwed into the core, the heads of said screws being sunk below the surface of the outer face of the segment, as shown.

The holding screws or bolts *h h* may have T-shaped heads, fitted to slide in correspondingly-shaped slots formed in the sides of the core C, with nuts upon their outer ends, as shown in Fig. 15.

The center button-hole cutters *c'* are set in the core C, as shown in Fig. 15, and project through a hole in the changeable center-piece of the die-sections provided for the purpose, and are provided with the spring-plunger *r* to remove the piece of paper cut out in forming the button-hole.

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

1. The method of cutting collars, tags, cards, and other like articles from paper, paper and cloth combined, or other suitable material, by means of a series of blunt-edged knives of the proper form, arranged upon the surface of a cylinder, and to revolve, under pressure, in contact with a chilled or hardened cylindrical surface, substantially as described.

2. The die-cylinder, made up of the core C, of any suitable shape, and the segments D, D^1, D^2, D^3, D^4, and D^5, secured thereto, so they may be adjusted thereon, and having formed thereon cutting and embossing dies for shaping collars, embossing the stitching and line of fold thereon, and tag or card cutting dies, constructed and arranged to cut onto a cylinder having a hardened surface, substantially as described.

Executed at Boston, Massachusetts, this 24th day of May, A. D. 1872.

SOLOMON S. GRAY.

Witnesses:
N. C. LOMBARD,
DAVID T. PRAY.