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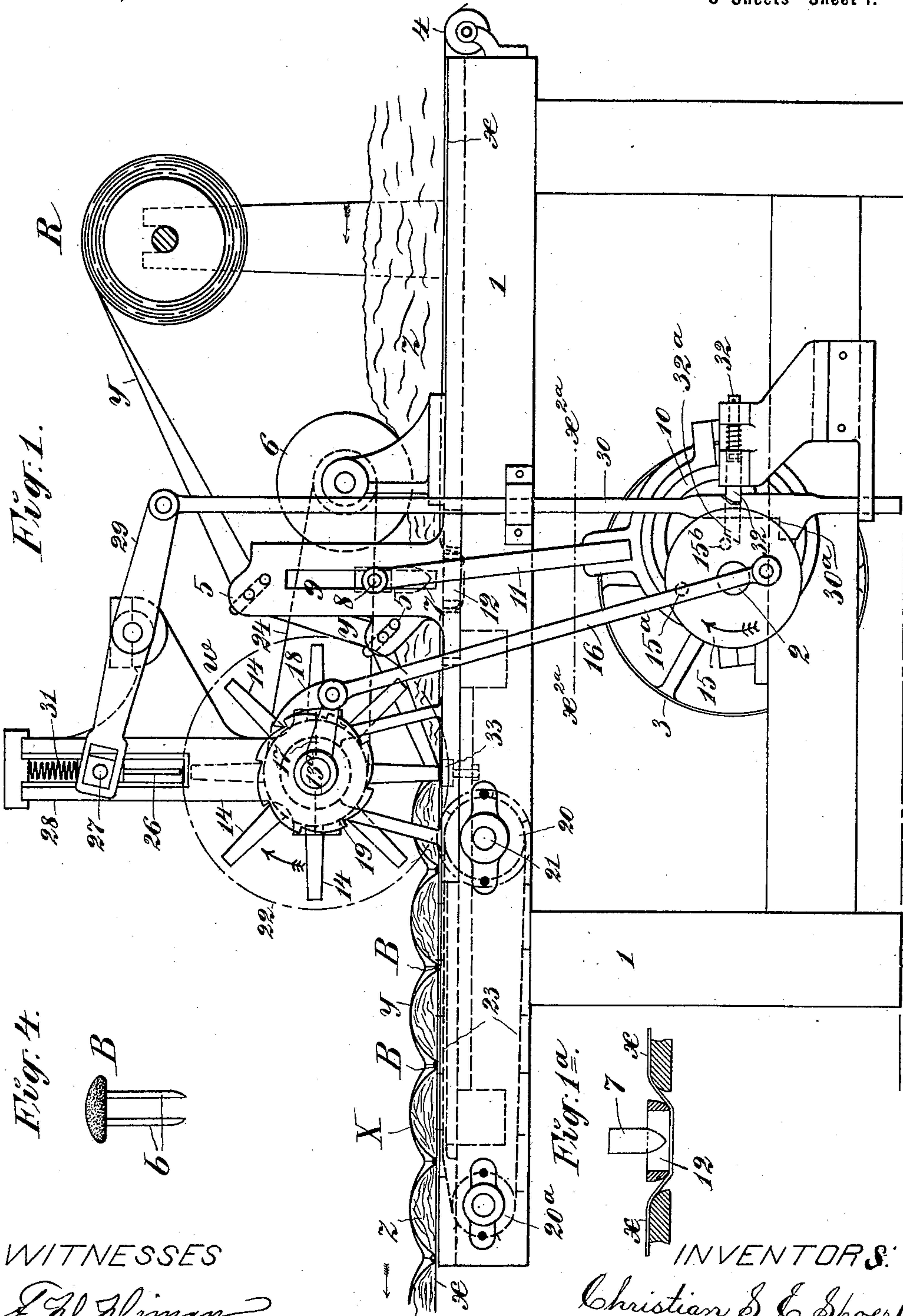
Patented Dec. 13, 1898.

C. S. E. SPOERL & J. HAUBRICH.  
MACHINE FOR MAKING TUFTED FABRIC.

(Application filed Nov. 27, 1897.)

(No Model.)

3 Sheets—Sheet I.



WITNESSES  
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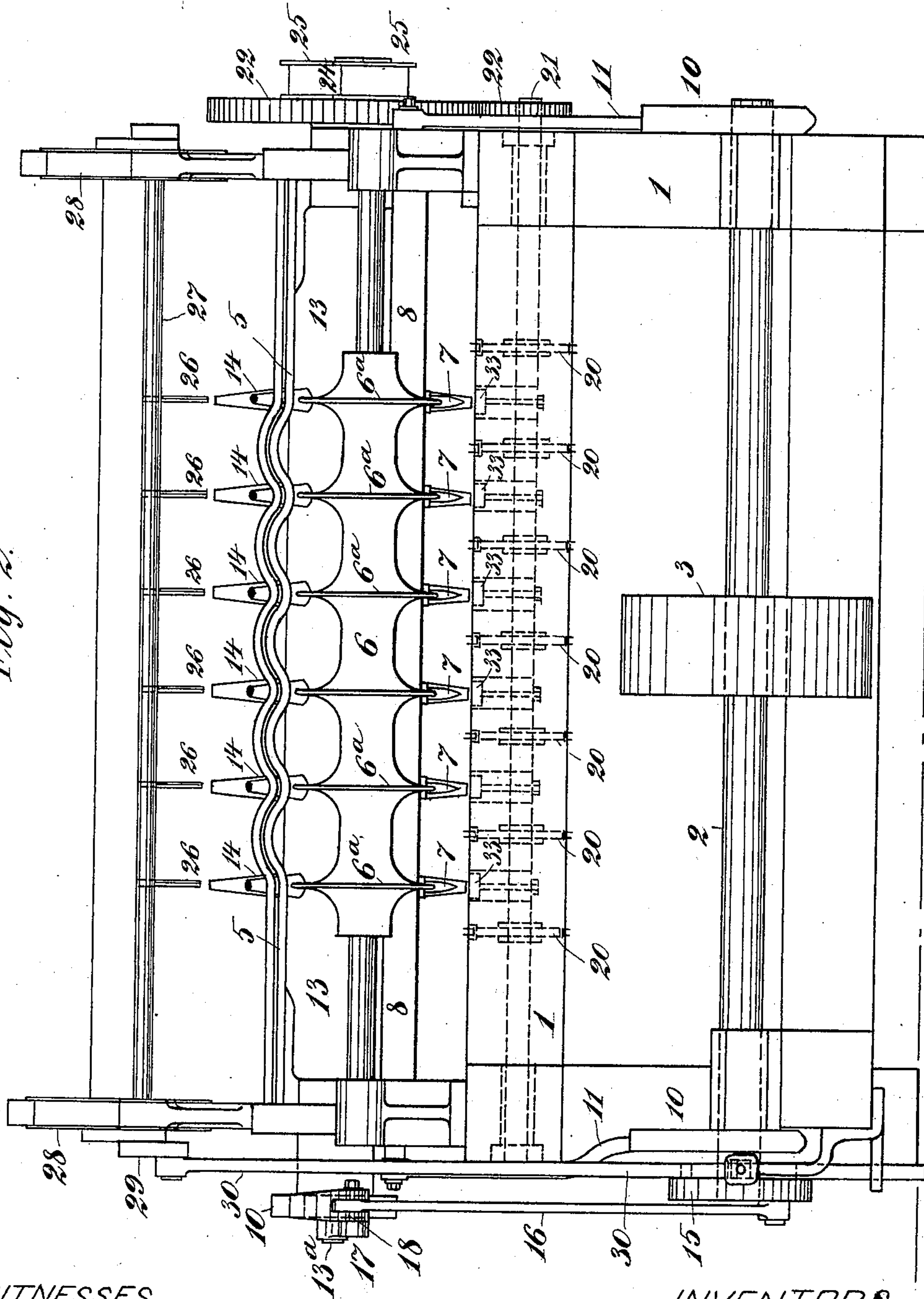
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Fig. 2.



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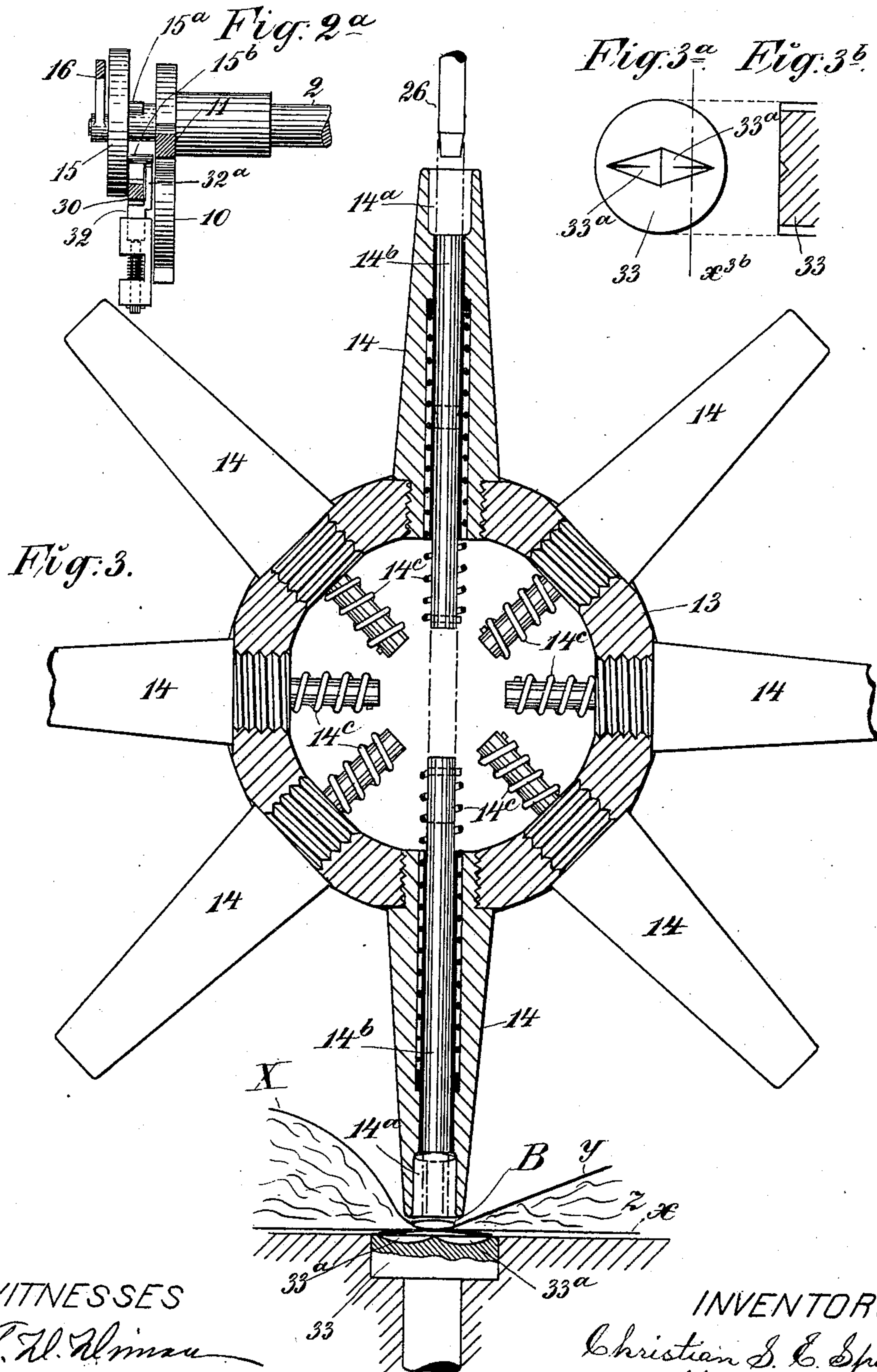
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# UNITED STATES PATENT OFFICE.

CHRISTIAN S. E. SPOERL AND JOHN HAUBRICH, OF SCRANTON, PENNSYLVANIA; SAID HAUBRICH ASSIGNOR TO SAID SPOERL.

## MACHINE FOR MAKING TUFTED FABRIC.

SPECIFICATION forming part of Letters Patent No. 615,761, dated December 13, 1898.

Application filed November 27, 1897. Serial No. 659,965. (No model.)

*To all whom it may concern:*

Be it known that we, CHRISTIAN S. E. SPOERL and JOHN HAUBRICH, citizens of the United States, and residents of Scranton, Lackawanna county, Pennsylvania, have invented certain new and useful Improvements in Machines for Making Tufted Fabric, of which the following is a specification.

Our invention relates to machines for making all kinds of stuffed or padded and tufted fabrics, such as cushions for seats and couches; and the object of the invention is to provide a machine for effecting the tufting automatically by means of pronged tufting-buttons. Such a machine is illustrated in the accompanying drawings, wherein—

Figure 1 is a side elevation of the machine. Fig. 1<sup>a</sup> is a fragmentary detail view; Fig. 2, an end elevation thereof as seen from the right in Fig. 1, and Fig. 2<sup>a</sup> is a section on line  $x^{2a}$  in Fig. 1. Fig. 3 is an enlarged detail view of the button setting and clenching mechanism, and Figs. 3<sup>a</sup> and 3<sup>b</sup> are fragmentary views showing the construction of the clenching-anvil. Fig. 4 is a side view of a clenching-button used for tufting.

The tufted fabric X usually consists of a base-sheet  $x$  of some suitable strong fabric, as burlaps, a covering fabric  $y$  of any suitable fabric adapted for use in upholstering, such as a corduroy fabric, for example, and a filling material  $z$ , such as tow, cotton, moss, &c., or such fibrous materials arranged in layers or strata.

The tufting is effected with buttons B, (see Fig. 4,) each comprising a head with prongs  $b$ , the latter being driven down through the fabric X and clenched on the base fabric  $x$ . Usually the heads of the buttons will be covered with a fabric similar to the fabric  $y$ ; but this is a common practice with the old or common form of upholsterer's buttons and is not a matter of importance.

The purpose of the machine shown in the drawings is to form the fabric, to cut ways or slits through the filling material  $z$  for the passage of the button-prongs, to crease the fabric, and to drive and clench the tufting-buttons. This machine will now be described, numerals being employed to designate the parts of the machine proper.

1 is the machine-frame, in which is rotatively mounted a shaft 2, which may be driven in a continuous manner through the medium of a pulley 3 on the shaft and a belt. (Not shown.)

The base fabric  $x$ , coming from a roll, (not shown,) passes over a guide-roller 4 at the right-hand end of the machine, as seen in Fig. 1, and thence over the upper face of the machine-frame.

The covering fabric  $y$  is fed from a roll R, mounted in any convenient manner either on or above the machine-frame, and passes through a creasing guide or guides 5, mounted on and extending across and above the machine-frame, and thence to the tufting-point, or point where the buttons are set.

The filling material or fiber  $z$  is placed on the base fabric  $x$  and is carried (to the left in Fig. 1) under a compressing and creasing roller 6, mounted in bearings on and extending over the frame. The form of this roller is best shown in Fig. 2. When the material shall have passed the roller 6, a series of perforations or slits are made in it, at the points where the button-prongs are to pass through, by a series of slitting-punches 7, carried on a bar 8, mounted in upright guides 9 on the frame, a reciprocating motion being imparted to said bar by two eccentrics 10 on the shaft 2, the yokes of which are coupled to the respective ends of the bar by suitable connecting-rods 11. It is not desirable that the base fabric  $x$  shall be punctured, and it is caused to pass down under a bar or plate 12, fixed in the frame at the cutting or puncturing point, and then up again, so as to remove it from the path of the punches 7. In Fig. 1<sup>a</sup> this feature is shown in section.

The creasing-guide 5, through which the facing fabric  $y$  passes, may be, as shown in Fig. 2, formed of two rods bent into a wavy form, the lesser curves, which form the creases, being alined with the creasing-disks 6<sup>a</sup> on the creasing and pressing roller 6, as clearly illustrated in Fig. 2. There are, as represented in Fig. 1, two creasing-guides 5, one quite elevated, through which the strip of fabric  $y$  first passes, and the other down lower, at or near the level of the material  $z$  after the latter shall have passed under the



roller 6. The creased fabric *y* being now brought down and applied to the layer of compressed material *z*, the materials of the fabric X are in form to receive the tufting-buttons, and these are now set and clenched by the means which will now be described.

Mounted rotatively in bearings in uprights on the machine-frame and extending across and over the same is an intermittently-rotating setter for the buttons. (Best illustrated in Fig. 3.) This device comprises a drum or hollow cylinder 13, provided with radially-arranged tubular button-holders 14, there being an even number of rows of these holders, each row being arranged to extend across the machine. As shown herein, there are eight of such rows and six circumferentially-arranged sets, these sets being alined with the creasing devices and with the punches 7. In each tubular holder 14 there is a button-recess 14<sup>a</sup> at its outer end, a tracker-pin 14<sup>b</sup>, and a coil-spring 14<sup>c</sup> about said pin. This spring is secured to the tracker-pin at one end and to the holder 14 at the other end and is adapted to operate either by distention or compression, so that it will return the pin to its normal position, whether it is pushed inward or outward.

In the sectional view, Fig. 3, the button-setting device is shown in position, one row of holders being down and another set directly opposite at the upper side, as must be the case when an even number of rows of holders are employed. The setter is adapted to be rotated intermittently from a crank-disk 15 on the shaft 2 and a pawl-rod 16, the latter being coupled to a pawl-arm 17, carrying a hook-pawl 18, which engages the teeth of an eight-toothed ratchet-wheel 19, fixed on the journal 13<sup>a</sup> of the drum 13, Fig. 1, whereby at each rotation of the shaft 2 the said drum is so rotated as to bring a row of the button-holders 14 to the tufting-point.

The fabric is fed along intermittently by an endless feeder consisting of sprocket-wheels 20 on a shaft 21, driven from the drum 13 by gears 22 (see Fig. 2) and sprocket-chains 23 about said wheels 20, and another set of wheels 20<sup>a</sup>. The chains have short points on them, which bite into the base fabric *x* and carry the completed fabric along. The compressing and creasing roller is driven from the drum 13 by a belt 24 on pulleys 25. (Best seen in Fig. 2.)

The attendant places buttons B in the row of holders 14, (seen at the point *w* in Fig. 1,) pushing them into their recesses head first, where they are held by friction. The dotted lines in the lower holder in Fig. 3 shows the position of the button. They are driven by a series or row of plungers 26, fixed in a plunger-bar 27, which extends across the machine directly above the axis of the drum 13 and having on its ends blocks which are mounted to play up and down in guides 28. The plunger-bar is elevated by a lever 29, one arm of which is coupled to the bar and the other to an operating-rod 30, guided in suitable keep-

ers on the frame and adapted to be drawn down by a stud 15<sup>a</sup> in the crank-disk 15, which engages a shoulder 30<sup>a</sup>, Fig. 1, on the rod 30. The plunger-bar is backed by strong operating-springs 31, which are thus compressed; and in order to hold these springs compressed after the stud 15<sup>a</sup> passes the shoulder 30<sup>a</sup> there is a spring-bolt 32 on the frame, Figs. 1 and 2<sup>a</sup>, which wipes into and engages a recess in the operating-rod 30. To release the rod, there is another longer stud 15<sup>b</sup> on the crank-disk 15, which at the proper time impinges on the beveled end of a projecting part 32<sup>a</sup> of the spring-bolt and drives it back, thus releasing the rod 30 and permitting the operating-springs 31 to drive down the plungers 26 forcibly. The plungers enter the open upper ends of the row of holders 14 at the top and drive down the tracker-pins therein. The inner (lower) ends of these pins impinge upon the inner (upper) ends of the tracker-pins in the lower set of holders and drive them down, whereby the latter drive the prongs of the buttons in the lower holders down through the fabric, the points being turned outward and clenched on an anvil 33, set in the frame below. The preferred form of this anvil is best illustrated in Figs. 3<sup>a</sup> and 3<sup>b</sup>. It has grooves or hollows 33<sup>a</sup> in its face, which deflect and bend up the prongs of the button.

It will be noted that the machine operates in an intermittent manner. The roller 6 and creasing-guides 5 form longitudinal creases in the fabric at the desired distance apart, and the button setting and clenching mechanism sets the buttons in rows transversely of the fabric in the several creases, the transverse rows being properly spaced. Ordinarily the spacing of the transverse rows of buttons measured longitudinally of the fabric will be the same as the spacing of the creases, so that the distance between adjacent buttons (or tufts) will be the same, measured both longitudinally and transversely of the fabric X.

A fabric tufted in this manner is much more durable, so far as the stability of the tufting is concerned, than the ordinary tufted cushions and the like where the buttons or tufts are secured with thread. As the way for the prongs of the button is primarily formed in the filling material by the punches 7, the button may be and is provided with slender wire prongs, which pass through the fabrics *x* and *y* without cutting or weakening them, and this adds greatly to the durability of the finished fabric, wherein there is always a strain on the fabric about the tuft. The filling being compressed at this point it is very important to punch or slit it primarily or the prongs of the button would not penetrate it. Thus in the fabric made on the machine described the face fabrics *x* and *y* are kept intact and uninjured, while the compressed filling *z* has a way formed in it for the passage of the button-prongs.

It will be understood that our invention is not limited to the formation of any particu-



lar number of creases extending lengthwise of the fabric. The machine illustrated is constructed to make six creases; but there may be one or more.

5 Having thus described our invention, we claim—

1. A machine for tufting fabrics, comprising a feeder for the fabric, creasers for the filling material and the covering fabric, and a  
10 tufting mechanism comprising means for carrying, driving and clenching the tufting-buttons, substantially as set forth.

2. A machine for tufting fabrics, comprising a feeder for the fabric, creasers for the filling material, means for puncturing the filling  
15 material in the creases at the tufting-points, and a tufting mechanism comprising means for carrying, driving and clenching the tufting-buttons, substantially as set forth.

20 3. A machine for tufting a fabric consisting of a base fabric  $x$ , a covering fabric  $y$ , and filling material  $z$ , said machine comprising an intermittent feeder for the fabric, a creaser for the filling material, a means for  
25 puncturing the filling material in the creases at the tufting-points, a creaser for the covering fabric, and a tufting mechanism comprising means for carrying, driving and clenching the tufting-buttons, substantially as set  
30 forth.

4. In a machine for automatically tufting cushion fabrics, the combination with an intermittent feeder for the fabric, of an intermittently-rotating compressing and creasing  
35 roller 6, of substantially the form shown, for compressing and creasing the filling material, the vertically-reciprocating punches 7, which puncture the filling material at the tufting-points, the creasing-guide for the covering  
40 fabric  $y$ , and a tufting mechanism comprising means for carrying, driving and clenching the tufting-buttons, substantially as set forth.

5. In a machine for automatically tufting cushion fabrics, the combination with a feeder  
45 for the fabric, and means for compressing and creasing the filling material, of the creasing-guide 5 for the covering fabric  $y$ , said guide comprising two bars of wavy form between which the fabric  $y$  is drawn, and means for  
50 setting and clenching the tufting-buttons, substantially as set forth.

6. In a machine for tufting cushion fabrics composed of a base fabric  $x$ , filling material  $z$ , and covering fabric  $y$ , the combination with a  
55 feeder for the fabric, a compressor and creaser for the filling material, and the reciprocating punches 7, which puncture the filling material at the tufting-points, and means for de-

pressing the base fabric at the punching-point out of the path of the punches, substantially  
60 as set forth.

7. In a machine for tufting fabrics, the combination with means for feeding and creasing the fabric, of a tufting mechanism comprising  
65 an intermittently-rotating drum 13, provided with a set of radially-arranged, tubular button-holders 14, the tracker-pins in said holders, the springs of said pins, a reciprocating plunger for driving said tracker-pins and  
70 through them the button, and an anvil for clenching the prongs of the button, substantially as set forth.

8. In a machine for tufting fabrics, the combination with means for feeding and creasing the fabric, of a tufting mechanism comprising  
75 an intermittently-rotating drum 13, provided with a set of radially-arranged, tubular button-holders 14, the tracker-pins in said holders, the springs of said pins, means for driving the buttons and clenching them, comprising  
80 a plunger 26, backed by a strong operating-spring 28, the said spring, the lever 29, for withdrawing the plunger, the rod 30, coupled to the lever and having a shoulder 30<sup>a</sup>, and a locking-shoulder, a spring-bolt 32, adapted to  
85 automatically engage said locking-shoulder on the rod 30, the rotating crank-disk 15, provided with a stud 15<sup>a</sup> to engage the shoulder 30<sup>a</sup> and draw down the rod 30, and a stud 15<sup>b</sup>, adapted to press back the bolt 32 and release  
90 said rod, and a clenching-anvil 33, substantially as set forth.

9. In a machine for automatically tufting fabrics, the combination with a feeder, a compressor and a creaser for the fabric, of means  
95 for puncturing the filling material only at the tufting-points, and means for setting and clenching the tufting-buttons, substantially as set forth.

10. In a machine for making tufted fabrics, the combination with a feeder which feeds the  
100 materials intermittently under the tufting devices, the said tufting devices, which consist of means for setting and clenching the tufting-buttons, and means for puncturing the filling  
105 material only, at the tufting-points, substantially as and for the purposes set forth.

In witness whereof we have hereunto signed our names in the presence of two subscribing witnesses.

CHRISTIAN S. E. SPOERL.  
JOHN HAUBRICH.

Witnesses:

SAMUEL J. CASTLE,  
WATSON BROWNING.