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FEEDING DEVICE FOR SEWING MACHINES

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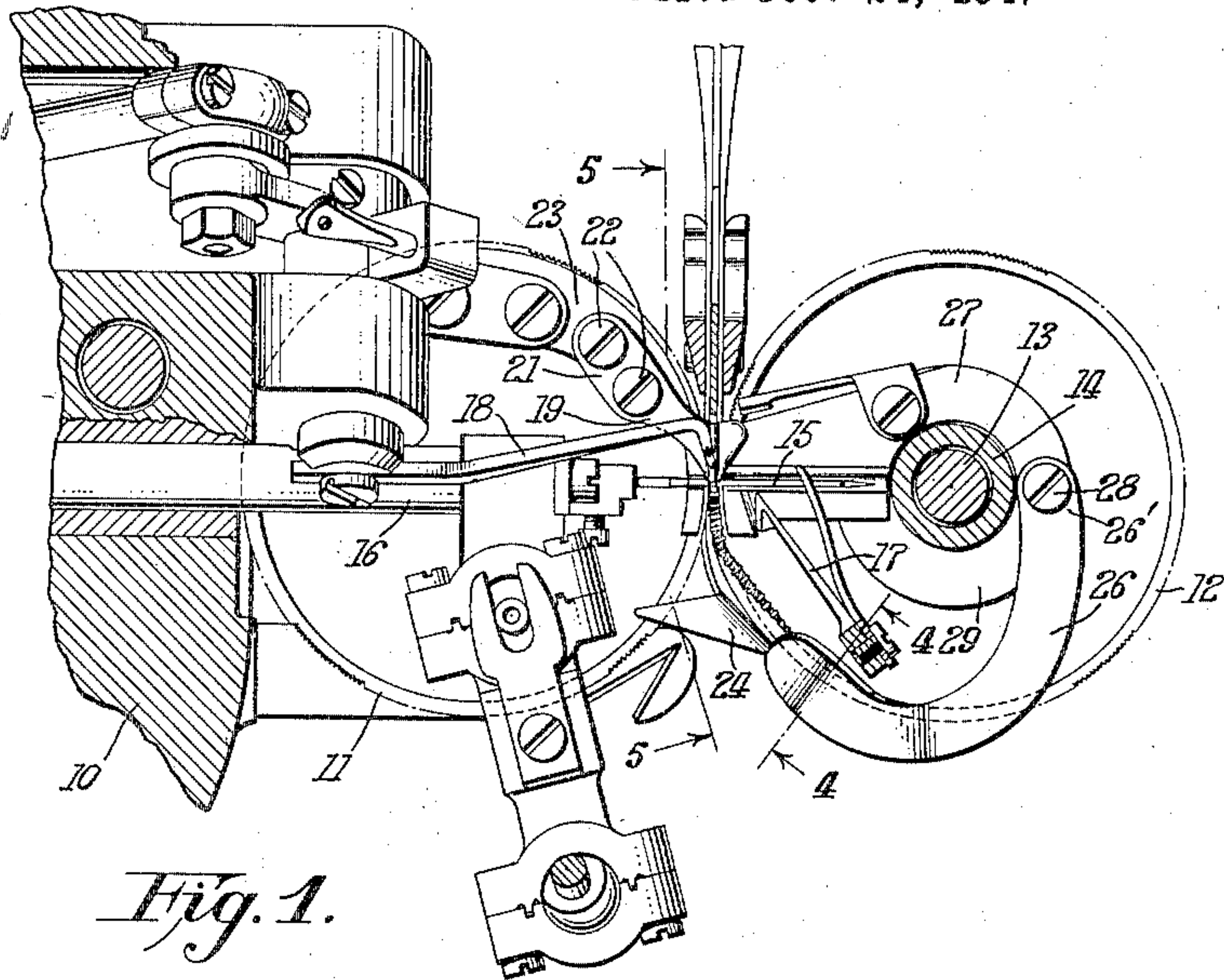


Fig. 1.

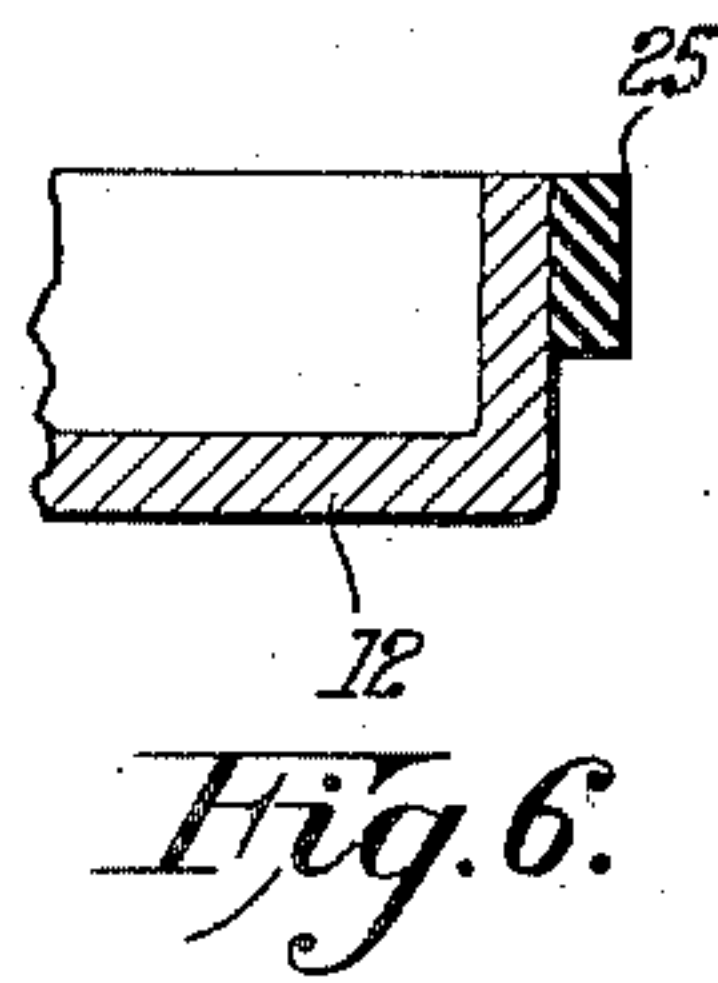


Fig. 6.

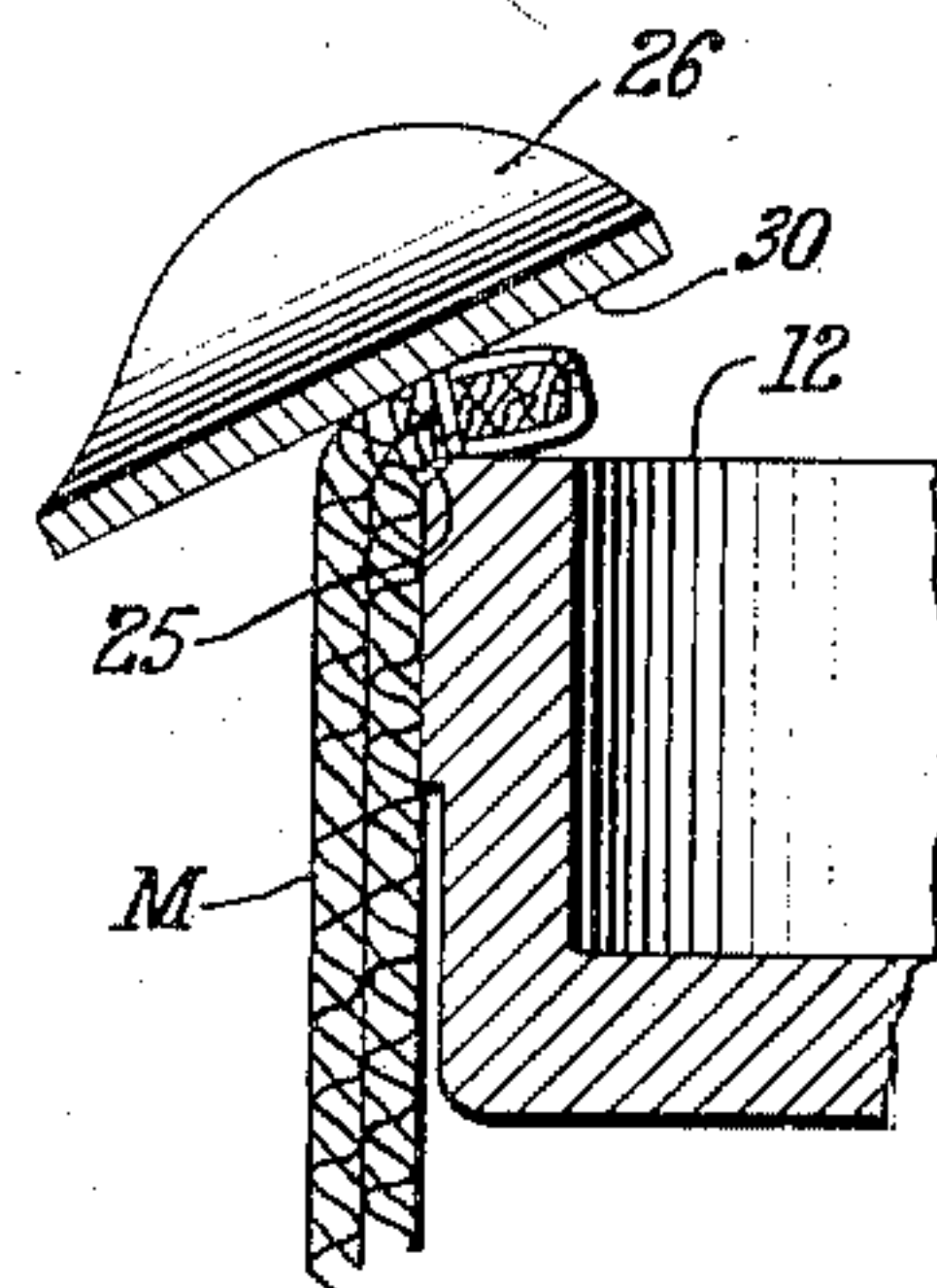


Fig. 4.

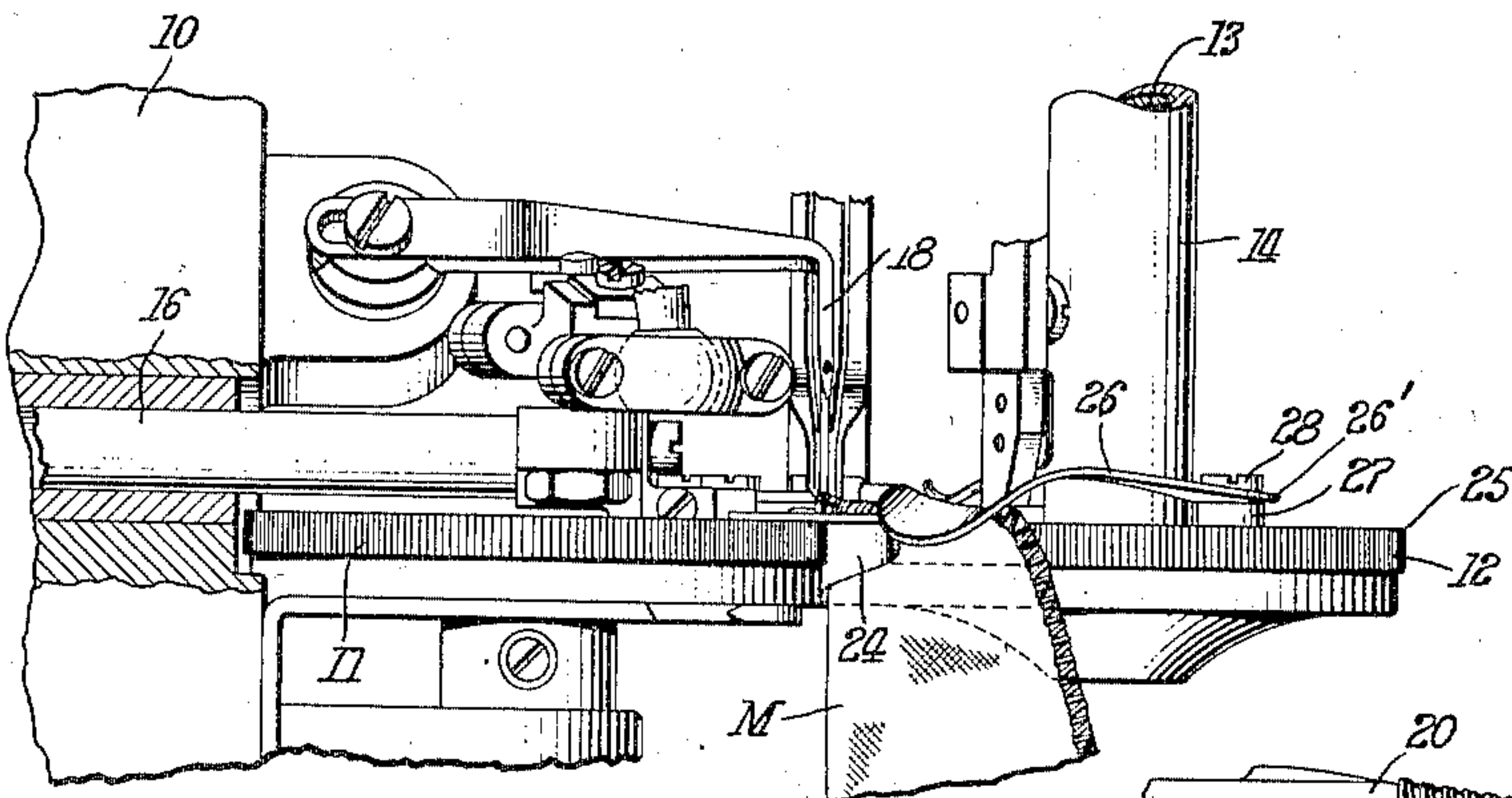


Fig. 2.

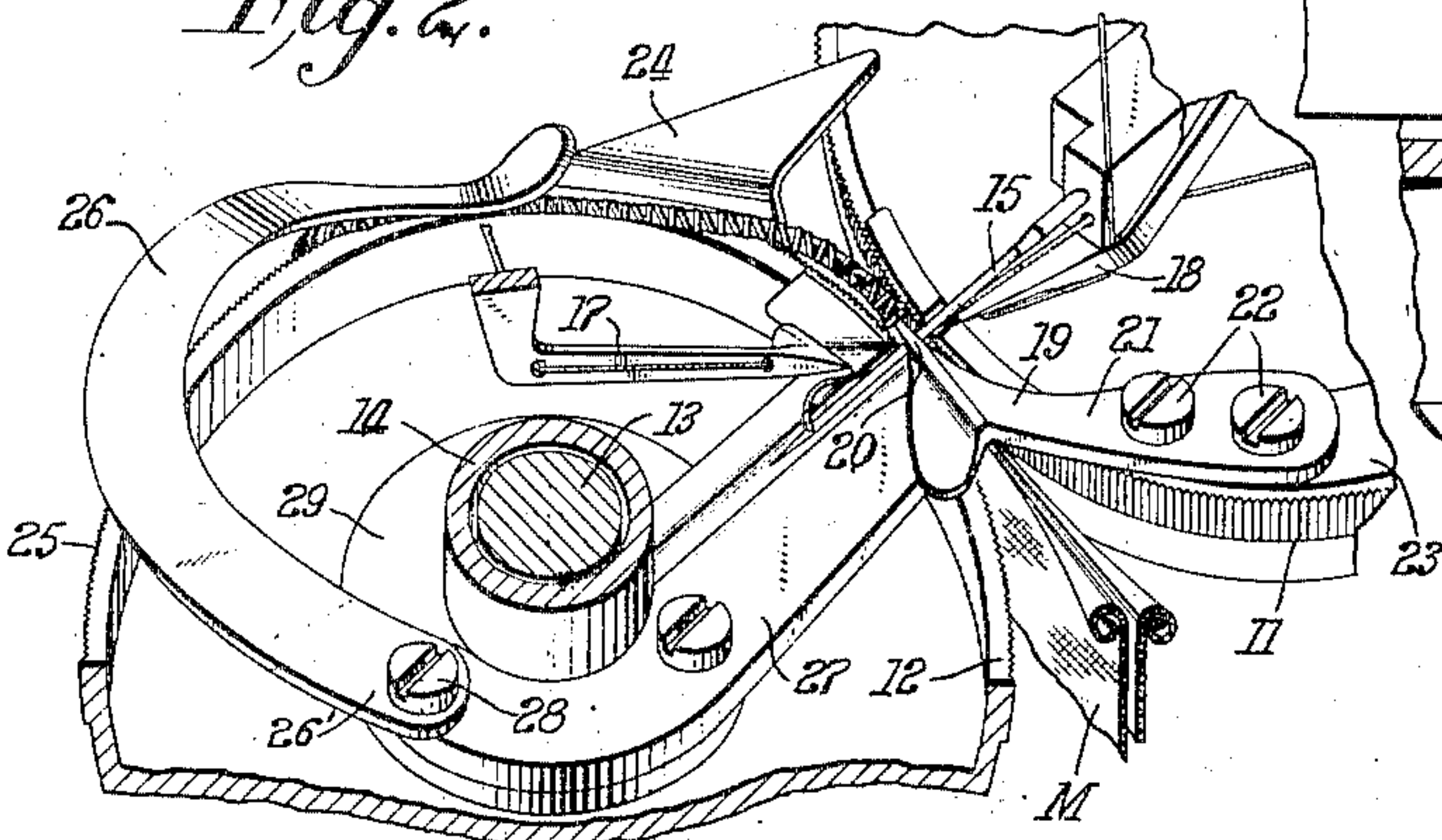


Fig. 3.

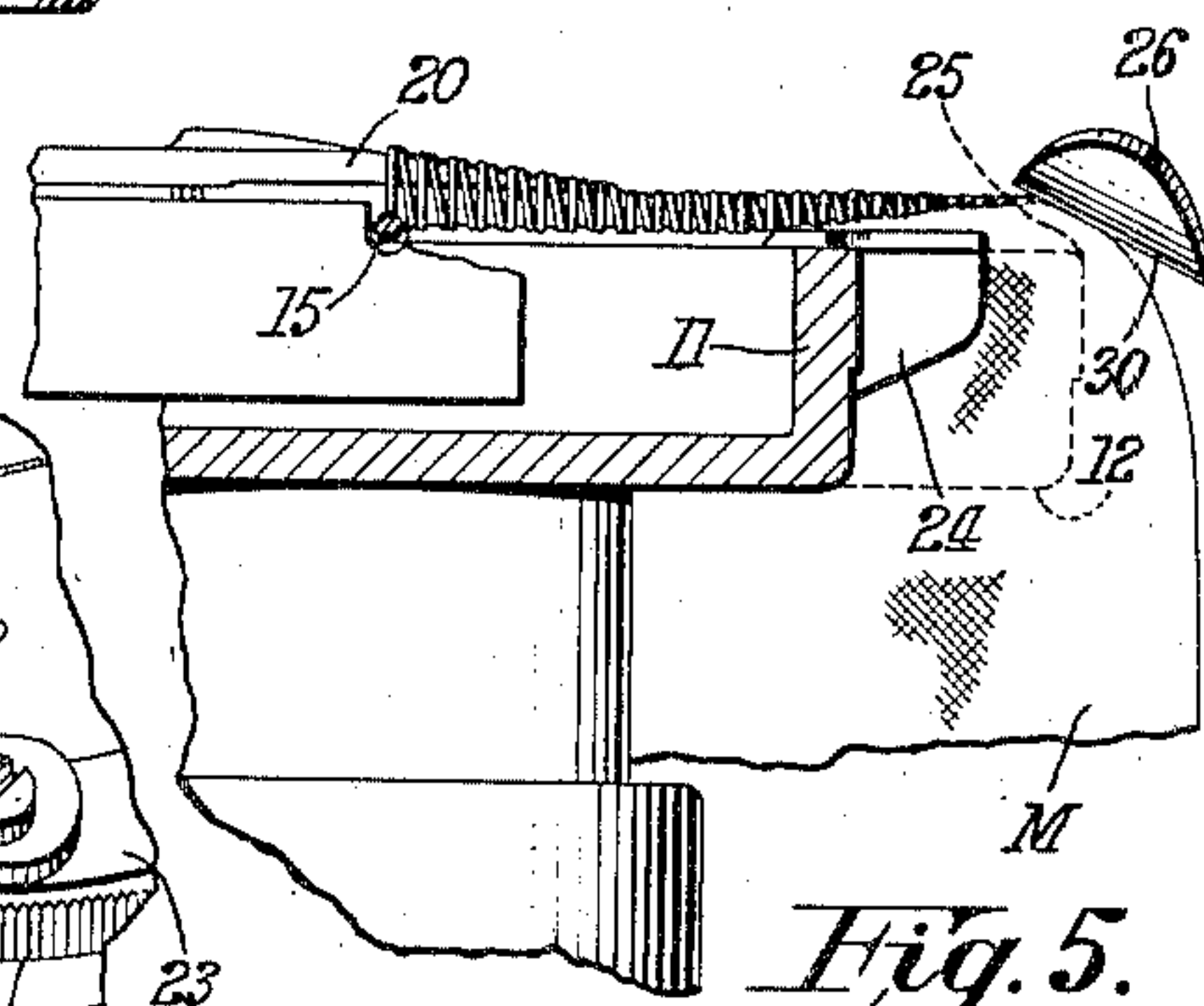


Fig. 5.

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## UNITED STATES PATENT OFFICE

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## FEEDING DEVICE FOR SEWING MACHINES

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5 Claims. (Cl. 112—18)

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This invention relates to sewing machines and more particularly to improvements in feeding mechanisms therefor of the type wherein the material being stitched is adapted to be supported and fed through the machine by feeding wheels or "cups."

In sewing machines of this type, the two feed-cups are opposed to each other directly beneath the path of reciprocation of the needle, and extending substantially at right angles thereto is the usual horizontally disposed stitch-finger about which the stitches are formed and set. When the stitches are tightly set upon the stitch-finger, as is necessary to produce a satisfactory seam, the stitches tend to cling to the stitch-finger and thereby afford a slight resistance to the uniform passage of the material through the machine. This slight resistance does not offer any serious obstacle to the effective operation of the machine when the material being sewn is of relatively firm body, since the material is rigid enough to move the stitches off the end of the stitch-finger uniformly as it is advanced through the machine by the feed-cups.

However, when the material is of a flimsy and relatively elastic nature as, for example, a nylon material, any resistance to the easy flow of the material through the machine causes puckering of the material on the discharge side of the feed-cups. This puckering interferes with the uniform travel of the material through the machine to the extent that the individual stitches are of unequal lengths and the seam appears wavy and non-uniform.

The feeding device forming the subject of my United States Patent No. 2,362,267, dated November 7, 1944, overcame the above described faulty feeding to a large extent. However, with the advent of exceedingly sheer nylon hosiery having a denier of about 15, the puckering was not entirely eliminated by said device. Whatever shortcoming this patented device possesses results from the fact that the 15 denier nylon material is so devoid of body that the effect of the feeding device, which engages the material at a level below the stitch-finger, is not transmitted through the material to the stitches formed upon the stitch-finger. Thus, the stitches are not uniformly pulled off the stitch-finger but cling thereto and interfere with proper feeding.

It is, therefore, the primary object of the present invention to provide an improved feeding device which operates rearwardly of the stitching devices and exerts a pull on the material in line with the longitudinal axis of the stitch-finger.

Another object of the present invention is to provide a supplementary feeding device constructed and arranged to cooperate with one of the feed-cups of a hosiery seaming machine at a

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level substantially coplanar with the longitudinal axis of the stitch-finger, whereby the stitches formed on the stitch-finger are uniformly fed off the same.

Further advantages and beneficial results in operation will be apparent from the following description of an illustrative embodiment of my invention taken in connection with the accompanying drawings, in which:

Fig. 1 is a top plan view, partly in section, of a portion of a cup-feed sewing machine embodying the improvement.

Fig. 2 is a side elevation, partly in section, of a portion of the sewing machine, showing the work as it emerges from beneath the improved feeding device.

Fig. 3 is an enlarged perspective view of the elements of the machine at and adjacent to the stitching point, showing clearly the improved feeding device and its preferred location with respect to these elements.

Fig. 4 is an enlarged sectional view taken substantially along the line 4—4, Fig. 1.

Fig. 5 is an enlarged sectional view taken substantially along the line 5—5, Fig. 1 showing the manner in which the stitches are formed in the work and around the stitch-finger and the improved feeding device cooperating with the upper peripheral corner of the outer feed-cup in pulling the stitches off the stitch-finger.

Fig. 6 is a vertical sectional view of a portion of a modified form of feed-cup in which the work-engaging peripheral portion is made of a resilient material such as rubber or neoprene.

Referring in detail to the drawings, the machine in which one embodiment of the invention is incorporated is constructed substantially in accordance with the disclosure in my U. S. Patent No. 2,277,970, dated March 31, 1942, and includes a machine-frame having a standard 10 supporting an inner feed-cup 11 which cooperates with an outer feed-cup 12. The outer feed-cup 12 is carried on the lower end of a shaft 13 journaled within a sleeve 14 depending from a laterally projecting overhanging bracket (not shown) of the machine-frame. As is common in machines of this type, the two feed-cups 11 and 12 are positively driven in synchronism, and are adapted to support and feed the material being sewn past the stitch-forming devices.

The stitch-forming devices of the machine illustrated comprise a threaded needle 15 carried by an endwise reciprocatory needle-bar 16, an oscillatory threaded looper 17 and an oscillatory threaded spreader 18, the looper and spreader being mounted on separate rock-shafts, as fully disclosed in my above mentioned U. S. Patent No. 2,277,970. The three stitching instrumentalities, namely, the needle 15, looper 17 and spreader 18



are properly actuated to effect the formation of a three-thread overseam.

As is common in cup-feed machines of the type disclosed, there is provided a stitch-finger 19 which overlies the feed-cups 11 and 12 at the stitching point and about which the stitches are formed and set to minimize distortion of the marginal edges of the material being sewn. As shown in the accompanying drawings, the stitch-finger 19 is formed with an attenuated blade 20 projecting from a shank 21 which is apertured to receive two securing screws 22 threaded into a support 23 disposed within the upturned peripheral flange of the inner feed-cup 11. As will be observed in Fig. 5, the stitch-finger 19 is supported so that the under surface of its blade 20 is spaced slightly above the upper peripheral edge of the feed-cups 11 and 12 at their point of cooperation, and that during sewing the top edges of the material M are pulled up into contact with the under surface of the stitch-finger by the tightening or setting of the stitches about the blade 20 of the stitch-finger. As fully explained in my U. S. Patent No. 2,362,267, the setting of the stitch on the blade 20 of the stitch-finger causes the stitch to cling slightly to the blade 20. The consequent resistance to the free passage of the material M through the machine is serious when the material is of a flimsy nature, for the reason that the feed-cups 11 and 12 engage the material below the stitch-finger 19 and the force derived from the feed-cups and effective for stripping the tightly clinging stitches off the stitch-finger must be transmitted through the material. The material, having little or no body, has proven to be a poor medium for transmitting the necessary force.

In an effort to overcome this feeding defect, the device forming the subject of my previously mentioned U. S. Patent No. 2,362,267, was developed. In the accompanying drawings, this device is disclosed as comprising a presser-member 24 having a vertical work-engaging face disposed to press the material M into contact with the serrated face of the outer feed-cup 12 at the discharge side of the feeding-cups. It will be understood that the presser-member engages the material and presses it into contact with the face of the feed-cup at the same level as the two serrated faces of the feed-cups 11 and 12 engage the material. This level is below the level of the under surface of the stitch-finger. While the addition of the presser-member 24 to the machine substantially improved the handling of the work, the feeding difficulty was not entirely eliminated when extremely thin and elastic nylon material was sewn. This difficulty arose from the fact that the feeding instrumentalities engaged the material below the level of the under surface of the stitch-finger instead of at the same level as the said under surface, the material disposed above the feeding devices being relied upon to pull the stitches off the stitch-finger at a uniform rate. It is the purpose of the present improvement to exert a pulling force on the margin of the material at the seam line, the force being applied along a line substantially coplanar with the longitudinal axis of the blade 20 of the stitch-finger 19, whereby the stitches are pulled off the stitch-finger uniformly and at the same rate as the material is advanced through the machine. It will be appreciated that the stitched seam strengthens the body material at the seam line,

giving it more body and rendering it slightly less elastic. Thus, by applying the pulling force at this strengthened portion of the material, a better feeding action is obtained in uniformly pulling the stitches off the stitch-finger.

To that end, there is provided a device which is constructed and arranged to press the stocking material M against the upper corner 25 of the outer feed-cup 12 at a point on the discharge side of the feed-cup and immediately behind and above the presser-member 24. This device preferably comprises a single spring-steel member 26 having an apertured shank 26' secured on the usual needle-guide 27 by one of the screws 28 which fastens the needle-guide to the flange 29 of the outer feed-cup supporting shaft sleeve 14. The body of the spring-steel member 26 is curved and adjacent the free end is bent so that the under or work-engaging surface 30 (Fig. 4) is inclined to the plane containing the shank 26' and engages the upper peripheral corner 25 of the outer feed-cup. As will be observed in the drawings, the material M travels between the feed-cups 11 and 12, then between the presser-member 24 and the outer feed-cup 12, the upper margin of the material being folded over the upper peripheral corner 25 of the outer feed-cup and maintained against the corner of the feed-cup by the spring-member 26. It will be seen in Figs. 4 and 5 that the pull-feed action obtained by the cooperation of the spring-member 26 and the outer feed-cup 12 is applied at maximum elevation with respect to the feed-cups 11 and 12, and that this pull-feed action occurs substantially at the level of the blade 20 of the stitch-finger 19.

In order that the delicate nylon material will not be marred, severed or otherwise damaged by the pressure exerted by the spring-member 26, the upper corner 25 of the outer feed-cup 12 is buffed to a slight radius. As an alternate, I have discovered that for the usual serrated periphery of the outer feed-cup, a resilient ring may be bonded to the metal feed-cup in the manner shown in Fig. 6. I have employed neoprene for this purpose and find it to be satisfactory from the standpoint of operation and durability.

Having thus set forth the nature of the invention, what I claim herein is:

1. A sewing machine having stitch-forming devices including a reciprocatory needle, feed-cups having cooperating work-engaging faces for supporting and feeding material past said stitch-forming devices, a stitch-finger disposed above said feed-cups and having a blade about which the stitches are formed and set, and a feeding device having a work-engaging surface at the discharge side of said feed-cups and disposed to cooperate with the upper edge of the work-engaging face of one of said feed-cups in gripping the material for exerting a pull-feed action on said material substantially at the level of the blade of said stitch-finger.

2. A sewing machine having stitch-forming devices including a reciprocatory needle, feed-cups having cooperating work-engaging faces for supporting and feeding material past said stitch-forming devices, a stitch-finger disposed above said feed-cups and having a blade about which the stitches are formed and set, and a feeding device having an inclined work-engaging surface opposed to one edge of the work-engaging face of one of said feed-cups.

3. A sewing machine having stitch-forming devices including a reciprocatory needle, inner



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and outer feed-cups having cooperating work-engaging faces for supporting and feeding material past said stitch-forming devices, a stitch-finger having a blade disposed so that its under surface is substantially coplanar with the upper edge of the work-engaging face of said outer feed-cup, and a feeding device having a work-engaging surface opposed to the upper edge of the work-engaging face of said outer feed-cup.

4. A sewing machine having stitch-forming devices including a reciprocatory needle, inner and outer feed-cups having cooperating work-engaging faces for supporting and feeding material past said stitch-forming devices, a stitch-finger having a blade disposed so that its under surface is substantially coplanar with the upper edge of the work-engaging face of said outer feed-cup, and a resilient member having an inclined work-engaging surface opposed to the upper edge of the work-engaging face of said outer feed-cup.

5. In a sewing machine having stitch-forming devices including a reciprocatory needle, opposed

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feed-cups for advancing work past said stitch-forming devices, and a stitch-finger disposed above said feed-cups and having a blade about which the stitches are formed and set, the improvement which consists in the provision at the work-discharge side of said stitch-finger of a pull-feed device including a work-gripping member having a work-gripping surface which extends above the upper surfaces of said feed-cups so as to engage the work on the seam line, thereby to exert a pulling action upon the work on the line of the stitches formed therein.

HANS HACKLANDER.

## REFERENCES CITED

The following references are of record in the file of this patent:

## UNITED STATES PATENTS

Number	Name	Date
2,362,267	Hacklander	Nov. 7, 1944