

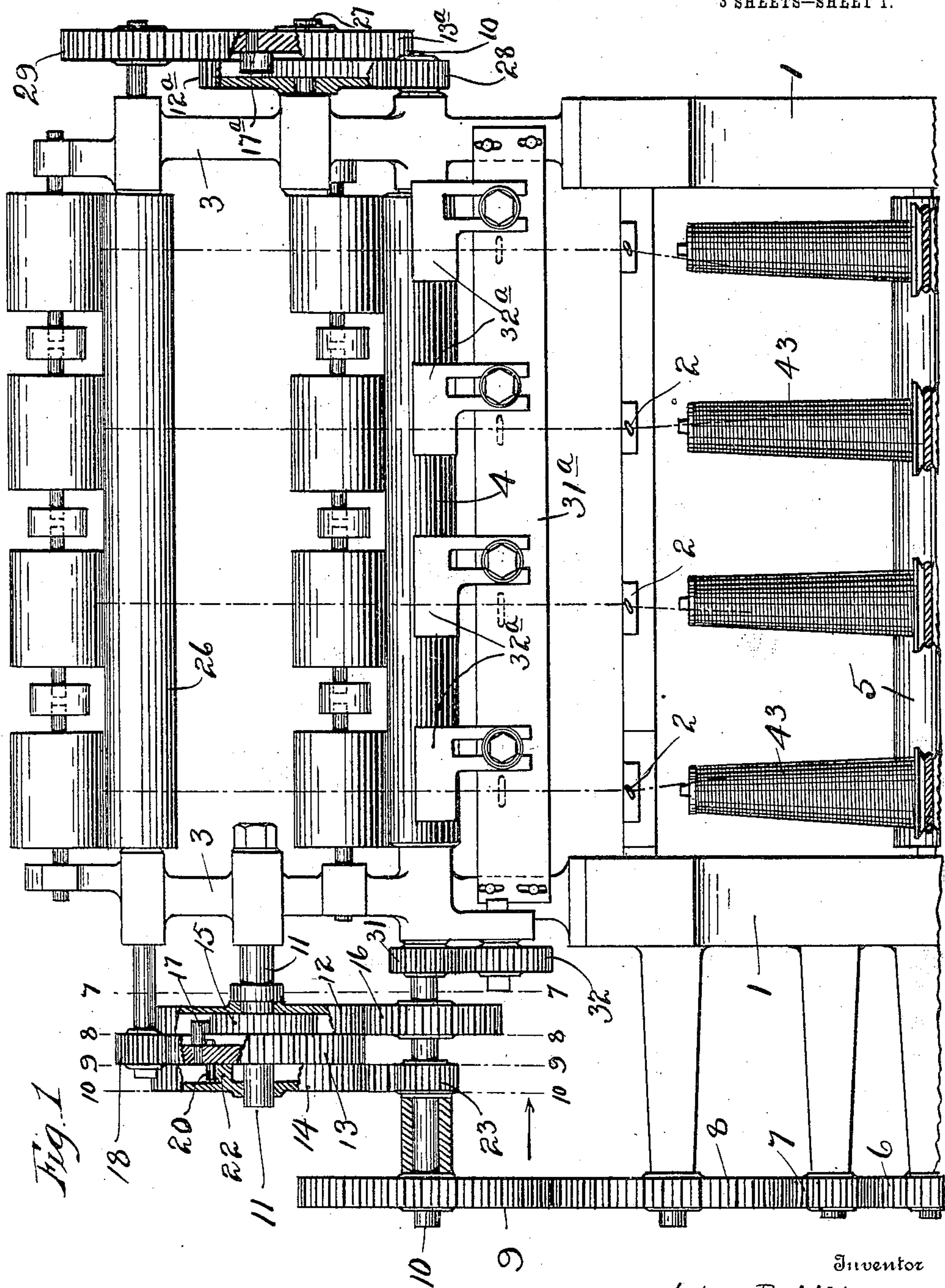
No. 816,675.

PATENTED APR. 3, 1906.

J. R. MILSON.
SPINNING AND TWISTING MACHINE.

APPLICATION FILED MAY 15, 1905.

3 SHEETS—SHEET 1.



Witnesses

Frank A. Foster
E. J. Ogden

By

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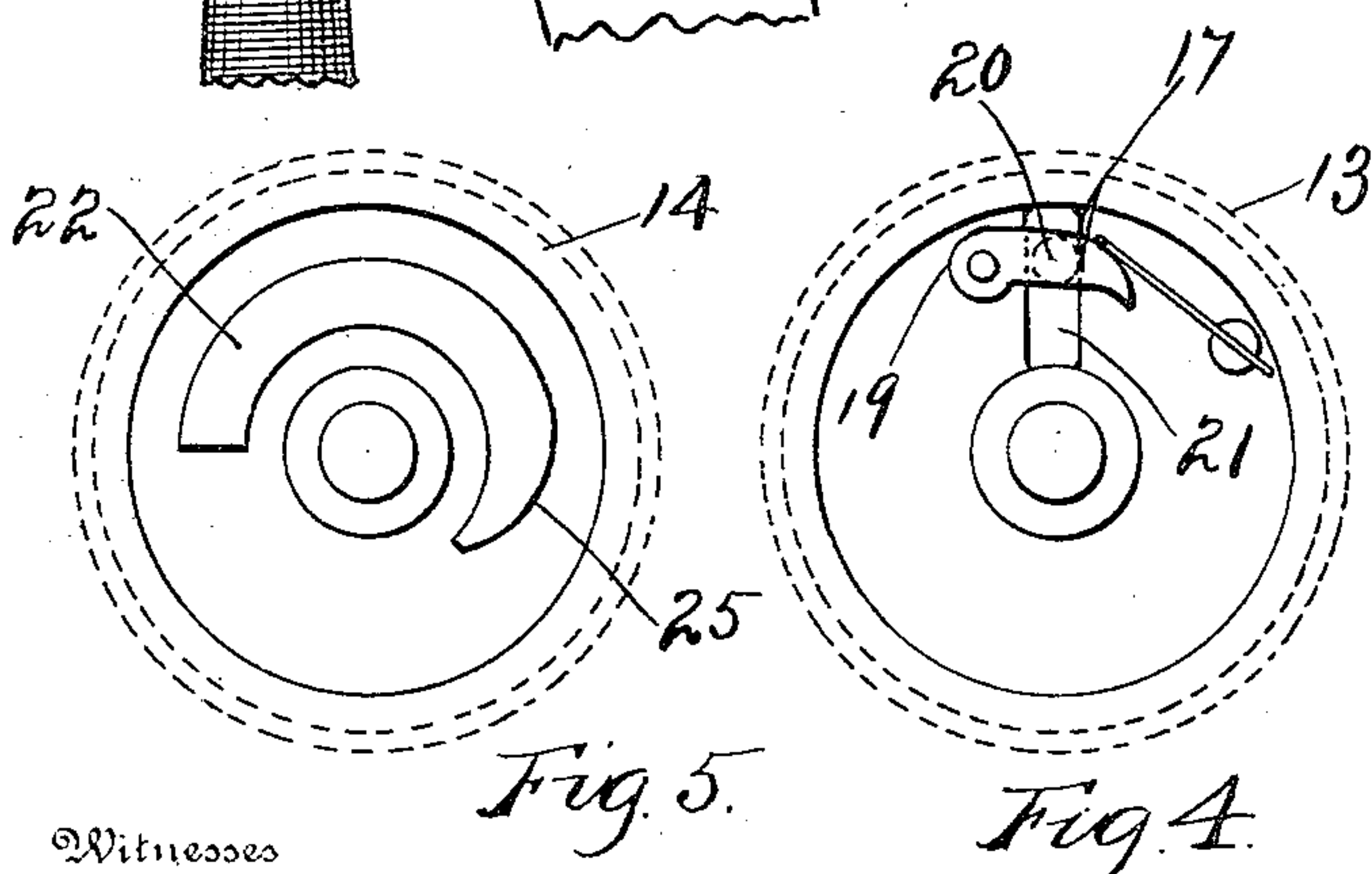
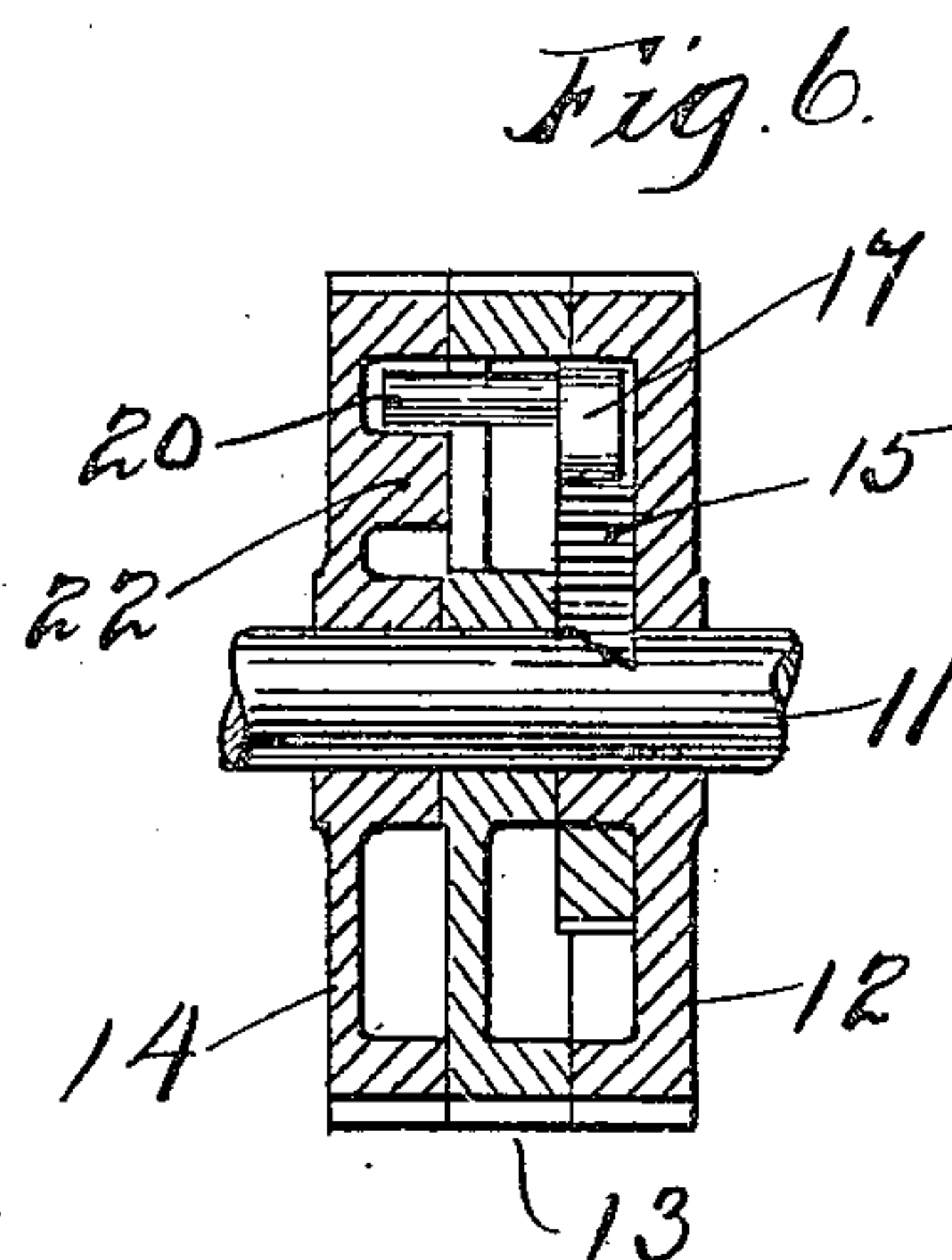
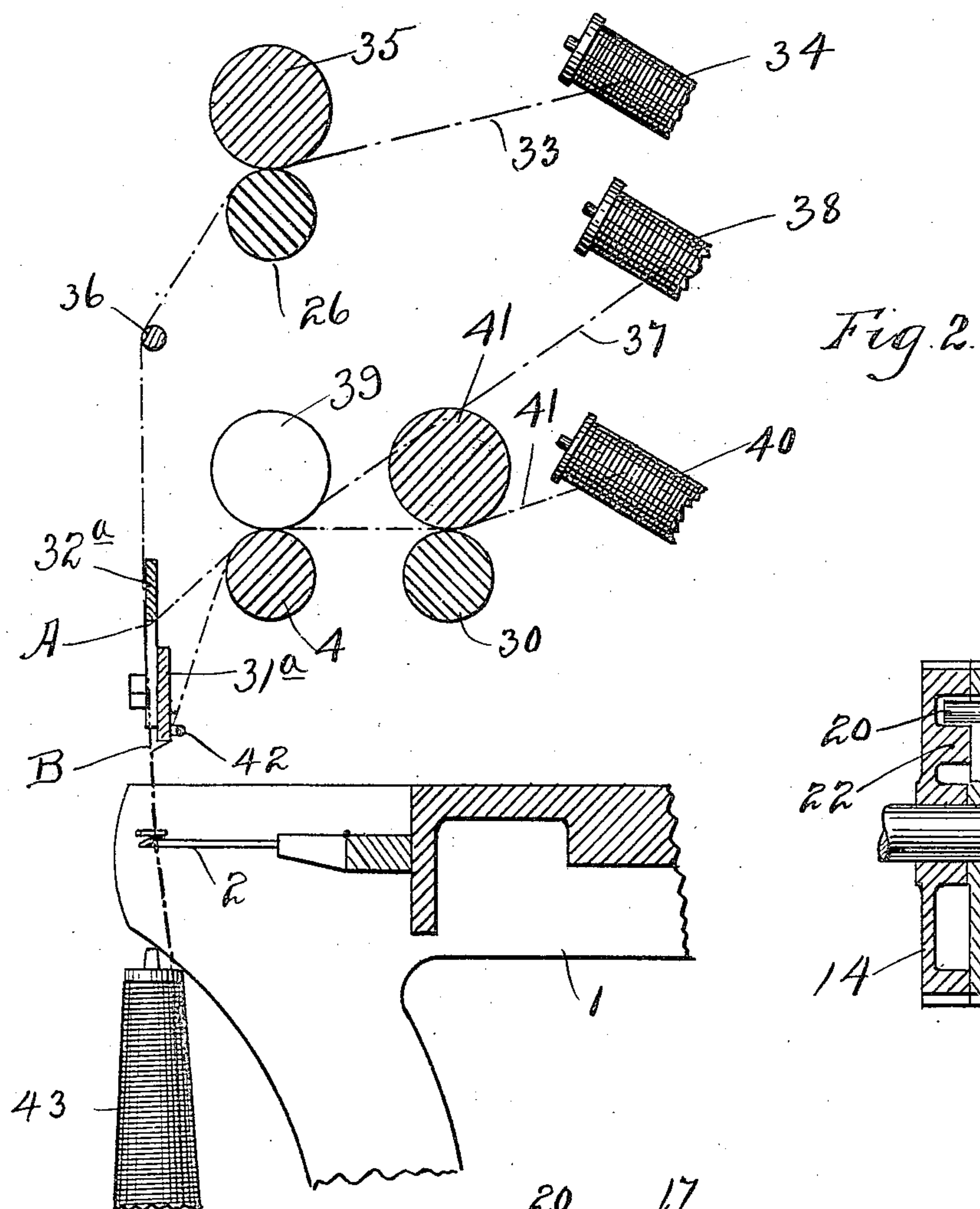
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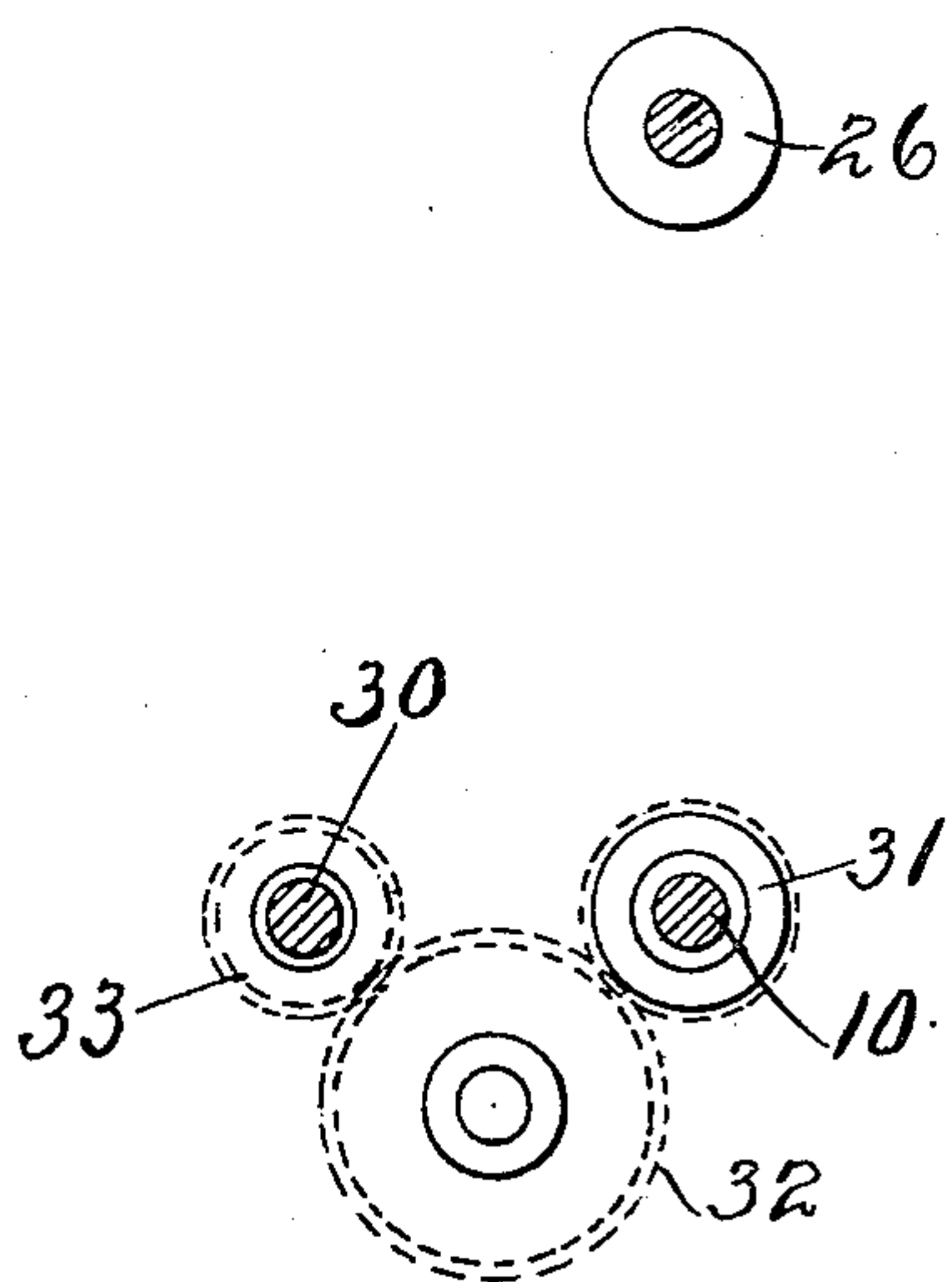


Fig. 7.

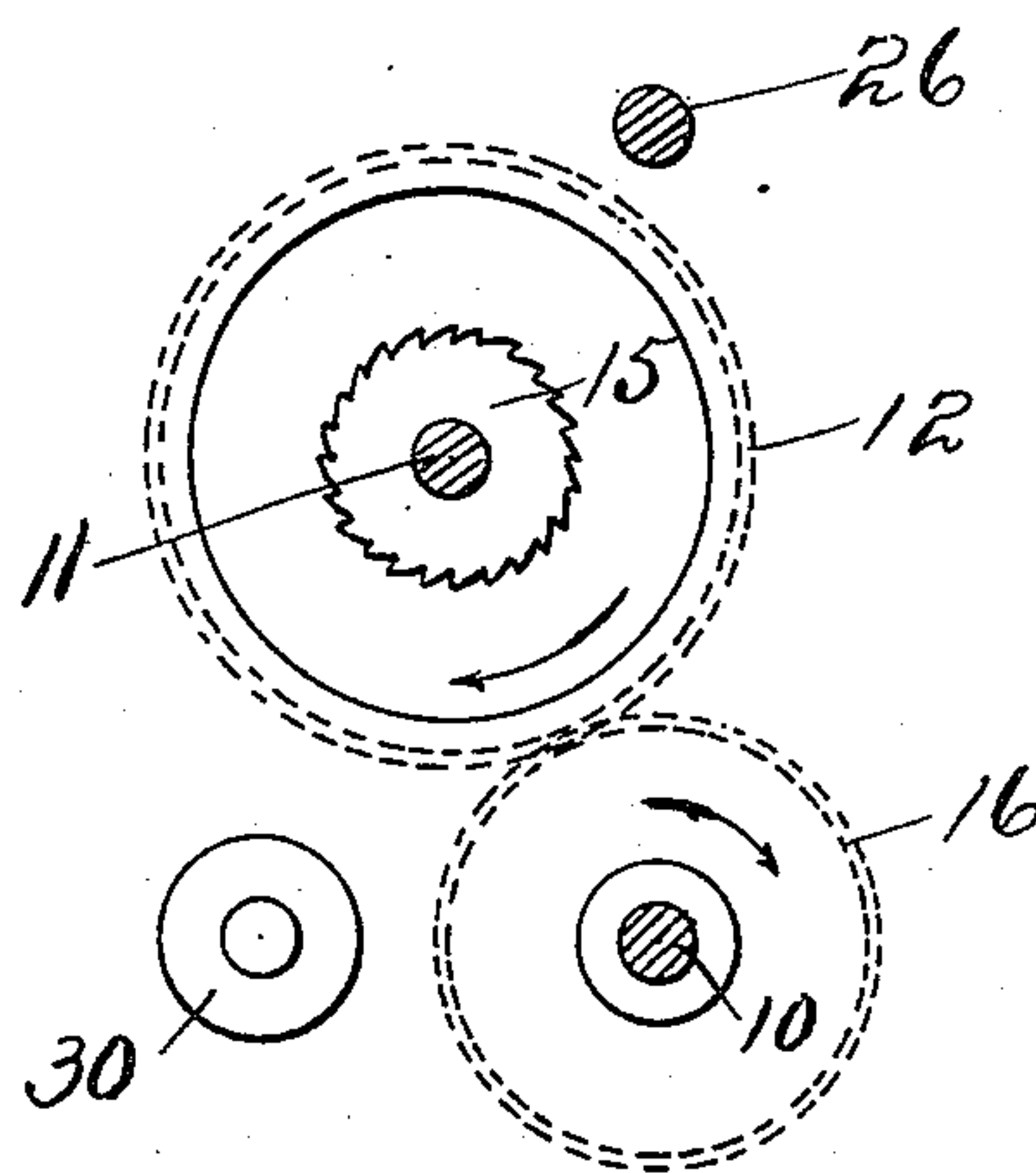


Fig. 8.

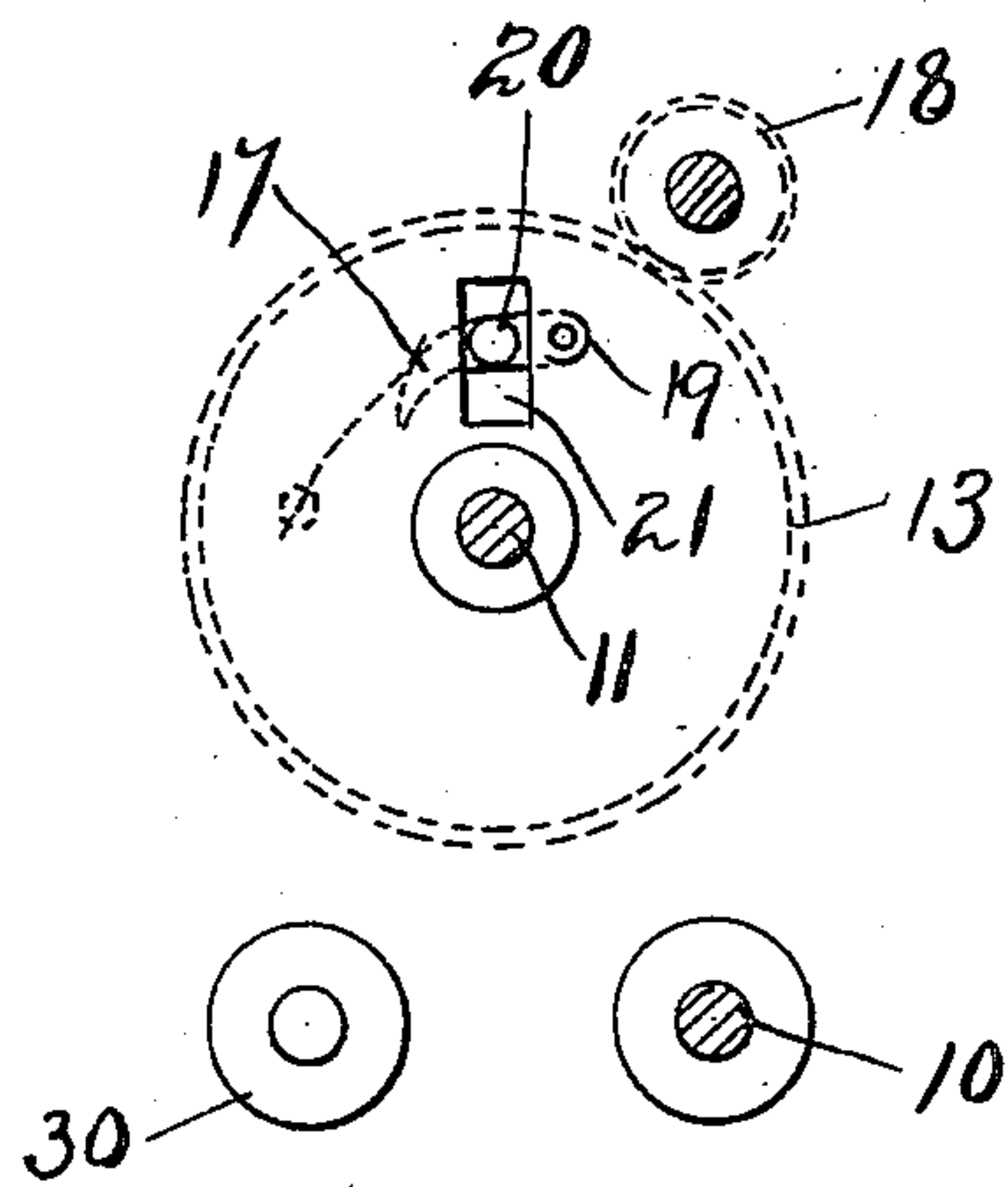


Fig. 9.

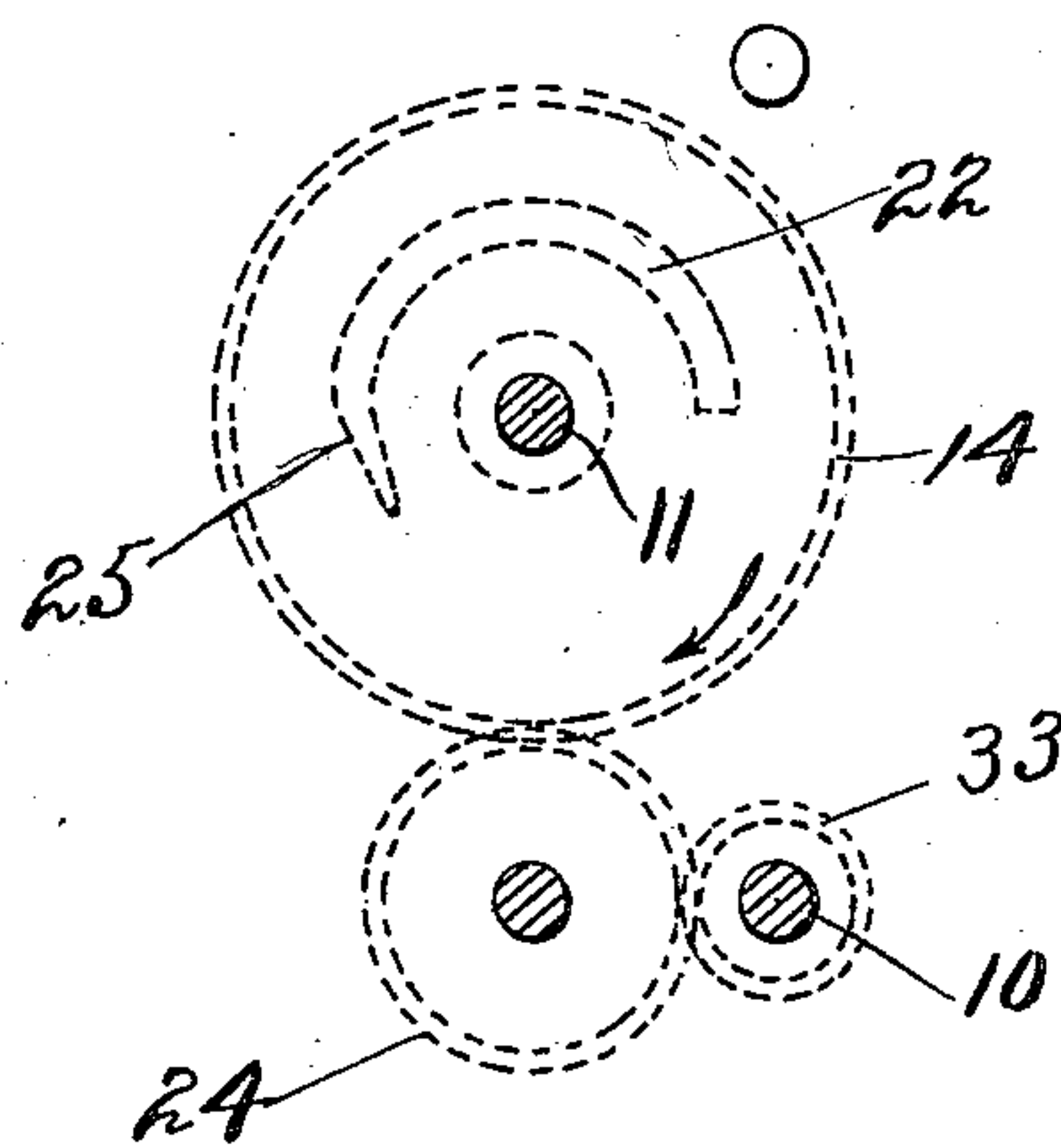


Fig. 10.

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UNITED STATES PATENT OFFICE.

JOHN R. MILSON, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR OF ONE-FOURTH TO COLLINS BROTHERS, OF PAWTUCKET, RHODE ISLAND, A FIRM.

SPINNING AND TWISTING MACHINE.

No. 816,675.

Specification of Letters Patent.

Patented April 3, 1906.

Application filed May 15, 1905. Serial No. 260,383.

To all whom it may concern:

Be it known that I, JOHN R. MILSON, a citizen of the United States, residing at the city of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Spinning and Twisting Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to the spinning and twisting of different-colored threads into fancy yarns, and has for its object to produce simple attachments to the ordinary spinning and twisting machines whereby a plurality of different-colored yarns may be fed at different relative speeds and twisted together to produce fancy-colored yarns.

A further object of the invention is to twist or spin a plurality of yarns together, so that when finished a thread of one color will be wound around all of the other threads, completely covering the same and producing a solid color for a given distance. Then a thread of another color may be brought to the outside and wound around the others, producing another solid color, and so on. Each thread in turn may be brought out and wound around the others at intervals, producing a yarn of a plurality of solid colors, giving said yarn a printed effect.

In the formation of my improved yarn any desired number of threads may be used; but for convenience I have shown only three threads in the drawings. These threads may be of any desired colors and fed by the three sets of rolls shown, which run at different relative speeds.

The same quantity of yarn may be turned off by the use of my machine as is now produced by the ordinary machine, and such yarn has a greatly increased value over said ordinary yarn, as fancy and novel effects in cloth may be produced therewith, and a much higher price is obtainable for the goods. Heretofore in preparing yarn to produce these effects in cloth the yarn has been printed, which necessitates putting it through several operations, the production being therefore necessarily slow and the product expensive.

It is well known to those skilled in the art that printed yarns cannot be obtained in fast

colors and will therefore soon fade, materially reducing the value of the goods; but yarns produced by my method may be of permanent colors and the goods woven from them will stand scouring and fulling without fading. A further advantage of producing yarn in this manner is that the same may be spun in various colors on one machine and all in one operation, reducing the expense of production to the minimum. Heretofore the printing of yarns has been confined mostly to cotton goods; but these printed effects with my improved yarn may be obtained not only in cotton threads, but also by the spinning of worsteds, wool, mohair, alpaca, or any other threads to produce novel effects in cloth for men's suiting and worsted dress goods or the like, such as have never before been obtained.

The invention consists of other novel features and parts and combinations of the same, as will be fully described hereinafter and then pointed out in the appended claims.

A practical embodiment of the invention is represented in the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

In the drawings, Figure 1 is a front elevation of a spinning and twisting machine with my mechanism for producing fancy yarns attached thereto. Fig. 2 is a sectional end view of the machine, representing three sets of rolls feeding three threads of different colors and at different relative speeds. Fig. 3 is a front elevation of the ratchet-gear that receives its rotary motion from the lower front roll. Fig. 4 is the gear that drives the upper set of rolls at intervals through the pawl mounted thereon that engages the said ratchet-gear. Fig. 5 is the cam-gear that engages and raises the pawl at intervals out of engagement with the said ratchet-gear. Fig. 6 shows the ratchet-gear, the pawl-gear, and the cam-gear in their working relation to each other. Fig. 7 is a section on line 7 7 of Fig. 1 looking in the direction of the arrow, showing the three sets of rolls and the intermediate gear for driving the lower rear roll from the front roll. Fig. 8 is a section on line 8 8 of Fig. 1, showing the ratchet-gear as being driven from the lower front roll. Fig. 9 is a section on line 9 9 of Fig. 1, showing the

pawl-gear as connected to the upper front roll. Fig. 10 represents the cam-gear as being driven in a reverse direction from the ratchet and pawl gears through an intermediate gear.

Referring to the drawings, at 1 1 are the end frames of the machine, and at 2 2 are the thread-guides, supported from said frames, and at 3 3 are the brackets for supporting the feed-rolls and driving mechanism. In Fig. 1 the lower feed-roll 4 is shown as being driven from the drum 5 through the gears 6, 7, 8, and 9, the last-mentioned gear being fixed to the roll-shaft 10. Mounted to turn on the short shaft 11 are the three gears 12, 13, and 14. A ratchet-wheel 15 is fixed to gear 12, which gear is driven from the roll-shaft 10 through the gear 16. The pawl-carrying gear 13, mounted on the same shaft 11, receives its motion from gear 12 through the engagement of its pawl 17 with the ratchet-wheel 15. This gear 13 transmits motion to the upper rolls through the pinion 18. The pawl 17, above referred to, is pivoted in this gear 13 at the point 19, (see Fig. 9,) and said pawl is provided with a pin 20, that projects out through a slot 21 in the side of the gear far enough to be engaged by the cam 22 in the cam-gear 14. This cam 22 is fixed to gear 14 and is shown as being semicircular in form and slightly tapering at one end 25, so as to better engage and lift the pawl 17, through its pin 20, from the ratchet 15. This cam may be made into two or more parts, if desired, and thereby change the speed of the upper roll oftener. This cam-gear 14 is driven in the reverse direction to the other two gears 13 and 12 and receives its motion from the roll-shaft 10 through the pinion 23 and intermediate gear 24. To completely control the driving of the upper roll 26, so that the speed may be intermittent, I have mounted a ratchet-gear 12^a and a pawl-gear 13^a, similar in construction to those on the opposite end of the machine. These gears are mounted to turn on the shaft 27, gear 12^a receiving its motion from lower roll-shaft 10 through the pinion 28, and, like the gears at the opposite end of the frame, gear 12^a transmits its motion to the upper roll 26, through the engagement of its pawl 17^a, to gear 13^a and through gear 29 to the said upper roll. The lower rear roll 30 is driven from the gear 31, mounted on roll-shaft 10, intermediate gear 32 and gear 33. (See Fig. 7.) It will be seen by this arrangement of gears that both the front roll 4 and rear roll 30 are driven at a constant speed, one a little faster than the other, while an alternate fast and slow speed is obtained on the upper roll 26 through the gears described above in the following manner: For example, let it be said that the gear 16 on the lower roll-shaft is running fifty rev-

olutions and is twice as large as the pinion 18 on the upper roll, and as the gears 12 and 13 act as intermediates it will be seen that when the pawl 17 is in mesh with ratchet 15 the roll 26 is being driven twice as fast as roll 4 and would continue to run at these relative speeds but for cam-gear 14, that is running in the opposite direction, causing its cam 22 to engage pawl-pin 20 to raise the pawl 17 out of engagement with its ratchet, thereby completely disconnecting the drive of these two rolls at this end of the frame, and the upper roll would stop but for the gears at the opposite end of the frame. On this right end the upper roll is driven by a pinion 28 on the lower roll one-third smaller than the gear 29 on the upper roll. Therefore when the drive is disconnected at the left end the drive at the right end runs the upper roll at one-third the speed of roll 4, and when the drive at the left end is in engagement said upper roll is running twice as fast as said roll 4, at which time the pawl 17 at the right end is being drawn backward over the face of its ratchet-wheel.

Extending across the front of the machine is shown a blade or bar 31^a, which bar is for the purpose of controlling or limiting the upper twisting-point of the thread that feeds under it, and at 32^a is a vertically-adjustable controlling-finger, that is also for the purpose of limiting the twist in the upward direction. For example, let us say that the thread 33, leading from spool 34, is white and is led through the roll 26 and top roll 35, over the guide-rod 36, down in front of the finger 32, and that the thread 37, leading from spool 38, is red and is led between the feed-rolls 4 to roll 29 to join the white thread at the lower edge of controlling-finger 32, and leading from spool 40 is the blue thread 41, that is fed forward by the roll 30 and top roll 41 and led through the hook 42 to join the other threads at the lower edge of the controlling-bar 31, and after said threads are twisted together they are led through the guide-eye 2 to the rapidly-rotating bobbin 43 below.

The operation of the device may be more fully described as follows: The general mechanism of the machine on which these yarns are produced is mainly that of the ordinary spinning and twisting machine, to which are added the number of feed-rolls required to handle the desired number of different-colored threads, and to these rolls is attached my special mechanism for driving the same. In the machine shown three different-colored threads are used. The two lower sets of rolls are run at constant speeds; but one set is geared to feed its thread faster than the other set, and the third or upper set of feed-rolls is geared to feed at two different speeds—first at a speed much faster than either of the lower rolls and then at a speed much slower

than the same. By this arrangement of rolls a great variety of fancy colored yarns may be obtained, as the speeds of the different feed-rolls may be altered to produce different effects, and threads of any desired colors may be used to produce the desired effect in the yarns. In the arrangement shown let it be said that a white thread is being fed at thirty-three revolutions from the upper rolls, which thread is joined at the point A by the red thread that is being fed at fifty revolutions. Therefore at these relative speeds a solid color of red yarn is being formed at this point A. At the same time the red is forming at A a blue thread 41 is being fed onto the other two at the point B at a speed of about sixty revolutions. Therefore a solid blue is being formed at B. After the blue has been wound for a length equal to the distance between the point A and point B then a change takes place. The upper feed-rolls, through the mechanism described above, are run at about one hundred revolutions, and the white thread is wound around all of the other threads, forming a solid white portion at the point B. The length of the white portion is governed by the length of time the upper rolls are allowed to run at their fast speed, the length of the blue portion is controlled by the time allowed for these rolls to run at their slow speed, while the length of the red portion is controlled by the distance between the points A and B. The distance between these points may be varied at will by adjusting the controlling-finger 32 either up or down. The style of the yarn may also be varied by changing the length of the cam 22 in the cam-gear 14. This cam may be made in two, three, or four parts or more instead of one, as shown, if desired, thereby raising the pawl to change the speed oftener, causing the colored portions on the yarn to be shorter, or the speed of the gear may be changed to drive the cam either faster or slower, producing other variations. In fact, the speeds of any of the different rollers may be varied at will to produce an endless variety or styles of fancy yarns.

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

1. In a spinning and twisting machine, a plurality of sets of continuously-driven rolls for feeding a plurality of threads of different character, means for driving one or more of said sets at two speeds only, namely; a low speed and a high speed, and means for shifting from one speed to the other.

2. In a spinning and twisting machine, a plurality of sets of continuously-driven rolls for feeding a plurality of threads of different character, means for driving one or more of said sets at two speeds only, namely; a low

speed and a high speed, means for shifting from one speed to the other and means for controlling the distance or length that each color shall be formed in the yarn.

3. In a spinning and twisting machine, a plurality of sets of continuously-driven rolls for feeding a plurality of threads of different character, means for driving one or more of said sets at two speeds only, namely; a low speed and a high speed and adjustable means independent from the rolls for controlling the distance or length that each color shall be formed in the yarn.

4. In a spinning and twisting machine a plurality of sets of continuously-driven rolls for feeding a plurality of threads of different colors, means for driving one or more of said sets at two speeds only, namely, a low speed and a high speed, and means whereby two or more solid colors may be formed of a predetermined length at different points at the same time in the yarn.

5. In a spinning and twisting machine, a plurality of sets of continuously-driven rolls for feeding a plurality of threads of different colors, means for driving one or more of said sets at two speeds only, namely, a low speed and a high speed, means whereby two or more solid colors may be formed of a predetermined length at different points at the same time in the yarn and means independent from the rolls for controlling the distance or length that each color shall be formed in the yarn.

6. In a spinning and twisting machine, a plurality of sets of continuously-driven rolls for feeding a plurality of threads of different character, means for driving one or more of said sets at two speeds only, namely; a low speed and a high speed and means for shifting from one speed to the other, said means including a cam-operated pawl and a ratchet-wheel.

7. In a spinning and twisting machine, a plurality of sets of continuously-driven rolls for feeding a plurality of threads of different colors, one of said sets being driven at a constant speed and means for driving one or more of the remaining sets at two speeds only, namely, faster and slower than the said constant-speed rolls.

8. In a spinning and twisting machine, a plurality of sets of continuously-driven rolls for feeding a plurality of threads of different colors, one of said sets being driven at a constant speed, means for driving one or more of the remaining sets at two speeds only, namely; faster and slower than the said constant-speed rolls, and means whereby two or more solid colors may be formed for a predetermined length at different points at the same time in the yarn.

9. In a spinning and twisting machine, a

plurality of sets of continuously-driven rolls
for feeding a plurality of threads of different
colors, one of said sets being driven at a con-
stant speed and means for driving one or more
5 of the remaining sets at two speeds only,
namely; faster and slower than the said con-
stant-speed rolls, means whereby two or more
solid colors may be formed for a predeter-
mined length at different points at the same

time in the yarn, and adjustable means where- 10
by the length of each color may be controlled.

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

JOHN R. MILSON.

Witnesses:

HOWARD E. BARLOW,
E. I. OGDEN.