

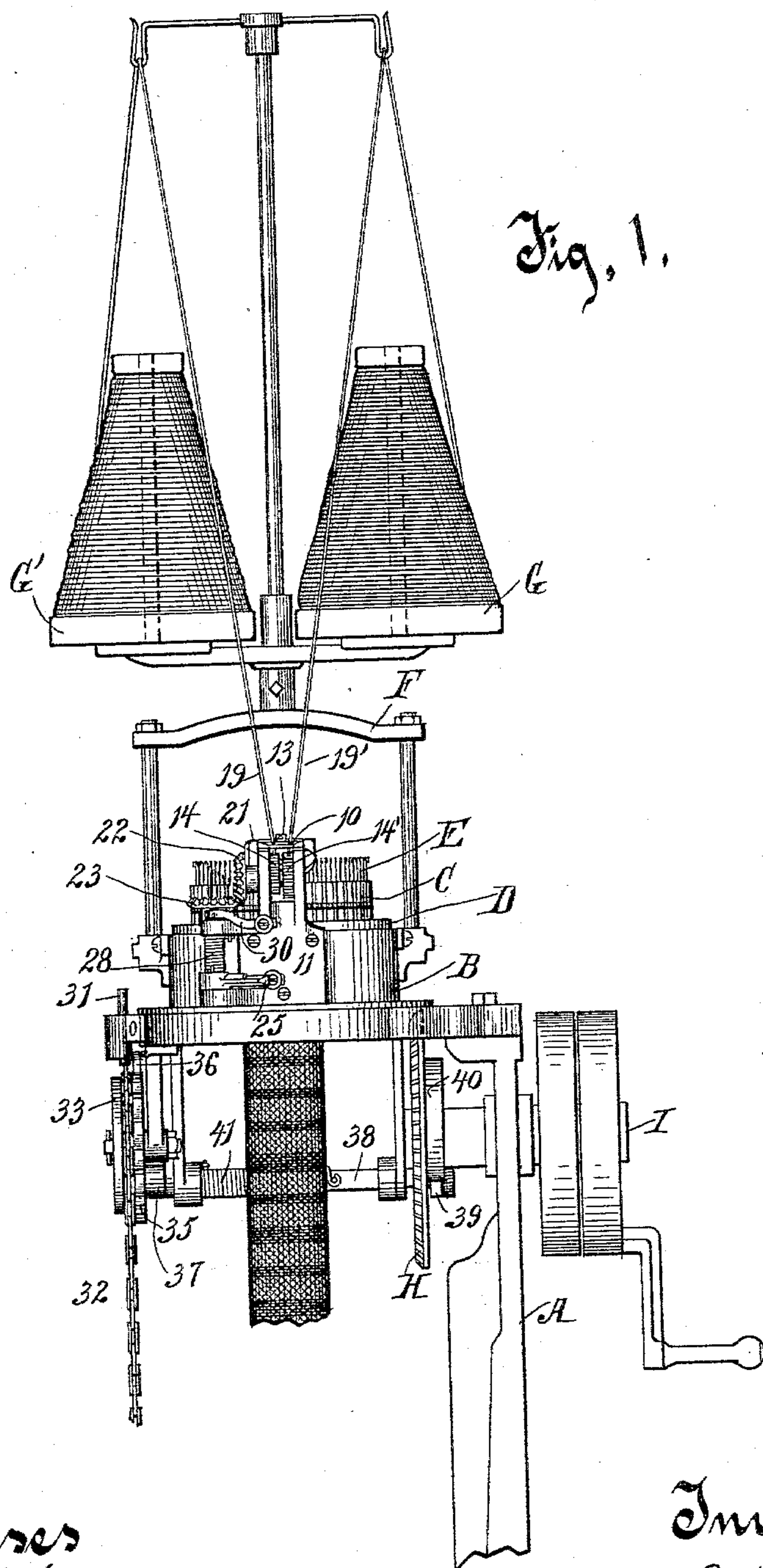
(No Model.)

2 Sheets—Sheet 1.

A. SEDMIHRADSKY.
YARN CHANGING DEVICE FOR KNITTING MACHINES.

No. 545,135.

Patented Aug. 27, 1895.



Witnesses
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(No Model.)

2 Sheets—Sheet 2.

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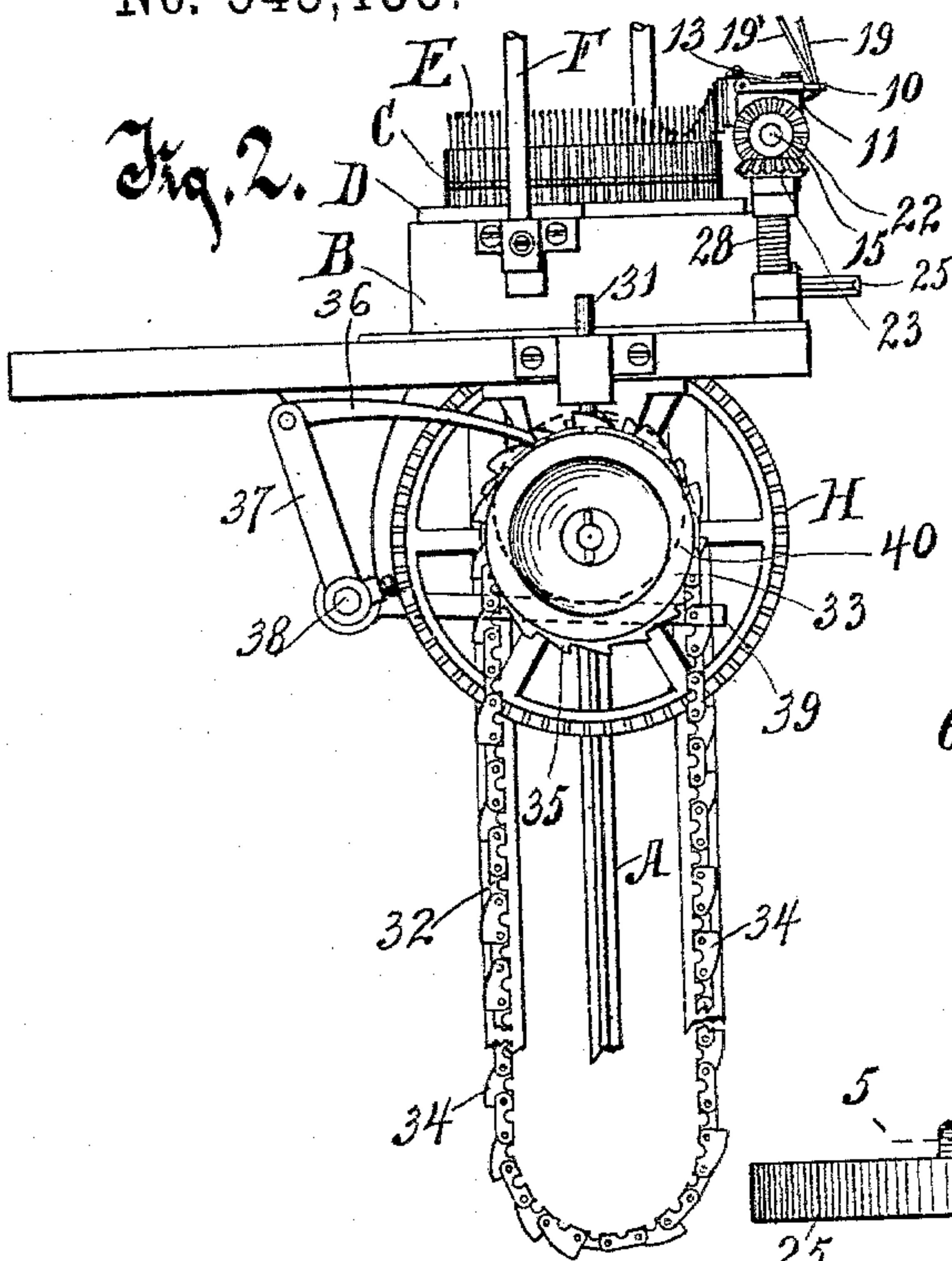


Fig. 3.

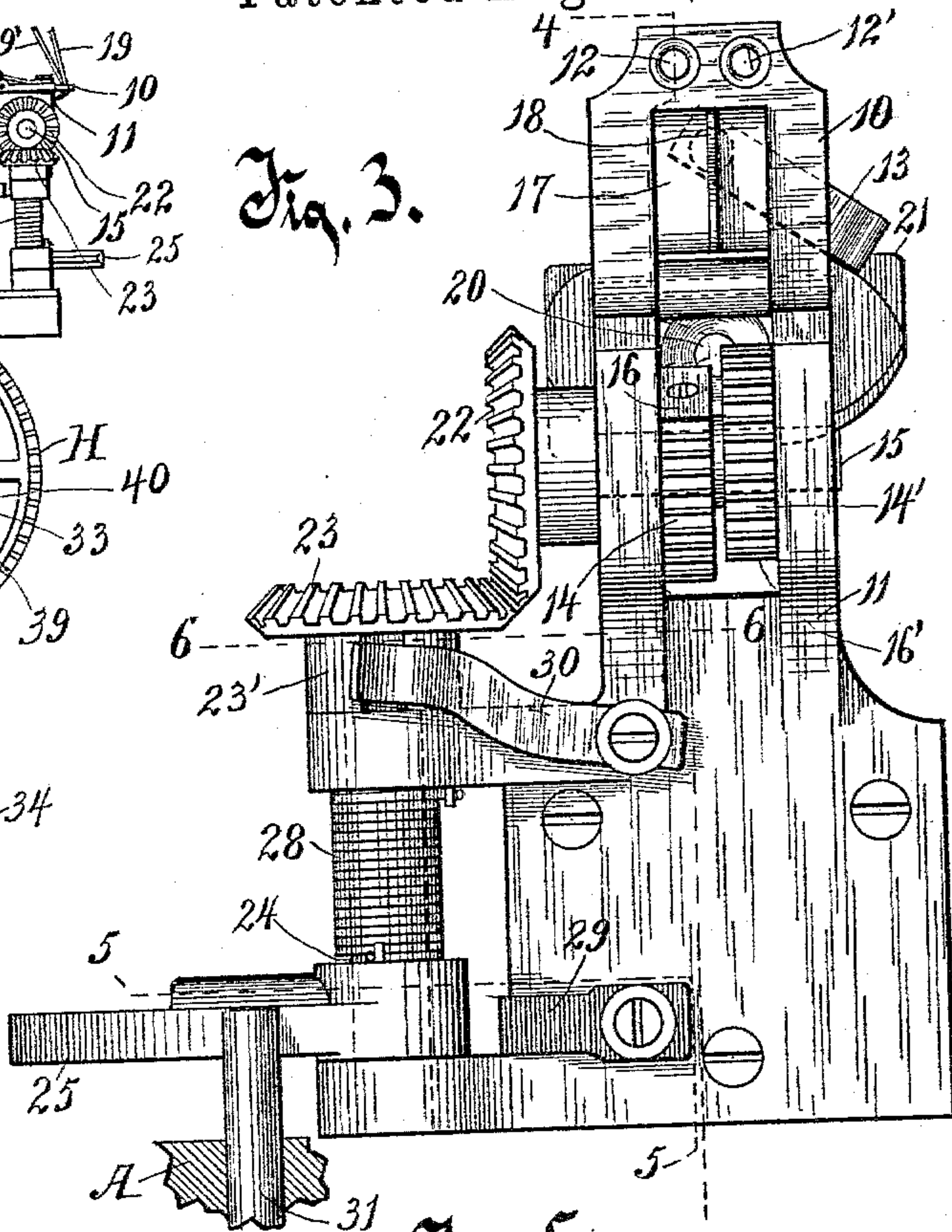


Fig. 4.

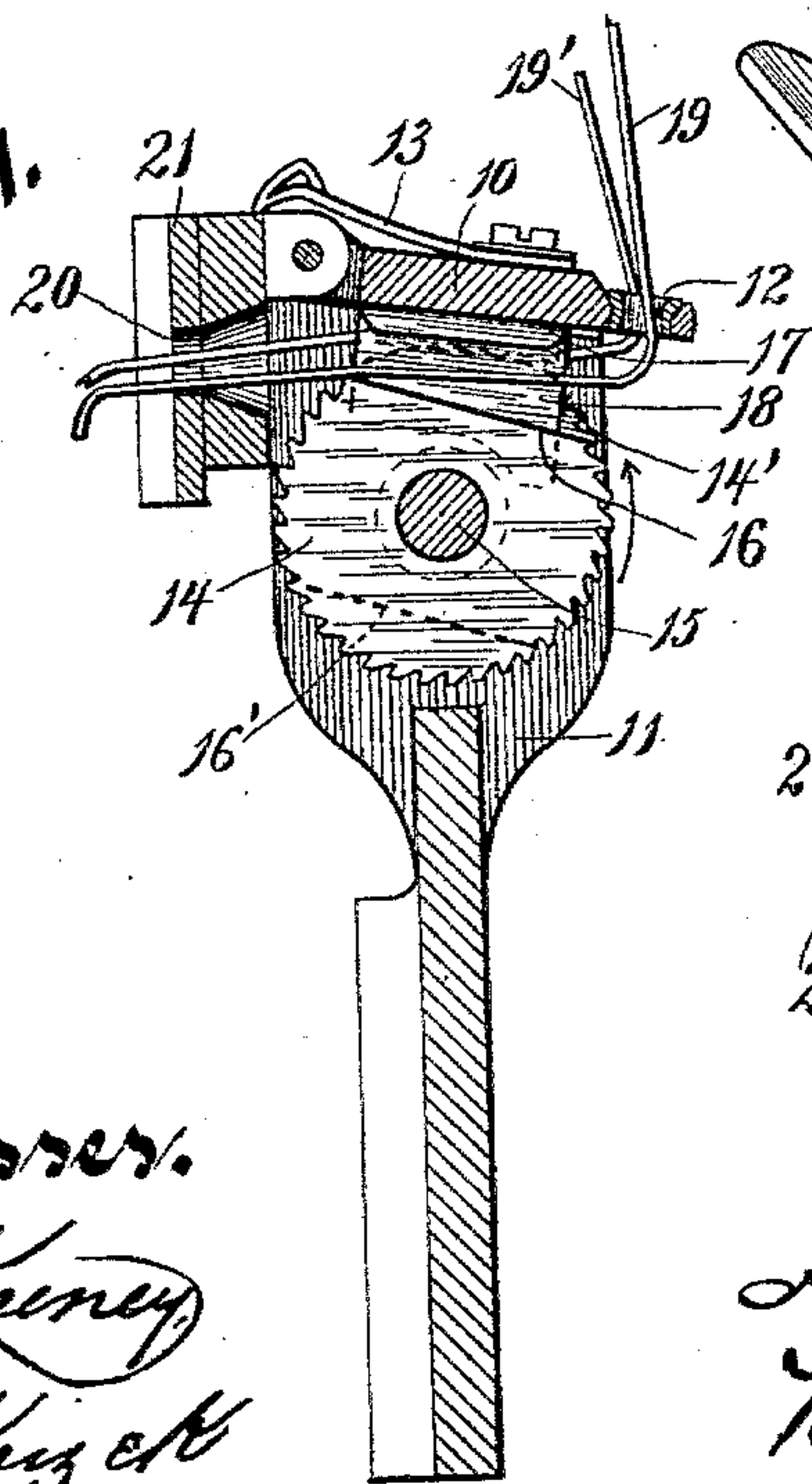


Fig. 5.

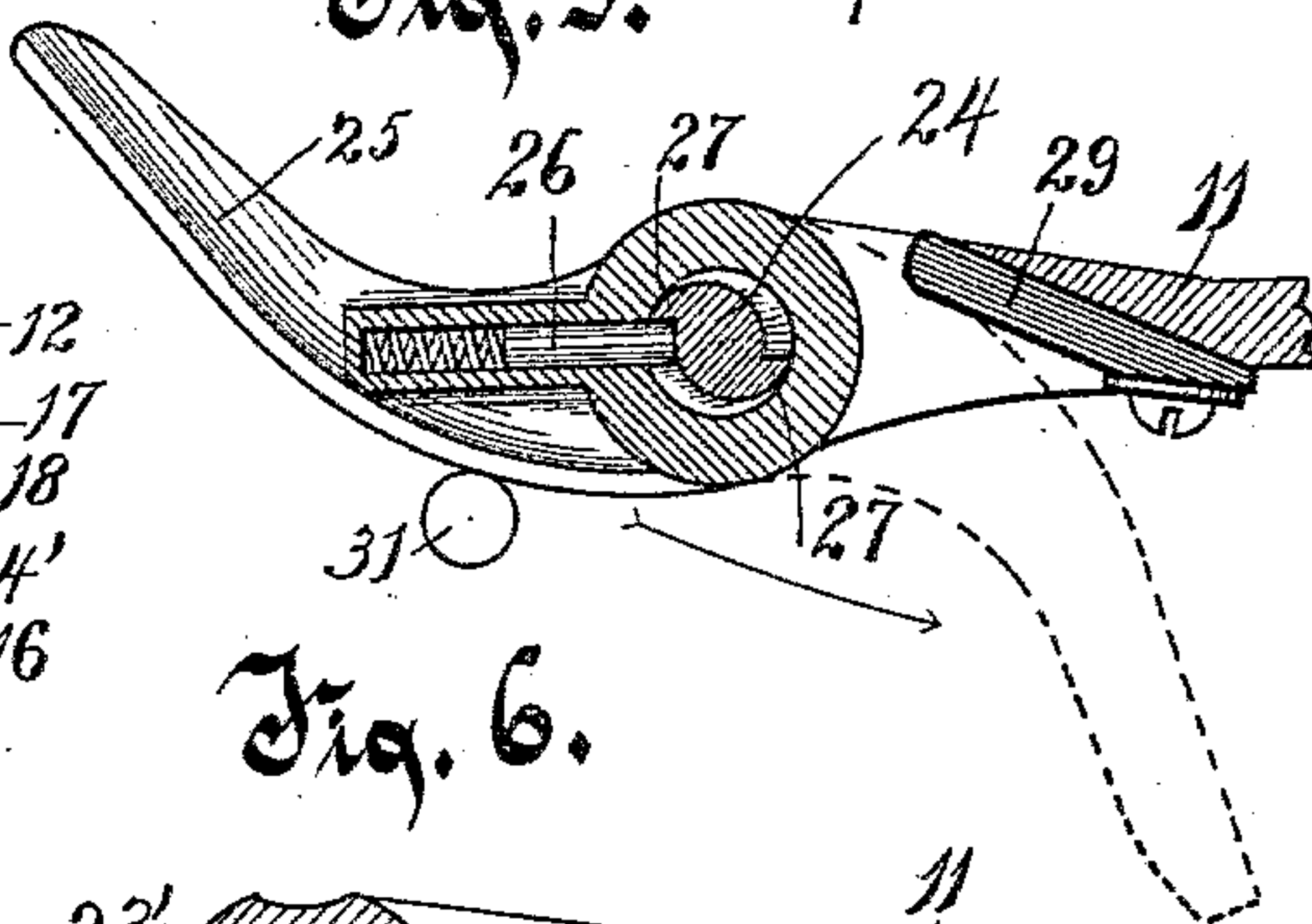
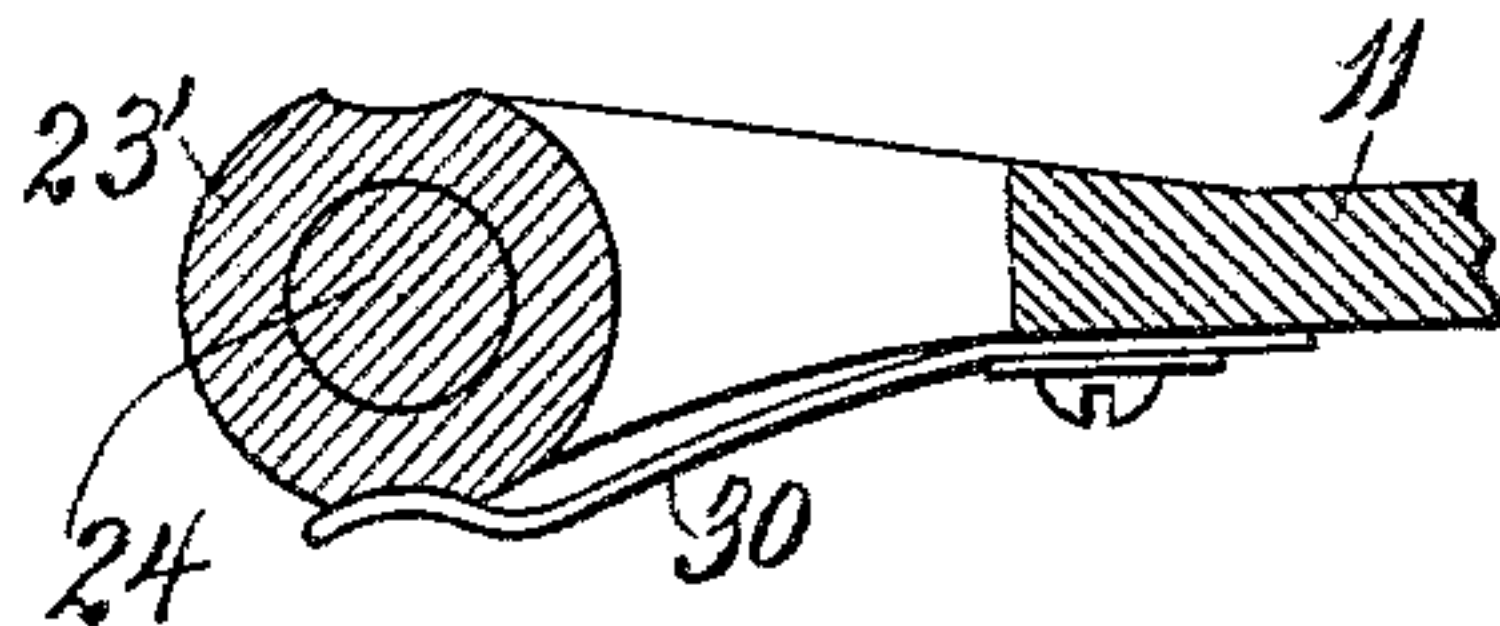


Fig. 6.



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UNITED STATES PATENT OFFICE.

ADOLPH SEDMIHRADSKY, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO THE
KALAMAZOO KNITTING COMPANY, OF SAME PLACE.

YARN-CHANGING DEVICE FOR KNITTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 545,135, dated August 27, 1895.

Application filed July 5, 1893. Serial No. 479,570. (No model.)

To all whom it may concern:

Be it known that I, ADOLPH SEDMIHRADSKY, of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented a new and useful Improvement in Yarn-Changing Devices for Knitting-Machines, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

10 The object of my invention is to provide devices in a knitting-machine for automatically and severally presenting threads of different colors to the needles and for stopping the delivery of the thread and causing it to
15 be broken off in accordance with a predetermined arrangement.

The invention consists of the devices hereinafter described and claimed and their equivalents.

20 Figure 1 is an elevation of the upper portion of a circular-knitting machine with which my novel devices are embodied. Fig. 2 is an elevation at a right angle to Fig. 1 of the principal portion of the mechanism shown
25 therein, exhibiting important features of my device. Fig. 3 is an enlarged view in elevation of a portion of my improved mechanism, the view of these parts being substantially the same as that shown in Fig. 1. Fig. 4 is a
30 vertical section of the device on line 4 4 of Fig. 3. Fig. 5 is a detail of a tripping-lever on line 5 5 of Fig. 3. Fig. 6 is a detail.

My improved devices are especially adapted for use with a circular-knitting machine, and
35 I have therefore shown them in connection with such a machine, though with slight modifications in form they may be used with any machine in which the needles are reciprocated in knitting and in connection with
40 the mechanism for reciprocating them.

In the drawings, A is the frame on which the machine is supported.

B is a cylinder mounted revolubly on the frame, and has in its inner surface an annular
45 groove and cam for reciprocating the needles.

C is the needle-cylinder.

D is a ring at the top of the cylinder B and partially within it between that cylinder and the cylinder C, and is adapted to prevent
50 the undue or excessive upward movement of the needles.

E are the needles in the needle-cylinder C.

F is a yoke mounted on the cylinder B, on which a plurality of spools G G' are carried, which spools are provided with thread or
55 yarn of different colors, the difference in colors being indicated in the drawings by the darker shading of the yarn on the spool G. The cam-cylinder B is rotated by a wheel H fixed on a shaft I mounted in the frame and
60 provided with a crank-handle and a fixed pulley, by either of which means it may be rotated. The wheel H meshes with an annular rack on the cylinder B. The mechanism thus far specifically described is in common
65 use and no more detailed description or illustration of these parts is deemed necessary.

In my improved devices a plate 10 is hinged on a bracket 11 secured rigidly to the cam-cylinder B. The plate 10 is so hinged to the
70 bracket 11 as to extend normally nearly horizontally, Fig. 4, on the top of the upwardly-extending furcate parts of the bracket, Fig. 3. This plate is preferably provided with a plurality of apertures 12 12', through which
75 threads of the yarn pass and are thereby loosely held and guided when being knitted. A spring 13, pivoted on the plate 10, bears against the bracket and holds the plate yieldingly in position.
80

Yarn-controlling cams or segmental wheels 14 14' are fixed on a shaft 15, mounted in the furcate bracket 11. These wheels 14 14' are preferably corrugated or toothed on the curved portions of their perimeters to provide for effectually gripping the thread and
85 also providing interdental spaces to receive knots occurring in the yarn as the thread passes it. These wheels 14 14' are severally faced or have a segment removed at 16 16',
90 which omitted segments are, where two wheels are employed, arranged diametrically opposite each other. Where more than two threads are to be used, there must be as many yarn-controlling cams or wheels as there are threads
95 or yarns to be used, and these several wheels, each having a segment removed, must be so arranged on the shaft 15 that the removed segments shall not register with each other, and there should be a corresponding number
100 of apertures 12 in the plate 10. I have deemed it sufficient to show only two wheels, thereby

providing for the use of yarns in two colors for striping annularly the article to be knitted. These segmental wheels are located immediately below and near to the pad or bearing-block 17, which forms a part of the plate 10. The space occurring between the block 17 and the faced or straight portion of each wheel, occurring by reason of the omitted segment, provides a passage for the free movement of the thread between each wheel and the block 17. A thin plate 18, projecting from the block 17, medially enters slightly a space between the wheels 14 14' and serves as a partition to separate and guide the threads above the wheels. The threads 19 19' pass respectively through the apertures 12 12' and over the wheels 14 14' beneath the block 17 and through an aperture 20 therefor in plates 21 at the rear of and forming a part of the bracket 11. It will be understood that when a removed segment or face 16 of one of the wheels 14 is directly below and opposite to the plate 17 that a free passage exists for the movement of the thread therethrough, and that when the wheel is rotated the curved perimeter will revolve so close to the plate 17 as to catch the thread and carry it forward therewith and when stopped will grip it thereto.

For rotating the shaft 15 it is provided with a beveled toothed wheel 22, gearing with a corresponding wheel 23, fixed on a short vertical shaft 24, mounted on the cylinder B, conveniently by being journaled in suitable projections of the bracket 11. A tilting arm 25 is loose on the shaft 24 near its lower extremity. This tilting arm is provided with a spring-actuated pin 26, adapted to engage the cam-teeth 27 on the shaft 24 and rotate the shaft with it in one direction. The teeth 27 are eccentric or cam-shaped in the rear, whereby they are adapted to lift the latch 26 and allow the arm 25 to swing freely in the reverse direction from that in which it carries the shaft with it without rotating the shaft. The arm 25 normally occupies the position indicated by dotted lines in Fig. 5, being held yieldingly in this position and retrieved thereto when otherwise forced therefrom by the spring 28 coiled about the shaft and secured at one end to the arm and at the other end to the relatively fixed supporting-bracket. A rubber block 29, secured to the bracket 11, receives the shock of the arm 25 when it is retrieved by the spring. A spring 30, fixed on the bracket 11, bears at its free end in recesses therefor, one at each side, in the hub 23' of wheel 23 on shaft 24 and holds the shaft yieldingly against rotation, serving to prevent the shaft from revolving rearwardly by friction with the arm 25 when the arm is retrieved and under strain on the yarn.

For tripping the arm 25, and thereby rotating the shafts 24 and 15, a pin 31 is set vertically and loosely in the frame, which pin, being at a predetermined time elevated into the path of the arm 25, engages it and swings

it around or tilts it as the arm 25 on the revolving cylinder B passes the pin. The pin 31 is so constructed and arranged that normally it is below the path of the arm 25.

For elevating the pin 31 into the path of the arm 25 at predetermined periods for and thereby changing the thread delivered to the needles a pattern-chain 32 is provided. This chain is carried on a sprocket-wheel 33 mounted on the frame. The chain is provided at prescribed distances apart, corresponding with the points in the knitted article at which a change in the color of the yarn is desired, with projecting or cam links 34. These cam-links are adapted as they pass beneath the pin 31 to elevate it into the path of the arm 25. A number of these pattern-chains may be provided and one may be used adapted to knit such annular stripes as thereby provided for. The chains are readily removed from and hung on the sprocket-wheel. The sprocket-wheel 33 is connected operatively to the working mechanism of the knitting-machine, preferably by means of a ratchet-wheel 35 fixed to the sprocket-wheel. This ratchet-wheel is actuated by a pawl 36, Fig. 2, pivoted in the crank-arm 37 of a rock-shaft 38, mounted in the frame, which rock-shaft is provided with another crank-arm 39, bearing against and actuated by an eccentric 40 on the shaft I. The rock-shaft 38 and the pawl 36 carried thereby are retrieved by a spring 41 coiled about the rock-shaft and secured thereto at one extremity and to the frame at the other extremity.

It must be understood that in knitting the fabric the dark thread 19', Fig. 1, runs freely to the needles until such time as the pin 31, being elevated by the pattern-chain, comes into the path of the arm 25 and rotates the wheel 16' a half-revolution, gripping and holding the thread 19', so that as a needle seizes it in the regular process of knitting and pulls down on it it will be broken off, while in the meantime and concurrently therewith the wheel 14, being rotated a half-revolution, pushes the thread 19 forward through the aperture 20 into the path of the needles, so that this thread 19 is caught and carried into the fabric by needles preceding the one that breaks the thread 19', thereby changing the yarn to the lighter color, which is continued running through the passage therefor until the pattern-chain elevates the pin 31 again, thereby changing the yarn again.

It will be understood, as hereinbefore suggested, that it is only necessary to add additional wheels of the same general character alongside the wheels 14 14', and to correspondingly change complementary parts, within the skill of any qualified mechanic, to adapt the mechanism for the use of an additional number of threads of varying colors.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a device for automatically changing

the threads being used in a knitting machine, a plurality of concurrently revoluble wheels having non-registering segments removed therefrom, and a plate held yieldingly to the perimeters of the wheels, whereby a thread between the perimeter of a wheel and the plate will be gripped and another thread between the plate and the face of the removed segment of the adjacent wheel is permitted to run freely therethrough, substantially as described.

2. In a knitting machine, the combination with the cam cylinder, the needle cylinder, and the needles therein, of a plurality of wheels having non-registering segments removed, mounted on the cam cylinder, and a spring-actuated plate having guides for the threads, located opposite to the perimeters of the wheels and adapted to grip threads of yarn thereto severally, substantially as described.

3. In mechanism for automatically feeding threads to and withholding them from a knitting machine, the combination of a plurality of concurrently rotating wheels, said wheels having non-registering segments removed therefrom, a thread-bearing plate located near to the wheels, a guide to direct the threads to the wheels, and means for intermittently rotating said wheels, substantially as described.

4. The combination with the cam cylinder of a knitting machine, of a plurality of wheels 14, 14' having non-registering segments removed therefrom mounted on said cylinder, a plate 10 provided with apertures 12, 12' and with a partition 18, and a spring 13 adapted to hold the plate yieldingly to the perimeters of the wheels, substantially as described.

5. In a knitting machine, the combination with thread gripping wheels mounted on a shaft provided with a gear wheel, of a shaft having a wheel meshing with the gear wheel aforesaid, a tripping arm loose on the last mentioned shaft, which arm is provided with means to engage and carry the shaft with it in one direction, and other means by which the arm is retrieved, substantially as described.

6. In a knitting machine, the combination with a revolving cam cylinder, of revoluble thread-gripping devices, a shaft mounted on the cylinder and geared to the gripping devices, a swinging arm loose on the shaft, a spring-actuated pin in the arm adapted to engage cam teeth on the shaft and to rotate the shaft therewith in one direction and to pass over the teeth when swung in the reverse direction, and a spring secured to the arm and to a relatively fixed support adapted to retrieve or swing the arm back in one direction, substantially as described.

7. In a device for actuating thread-gripping mechanism in a knitting machine, the combination of a shaft 24, a tripping arm 25 loose on the shaft having means to engage the shaft and rotate it therewith in one direction, means for engaging and swinging the arm with the shaft in one direction, and other means for swinging the arm in the reverse direction, and a spring 30 engaging the shaft yieldingly and preventing its rotation by friction with the arm when it is retrieved, substantially as described.

8. The combination with the frame and revoluble cam cylinder of a knitting machine, of a plurality of revoluble alternately acting gripping wheels fixed on a shaft, a second shaft geared to the first mentioned shaft, an arm loose on said second shaft having means to engage the shaft and rotate it therewith in one direction, a pin movable vertically in the frame adapted to be lifted into the path of the arm and thereby to trip it as the cylinder revolving carries the arm past the elevated pin, and a traveling pattern chain directly beneath the pin, which chain is provided with cam links adapted to elevate the pin as they pass it on the chain, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

ADOLPH SEDMIHRADSKY.

Witnesses:

C. T. BENEDICT,
ANNA V. FAUST.