

No. 622,901.

Patented Apr. 11, 1899.

C. S. E. SPOERL.

MACHINE FOR MAKING TUFTED FABRICS.

(Application filed Oct. 22, 1898.)

(No Model.)

2 Sheets—Sheet 1.

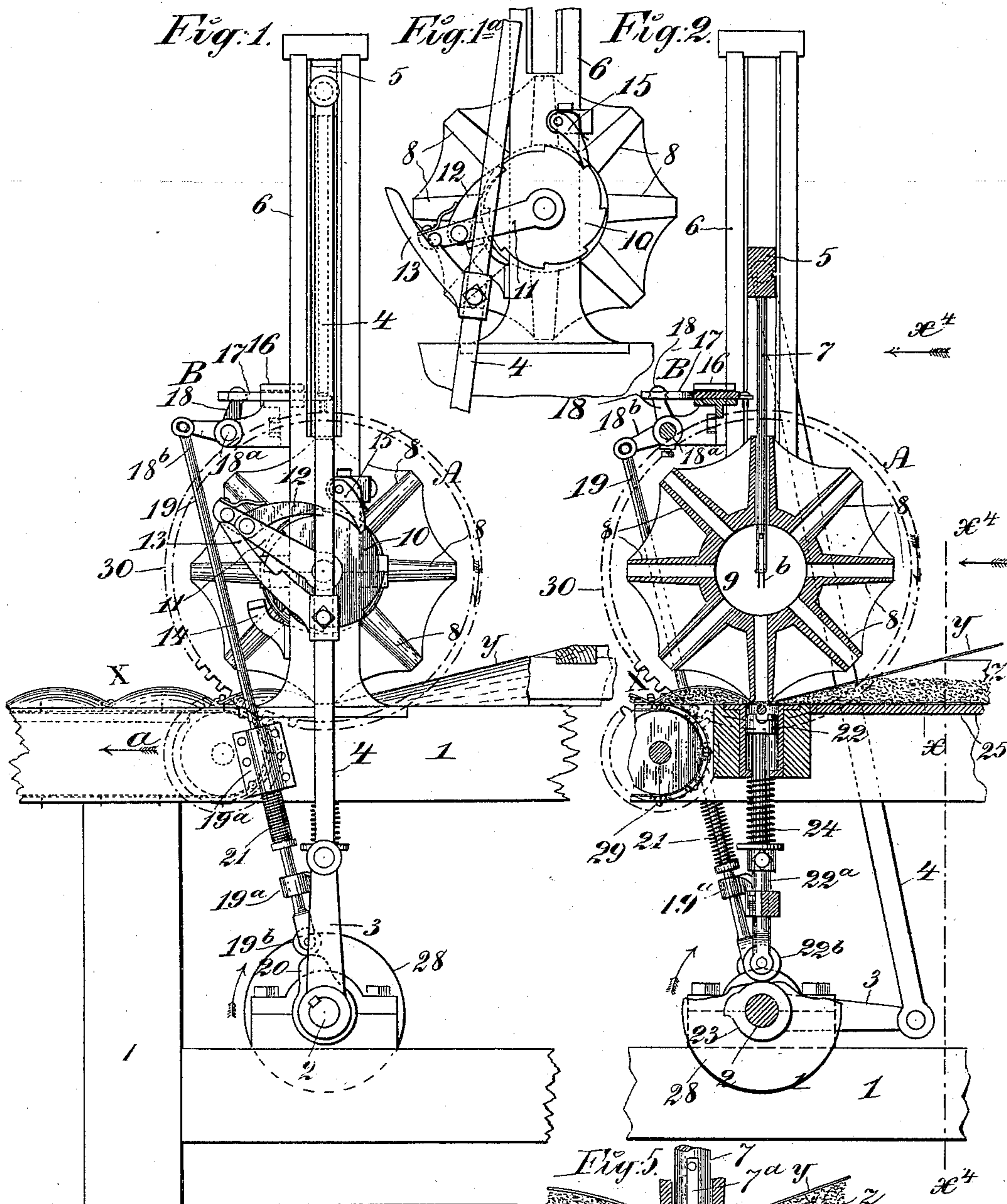


Fig. 6.

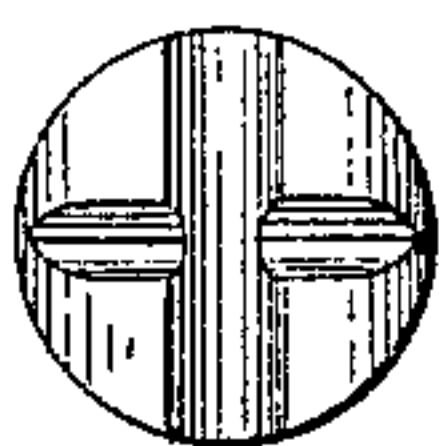


Fig. 7.

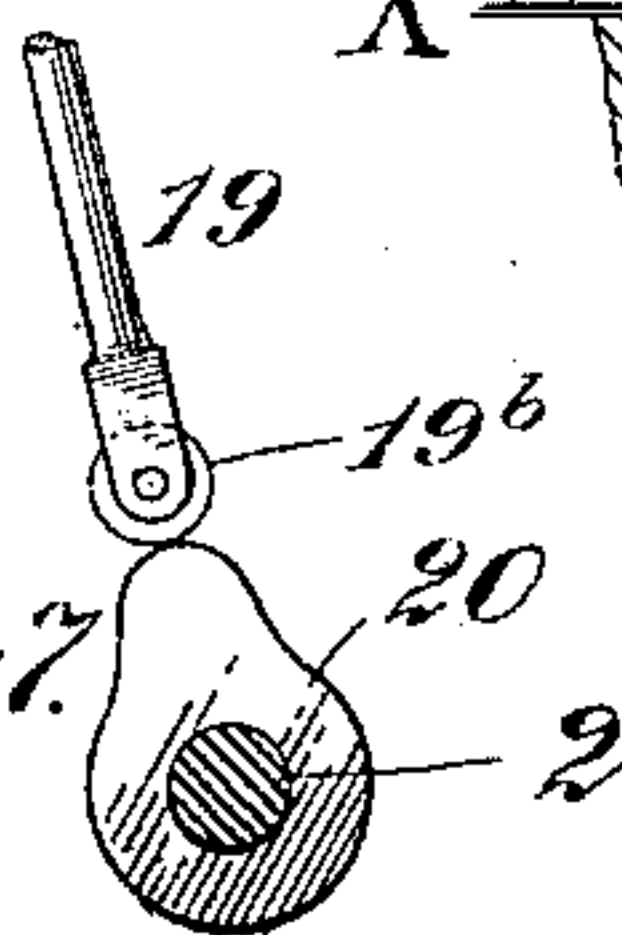
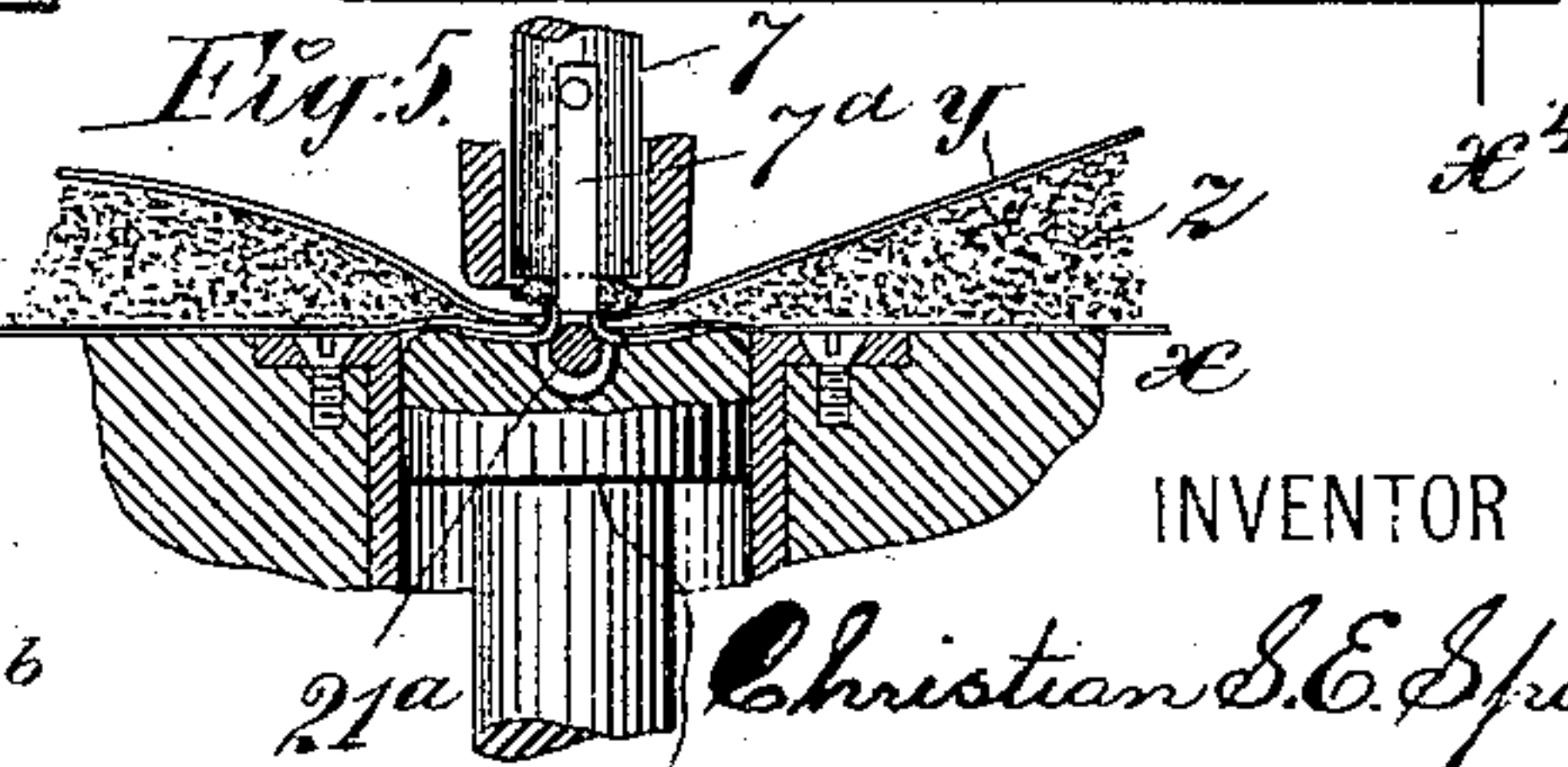


Fig. 5.



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Fig. 3.

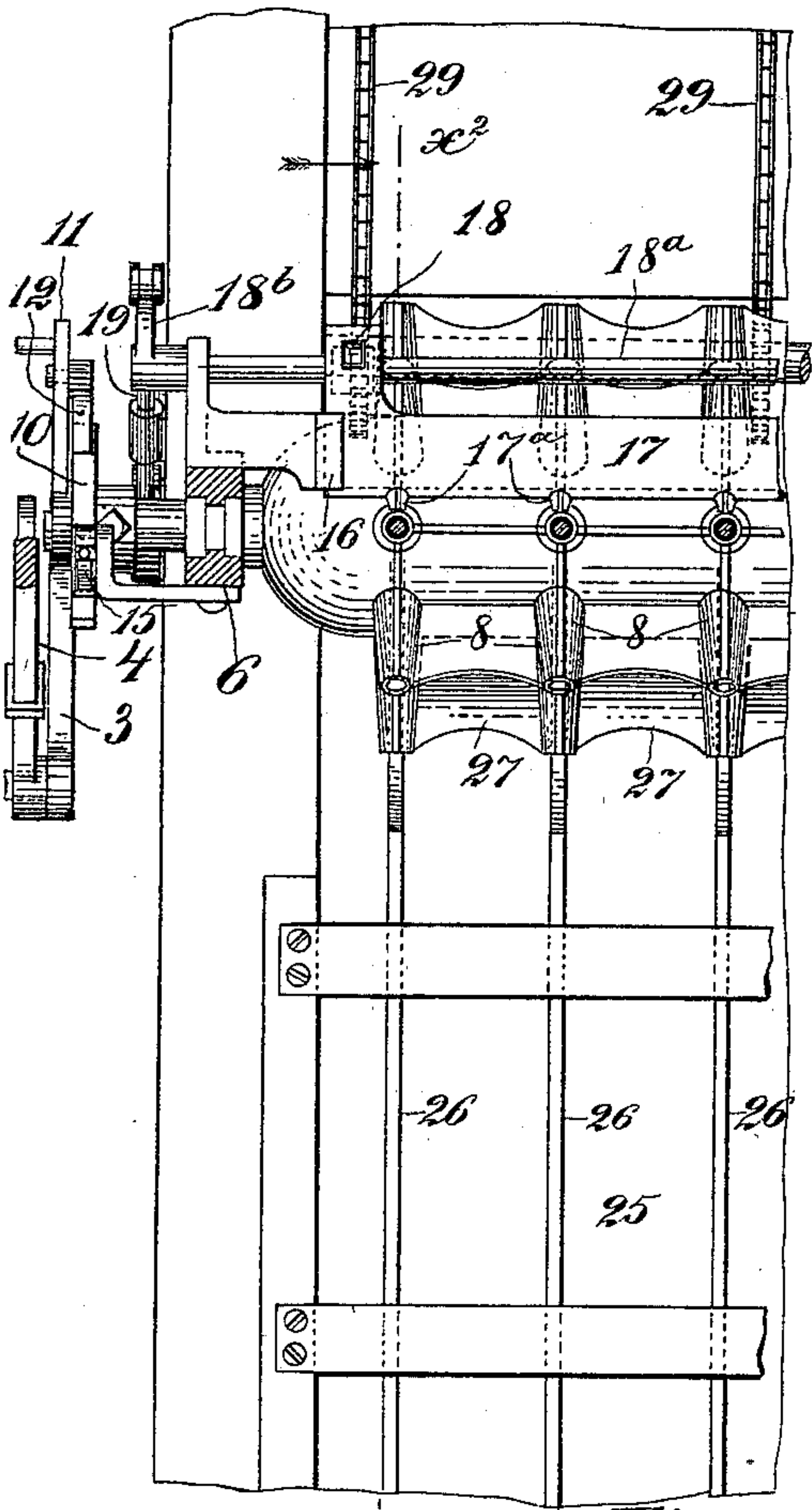


Fig. 4.

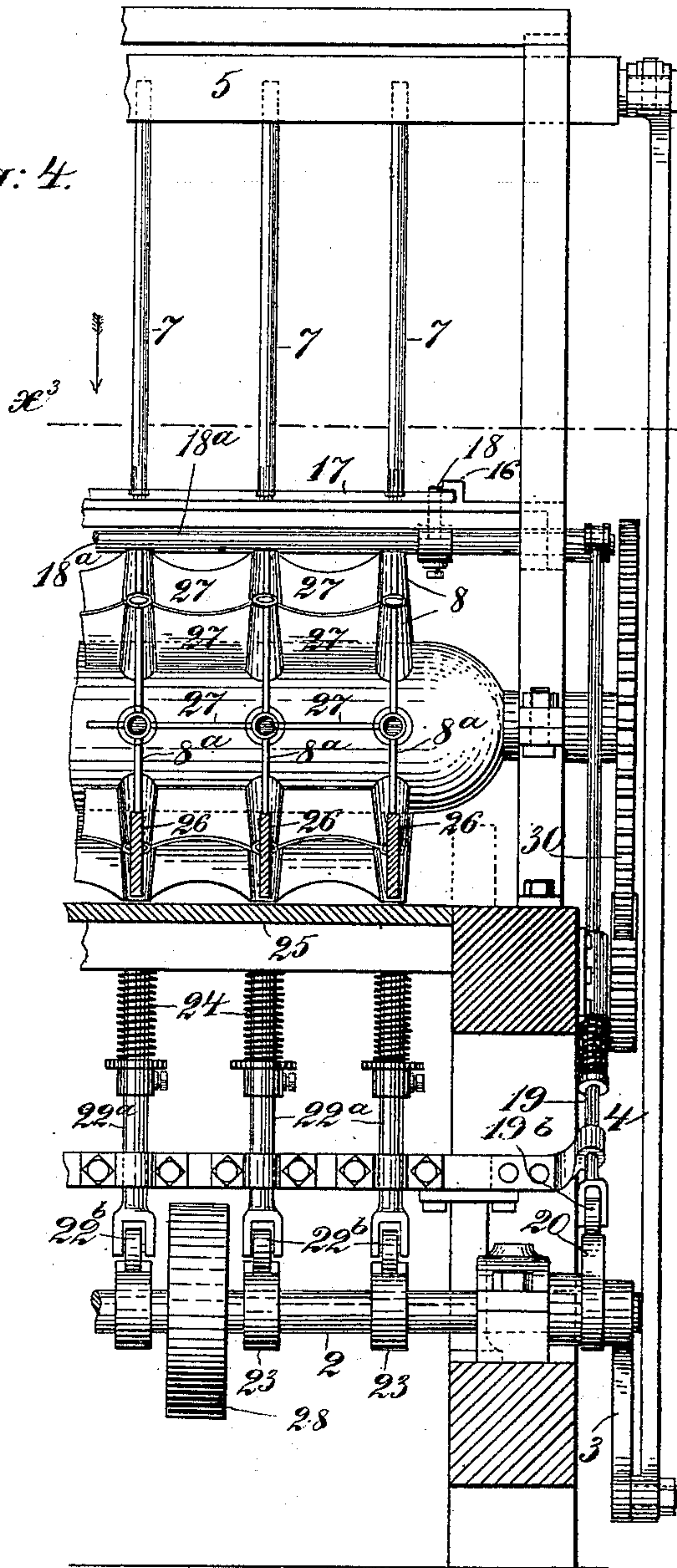


Fig. 9.

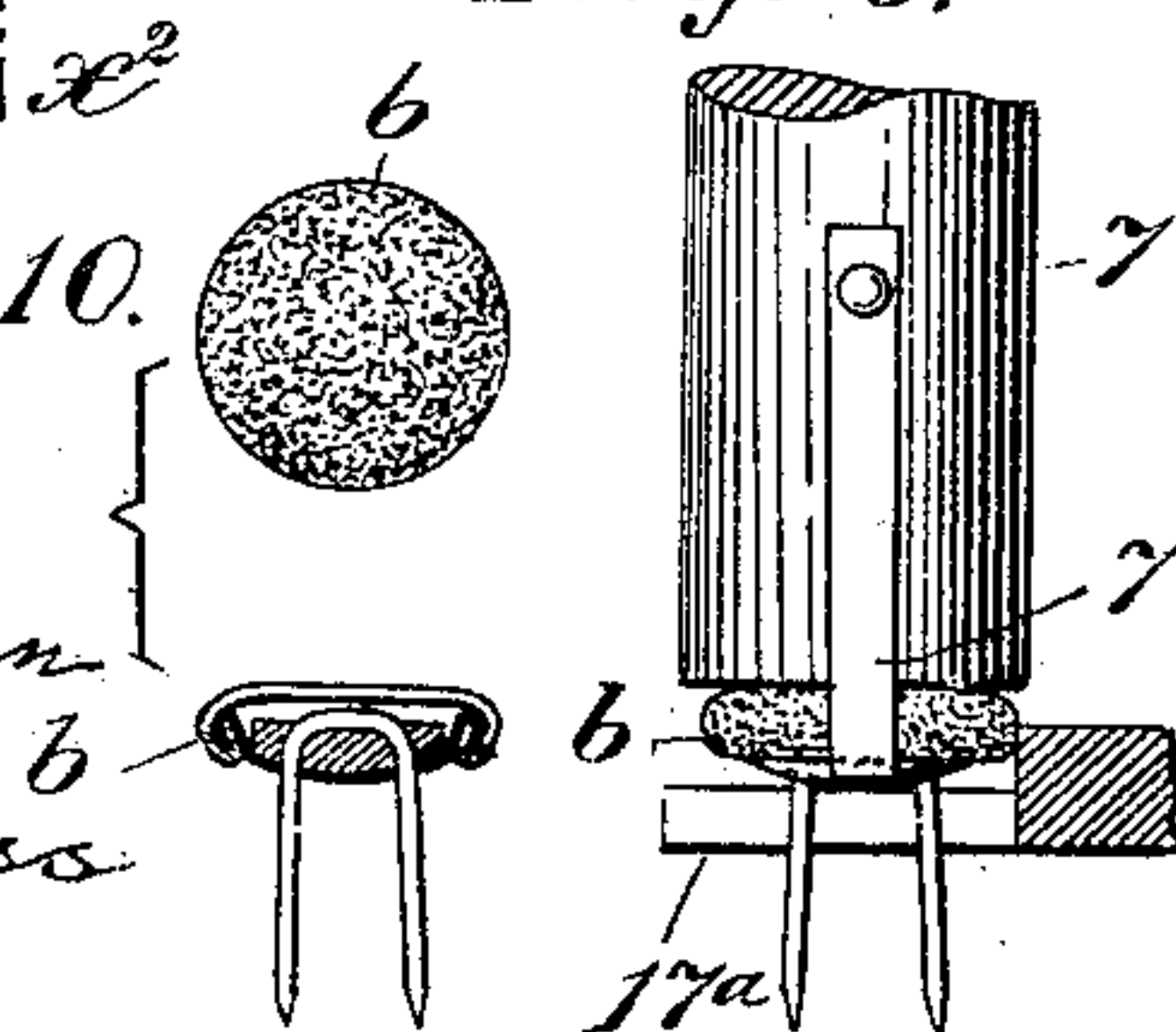


Fig. 10.

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Fig. 8.

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UNITED STATES PATENT OFFICE.

CHRISTIAN S. E. SPOERL, OF SCRANTON, PENNSYLVANIA.

MACHINE FOR MAKING TUFTED FABRICS.

SPECIFICATION forming part of Letters Patent No. 622,901, dated April 11, 1899.

Application filed October 22, 1898. Serial No. 694,282. (No model.)

To all whom it may concern:

Be it known that I, CHRISTIAN S. E. SPOERL, a citizen of the United States, residing at Scranton, Lackawanna county, Pennsylvania, have invented certain new and useful Improvements in Machines for Making Tufted Fabrics, of which the following is a specification.

This invention relates to machines for making padded and tufted fabrics, such as cushions for seats and couches; and it consists in improvements in a machine of the character illustrated in the joint Letters Patent granted to John Haubrich and myself, No. 615,761, dated December 13, 1898, and in order to a better and fuller understanding of the present invention it may be said that the machine described in the said Letters Patent comprises a fabric-feeding mechanism, creasing-guides for the top or face fabric, a creasing-roller for the filling material, vertically-reciprocating slitting-punches to form ways in the compressed filling material for the passage of the prongs of the tufting-buttons, and an intermittently-rotating button setting and clenching device. This latter in the said Letters Patent consists of a drum extending transversely across and over the machine-frame and provided with radially-arranged tubular button-holders containing spring tracker-pins for use in setting the buttons. Reciprocating plungers act on the tracker-pins to drive down the latter and cause them in turn to drive the prongs of the buttons through the fabrics and clench them. In the construction of the said Letters Patent the buttons have to be placed in button-pockets in the ends of the holders with their prongs directed outward by reason of the use of the tracker-pins. In the machine of the present application the tracker-pins are not employed. The buttons are fed to clips or keepers on the plungers and then forced down through tubular guides to the clenching-point. The filling material is so fed in as to avoid the necessity of cutting through it to form ways for the button-prongs, and other improvements are effected, all as will be more particularly described hereinafter with reference to the accompanying drawings, wherein—

Figure 1 is a side elevation of the middle portion of the machine, showing the button-

setting mechanism; and Fig. 1^a is a fragmentary view of the same parts, illustrating the operation of the ratchet mechanism. Fig. 2 is a vertical section in the plane indicated by line x^2 in Fig. 3. Fig. 3 is a fragmentary sectional plan taken in the plane indicated by the line x^3 in Fig. 4. Fig. 4 is a fragmentary sectional elevation as seen from the point indicated by the arrow x^4 in Fig. 2. This view shows the main operative parts as seen from the feeding end of the machine. Fig. 5 is a sectional detail view of the clenching-die on a large scale, and Fig. 6 is a face view of said die. Fig. 7 is a detached view of the cam device for actuating the button-feeding mechanism. Figs. 8 and 9 are detached fragmentary detail views, on a large scale, of parts of the button-feeding mechanism; and Fig. 10 includes two views of the button—a top view and a section.

1 is the frame of the machine, which may be of wood or metal and of any suitable form and dimensions.

X is the tufted fabric as it comes from the machine.

x is the base fabric, y the face fabric, and z the filling material.

A, Figs. 1 and 2, indicates as a whole the button-setting mechanism, which is in some respects similar to that described in the said Letters Patent, and the novel features set forth in the present application will be hereinafter pointed out and fully described.

B, Figs. 1 and 2, indicates as a whole the button-feeding mechanism, which will be hereinafter described.

The machine is designed and adapted to make a continuous strip of the tufted fabric X, the width of said strip being limited to the width of the particular machine used. The material is fed in at the right as the machine is represented in Figs. 1 and 2 and comes out at the left, the movement thereof being in the direction indicated by the arrow a in Fig. 1. The buttons are set in rows transversely of the fabric by the button-setting mechanism A, which will now be described.

2 is the main shaft, rotatively mounted in the machine-frame and driven from any source of power. On the ends of this shaft are cranks 3, coupled by connecting-rods 4 to a plunger-bar 5, extending transversely

over the machine and adapted to play up and down in an upright guide-frame 6 on the machine-frame. The plunger-bar 5 carries a series of properly-spaced pendent plungers 7, and these plungers are adapted, during the vertical reciprocating movements of the plunger-bar, to pass down through a transversely-arranged series of tubular guides 8. These guides are not only alined transversely of the machine in transverse series, but they are also arranged in circumferential series, the guides projecting radially from a rotatively-mounted hollow shaft 9, mounted in bearings on the machine-frame directly below the plunger-bar 5. As herein shown, there is an even number of radially-arranged guides 8 in each circumferential series, so that one transverse series of guides comes directly opposite to another.

On a prolonged journal of the shaft 9 is fixed a ratchet-wheel 10, which has as many teeth as there are tubular guides 8 in a circumferential series—as eight, for example—and this ratchet-wheel is utilized to impart automatically to the shaft 9 intermittent rotation, so as to bring the ends of the guides 8 successively to the button setting and clenching point seen in Fig. 2. The means herein shown for effecting this intermittent rotation comprises a pawl-arm 11, which swings freely about the journal of the shaft 9, a pawl 12, carried by this arm and engaging the teeth of the ratchet, and an arm or lifter 13 on one of the connecting-rods 4. Said lifter at the proper moment during the upward movement of said rod takes under a stud on the pawl-arm and lifts or drives the arm upward, thus rotating the shaft 9 to the extent of one tooth of the ratchet-wheel and thus bringing the next transverse series of guides 8 to the clenching or setting point. When the lifter 13 descends, the pawl-arm and pawl drop back by gravity to a stop or rest 14, and a back stop-pawl 15 prevents back rotation of the ratchet-wheel.

The button-feeding mechanism B is constructed as follows: On guide-brackets 16, fixed to the frame 6, is mounted a button-feeding slide 17, which extends across and over the machine-frame and has on it a series of slotted button-holders 17^a. (Seen best in the detail views Figs. 8 and 9.) The buttons *b* may be set in these holders by hand, the prongs thereof passing down through the respective slots therein and the buttons being suspended by their heads. Each holder 17^a is opposite to a plunger 7, and when these latter are withdrawn to their highest elevation their lower ends come to the same level as the button-holders. Each plunger has on its end a keeper, formed of spring-clips 7^a, to receive and hold the head of a button, and when the plungers arrive at their highest elevation the slide 17 is moved forward, pushing the heads of the buttons sidewise into the respective keepers 7^a and then withdrawn.

To move the slide 17 forward and withdraw

it, any suitable mechanism may be employed. As herein shown, it consists of a pair of upright arms 18, fixed on the respective ends of a rock-shaft 18^a, which has bearings in the brackets 16, these arms 18 engaging apertures in the slide 17. Another arm 18^b on said rock-shaft is coupled to a rod 19, guided at 19^a, Fig. 1, and provided at its lower end with a roller 19^b, which bears on a cam 20 on the shaft 2. This cam effects the feeding movement of the slide 17, and a spring 21 on the rod 19 serves to withdraw the slide after the cam passes. There may be two arms 18^b, two rods 19, and two cams 20, one set at each side of the machine, and a set of these devices at the far side of the machine is shown in Figs. 2 and 4.

The plungers 7, carrying the buttons *b*, pass down through the alined guides 8 to the clenching-points, where the prongs of the button are forced down through the two fabrics *x* and *y* and clenched by a device that will be now described with especial reference to Figs. 2 and 5.

Just below the bed of the machine, at an opening in said bed through which the button-prongs pass, is mounted a prong-spreading bar or rod 21^a, which is adapted to take between and spread the prongs of the button as it is driven down by the plunger, and in the bed at each clenching-point is mounted a vertically-reciprocating clenching-die 22. (Seen in plan in Fig. 6.) This die is driven upward by suitable mechanism at the proper time and clenches the prongs of the button. As herein shown, the mechanism for operating the die 22 is a cam 23, Fig. 2, which takes under a roller 22^b on the lower end of the stem 22^a of the die. The latter is retracted or drawn down by a spring 24. When the plungers are retracted, the spring-clips on the ends thereof disengage themselves from the fixed buttons, the springs of the clips yielding sufficiently for the purpose.

In order to avoid the necessity of using cutting devices for cutting through the mass of filling material, so as to provide a way for the prongs of the buttons, means are provided, such as will now be described with especial reference to Figs. 2, 3, and 4.

Above the bed 25 of the machine, over which the bottom fabric *x* and the filling material *z* pass, are mounted upright partitions 26, which are raised above the bed 25 just enough to permit the fabric *x* to pass under them. These partitions extend lengthwise of the machine-bed and are alined with the respective circumferential series of guides 8, being beveled or sloped down at their ends which approach the clenching-points, so that the guides will clear them as they come into position. Between the guides 8 of each circumferential series partition-webs 8^a are provided, and these are in the same longitudinal vertical plane with the partitions 26. In feeding the filling material *z*, as curled hair, for example, between the fabrics *x* and *y* it is placed in the

chutes or channels between the partitions 26 and is carried along with the fabrics x and y to and past the clenching-points, the function of the partitions being to maintain a clear space free from the filling material at the points where the buttons are set by supplying the filling in separated parallel strips. The partitions 26, however, terminate at the points where the buttons are set, and beyond this point the strips of filling material come together laterally and coalesce into a single mass.

There will be preferably curved partitions or webs 27 between the guides 8, forming transverse series, said webs extending lengthwise of the shaft 9. These webs will have concave edges, and they serve to give the proper form to the tufted fabric between the buttons extending across the fabric.

As before stated, any means of driving the shaft 2 may be employed, as a pulley 28 thereon adapted to receive a belt. I have shown the same form of feeder for the fabric X as that illustrated in the said Letters Patent No. 615,761, which consists of an endless-chain carrier 29, driven from the shaft 9 through gearing 30, (seen in Figs. 1, 2, and 4;) but I do not consider this feeding device essential to good work, as the radial guides 8 will take into the fabric and feed it over the smooth surface of the machine-bed without other feeding mechanism.

It will be noted that where there is an even number of tubular guides 8 in a circumferential series there will always be two guides axially alined, and the plunger will pass down through both of these guides; but if there be an odd number of guides in a series the plunger will obviously have to pass through an aperture in the hollow shaft opposite to the guide which is situated directly over the clenching anvil or die, and where there is a web 8^a between the guides 8 obviously there will be in such a case a passage for the plunger formed in said web. This will not require illustration, nor is it important, as there may as well be an even number of the guides 8 in all cases.

The shaft 9 is conveniently made hollow in order to afford communication between the opposite tubular guides 8; but it will be obvious that so long as ways are provided for the passage of the plungers diametrically through said shaft the end sought will be attained, nor is it important that the length of the guides 8 relatively to the diameter of the shaft 9 shall be that herein shown.

Having thus described my invention, I claim—

1. In a machine for making tufted fabrics, the combination with means for supplying the materials of the fabric, of a button-setting mechanism comprising an intermittently-rotating shaft provided with a circumferential series of radial, tubular guides, a reciprocating plunger axially alined with the vertically-arranged guide and playing through said

shaft and the bore of said guide, said plunger being adapted to drive down and set the button by direct impingement thereon, and means for spreading and clenching the prongs of the driven button, substantially as set forth.

2. In a machine for making tufted fabrics, the combination with means for supplying the materials of the fabric, of a button-setting mechanism comprising an intermittently-rotating shaft provided with a circumferential series of radial, tubular guides, a reciprocating plunger axially alined with the vertically-arranged guide and playing through said shaft and the bore of said guide, said plunger having a keeper which receives and holds the button and which is adapted to drive down the button through the guide and set it, by direct impingement thereon, and means for spreading and clenching the prongs of the driven button, substantially as set forth.

3. In a machine for making tufted fabrics, the combination with means for supplying the materials of the fabric, of a button-setting mechanism comprising an intermittently-rotating shaft provided with sets or series of circumferentially-arranged tubular guides 8, a series of reciprocating plungers axially alined with the respective vertically-arranged tubular guides of each set, each plunger having at its end a keeper to receive and hold the head of a button, and said plunger adapted to drive down the button through the guide and set it by direct impingement thereon, and a series of devices for spreading and clenching the prongs of the buttons simultaneously, substantially as set forth.

4. In a machine for making tufted fabrics, the combination with means for supplying the materials of the fabric, of a button-setting mechanism comprising an intermittently-rotating shaft provided with a circumferential series of radial, tubular guides, a reciprocating plunger axially alined with the vertically-arranged guide and playing through said shaft and the bore of said guide, said plunger having a keeper which receives and holds the button and which is adapted to drive down the button through the guide and set it, by direct impingement thereon, automatic means for feeding the button to the keeper on the plunger, and means for spreading and clenching the prongs of the button, substantially as set forth.

5. In a machine for making tufted fabrics, the combination with means for supplying the materials of the fabric, of a button-setting mechanism comprising an intermittently-rotating shaft provided with a circumferential series of radial, tubular guides, a reciprocating plunger axially alined with the vertically-arranged guide and playing through said shaft and the bore of said guide, said plunger being adapted to drive down and set the button by direct impingement thereon, and means for spreading and clenching the prongs of the button, said means consisting of a fixed transverse bar to spread the prongs and a reciprocating

4
cating die which clenches the latter, said die operating in unison with the plunger, substantially as set forth.

5 6. In a machine for making tufted fabrics, the combination with means for supplying the materials of the fabric, the intermittently-rotating series of radially-arranged tubular guides, and a reciprocating plunger alined axially with the bore of the vertically-arranged guide of the series, said plunger having at its end a keeper to receive and hold the head of the button, of means for feeding the button to the keeper in said plunger, said means consisting of a reciprocating slide having a slotted holder to receive the buttons, substantially as set forth.

7. In a machine for making tufted fabrics, the combination with the machine frame and bed, a feeding mechanism for the fabric, and a button-setting mechanism which sets the buttons in rows lengthwise of the fabric, of the fixed partitions, 26, over the bed and extending lengthwise thereof, and alined with the respective button-setting devices, said partitions serving to separate the mass of filling material and leave spaces for the buttons at the points where they are set, substantially as set forth.

8. In a machine for making tufted fabrics, the combination with the machine frame and bed, and a button-setting mechanism having circumferential series of tubular guides 8, webs 8^a between said guides, reciprocating

plungers which play through said guides in setting the buttons, and means for clenching the prongs of the buttons, of the fixed partitions 26 over the machine-bed and alined with the respective series of guides 8, substantially as and for the purposes set forth. 35

9. In a button-setting mechanism for stuffed fabrics, the combination with a rotatively-mounted hollow shaft 9, provided with a plurality of circumferential series of radial, tubular guides 8, connected circumferentially by webs 8^a, and transversely by webs 27, reciprocating plungers adapted to play through said guides 8 for setting the buttons, and means for clenching the buttons, substantially as set forth. 40 45

10. In a machine for making tufted fabrics in a continuous manner, the combination with the machine frame and bed, of an intermittently-rotating shaft extending over and across the same and provided with a circumferential series of radially-arranged guides 8, which take into the fabric and move it over the bed, and means for setting and clenching the buttons, substantially as set forth. 50 55

In witness whereof I have hereunto signed my name, this 20th day of October, 1898, in the presence of two subscribing witnesses. 60

CHRISTIAN S. E. SPOERL.

Witnesses:

GEO. H. RICE,
V. M. BUNNELL.