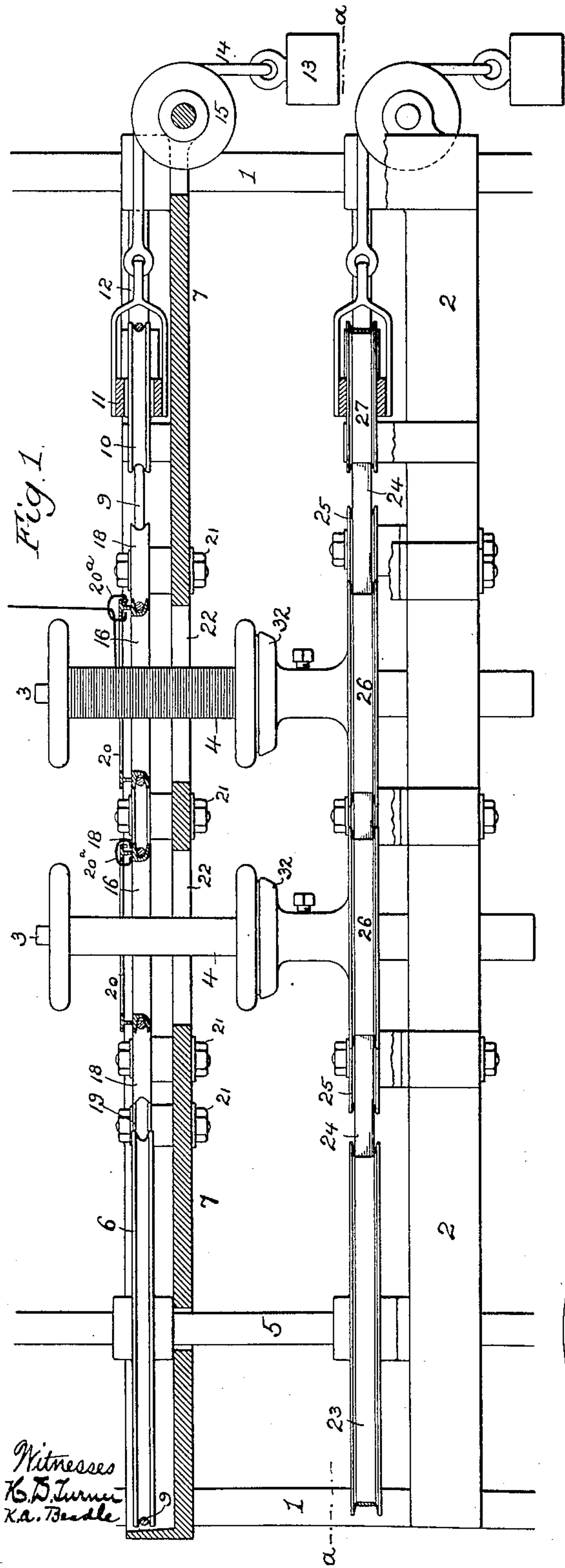


R. DAWES.

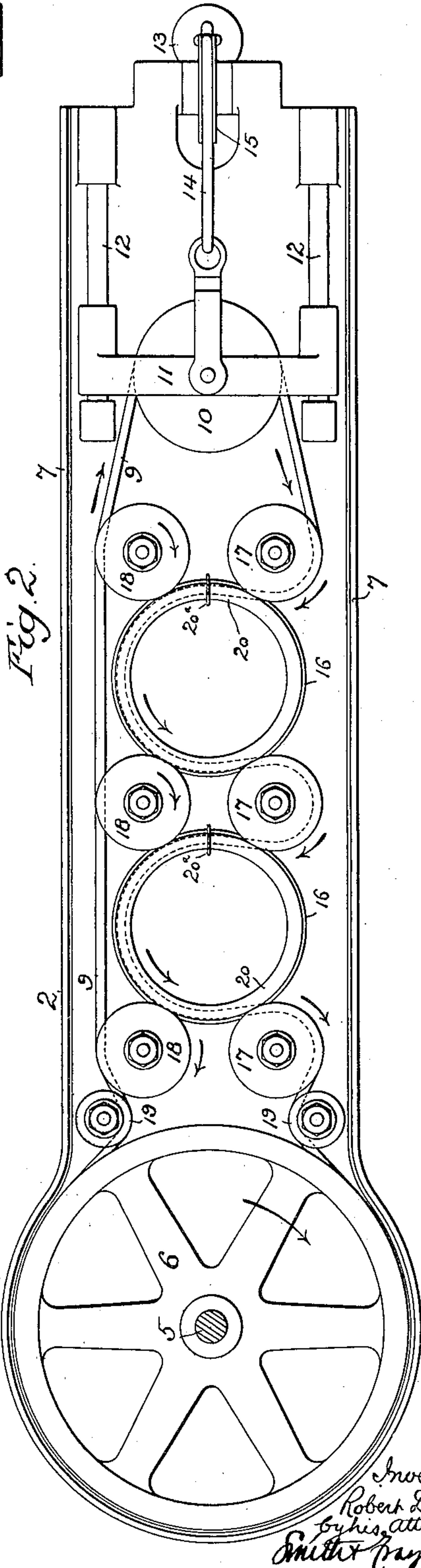
SPINNING, TWISTING, AND WINDING MACHINE.

APPLICATION FILED OCT. 16, 1906.

3 SHEETS—SHEET 1.



Witnesses  
K. B. Turner  
K. A. Biddle



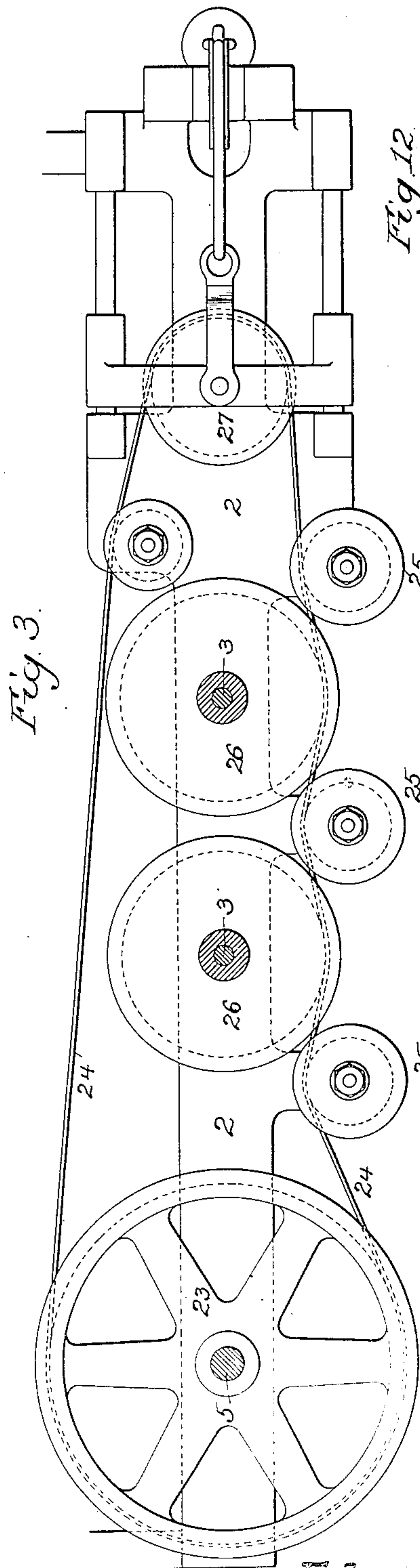
Inventor  
Robert Dawes  
By his Attorney  
Smith & Payne

No. 865,685.

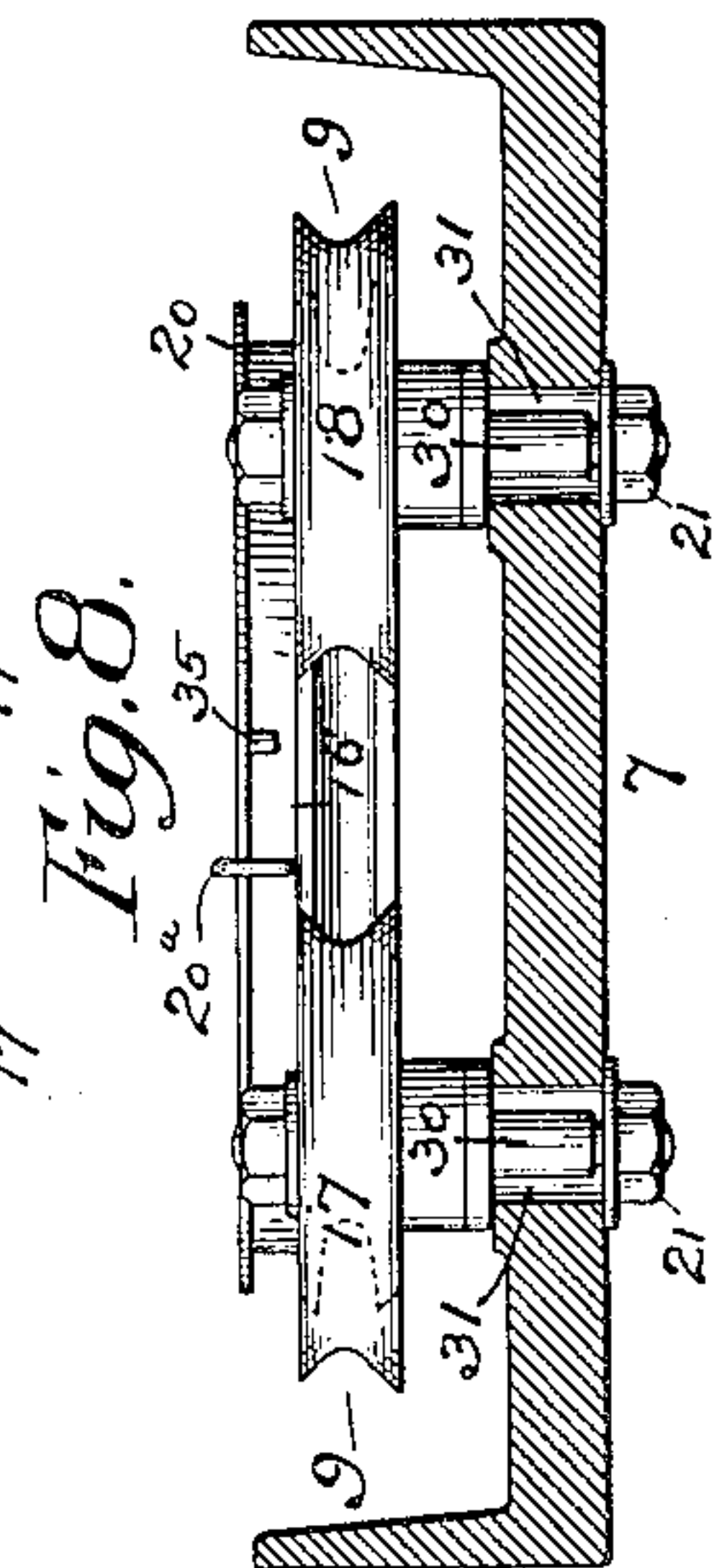
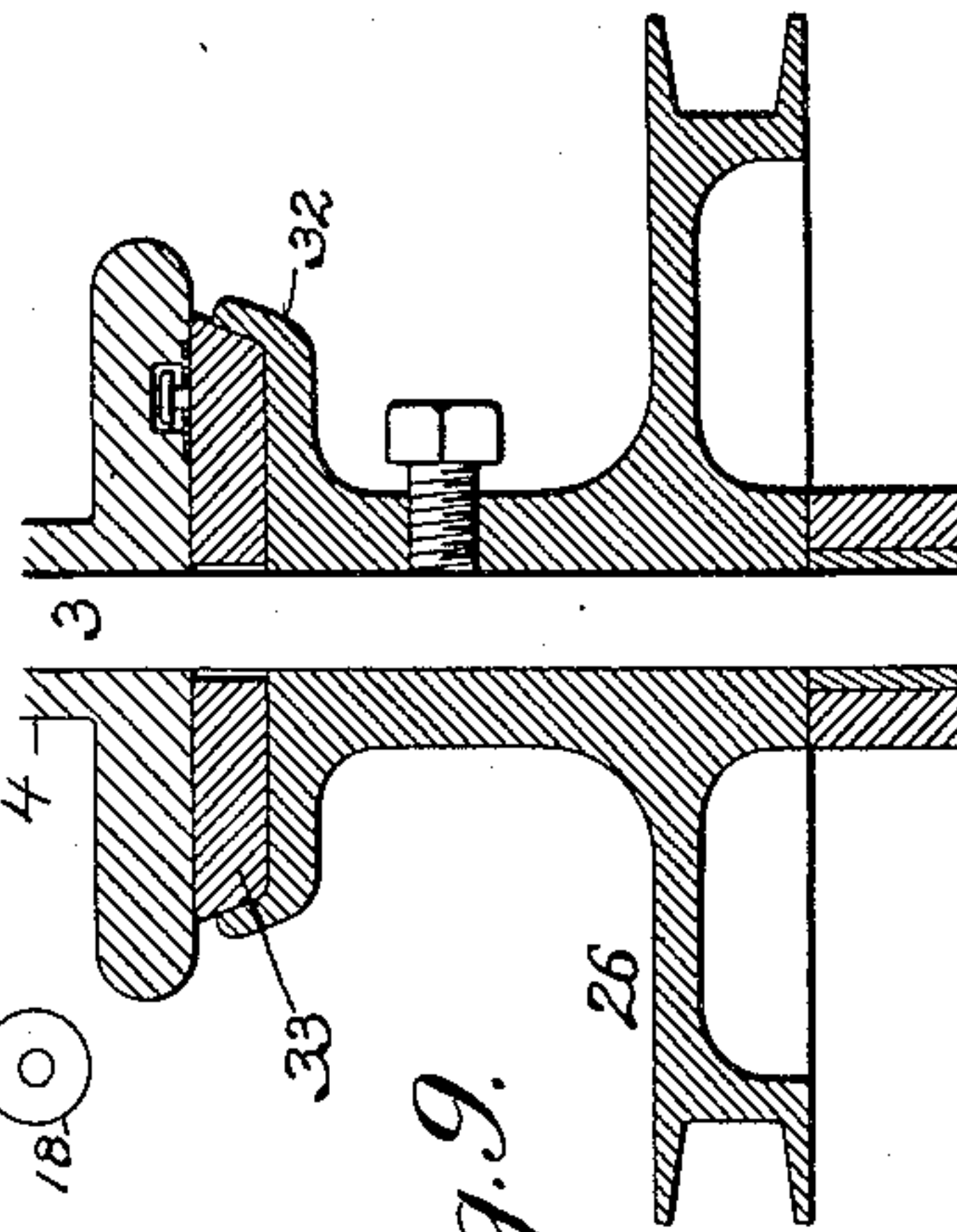
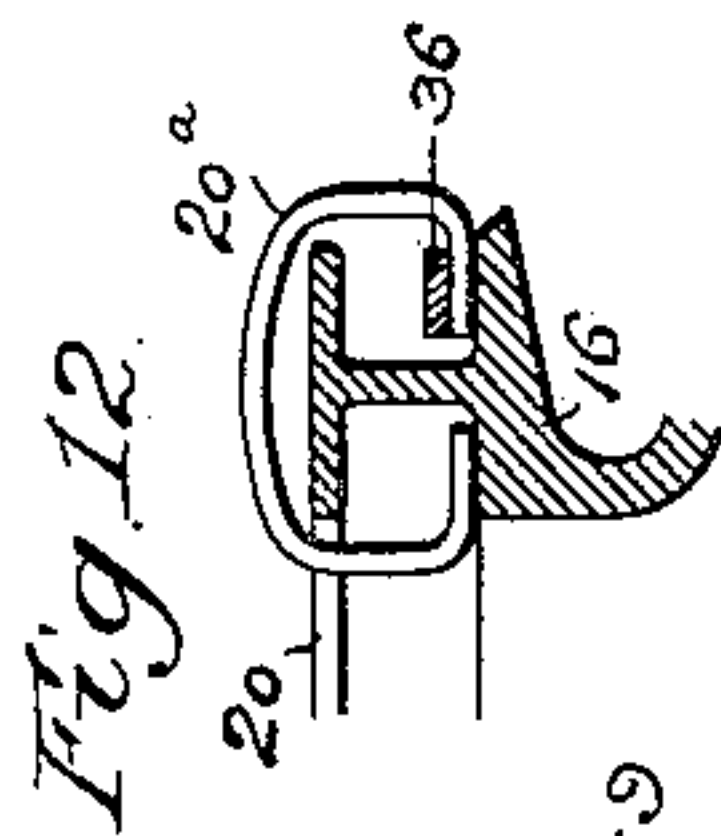
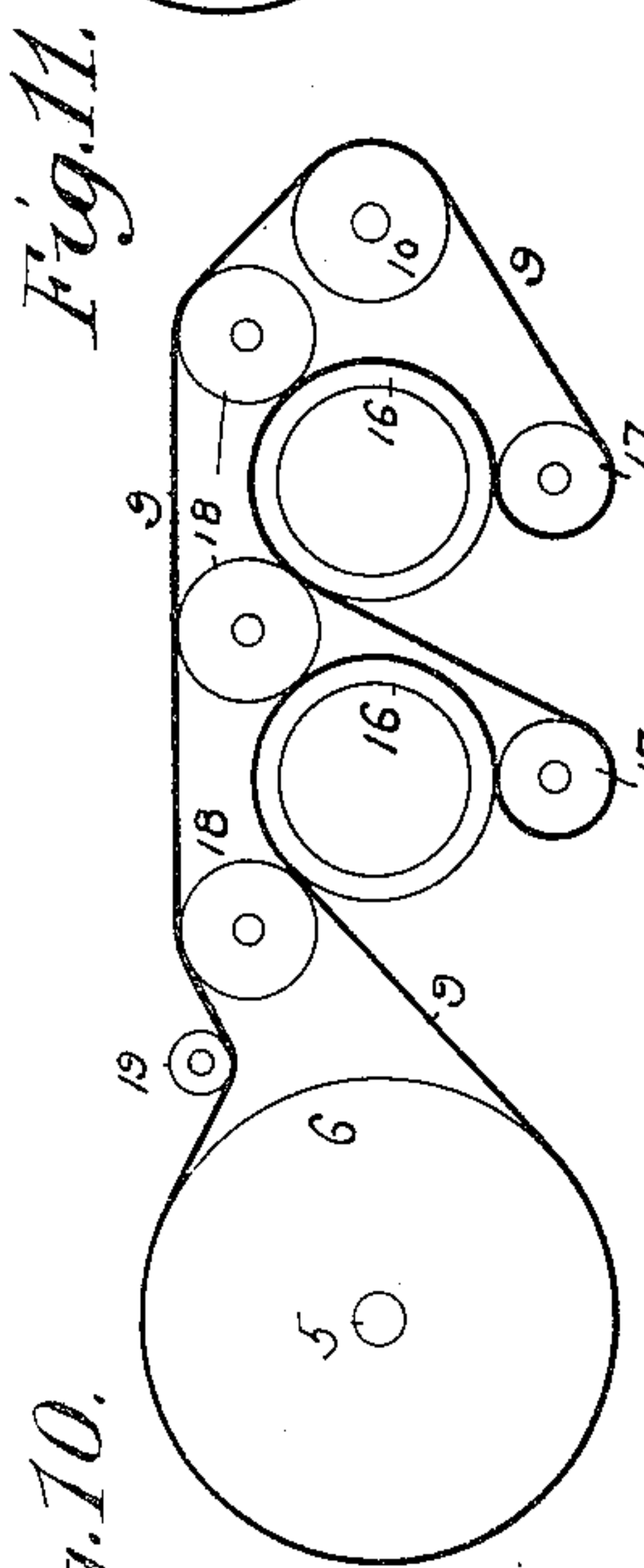
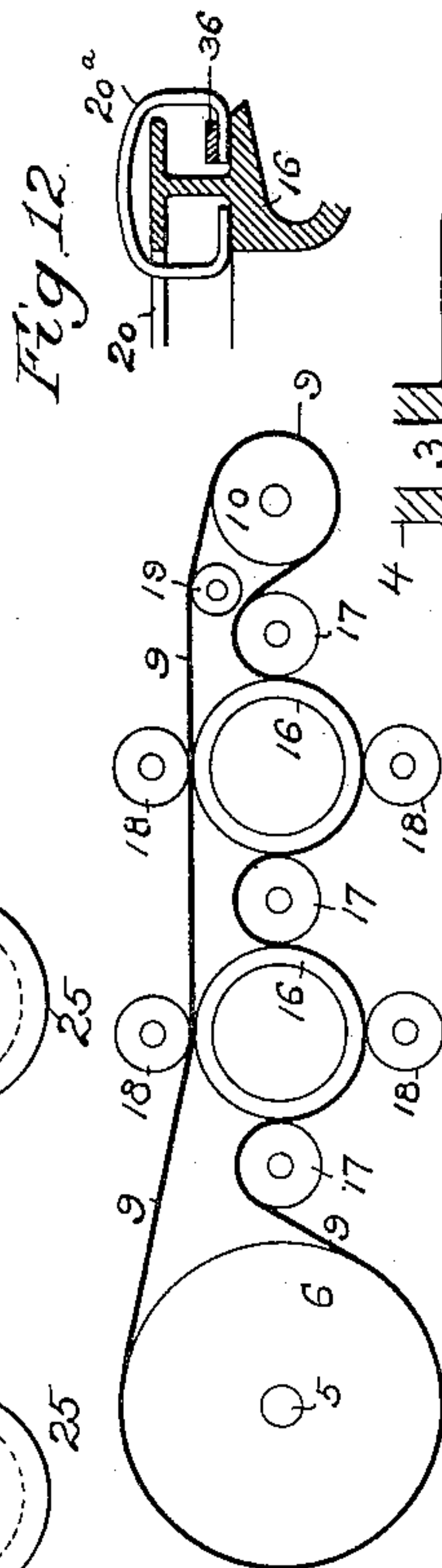
PATENTED SEPT. 10, 1907.

R. DAWES.  
SPINNING, TWISTING, AND WINDING MACHINE.  
APPLICATION FILED OCT. 16, 1906.

3 SHEETS—SHEET 2.



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Inventor  
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No. 865,685.

PATENTED SEPT. 10, 1907.

R. DAWES.  
SPINNING, TWISTING, AND WINDING MACHINE.

APPLICATION FILED OCT. 16, 1906.

3 SHEETS—SHEET 3.

Fig. 4.

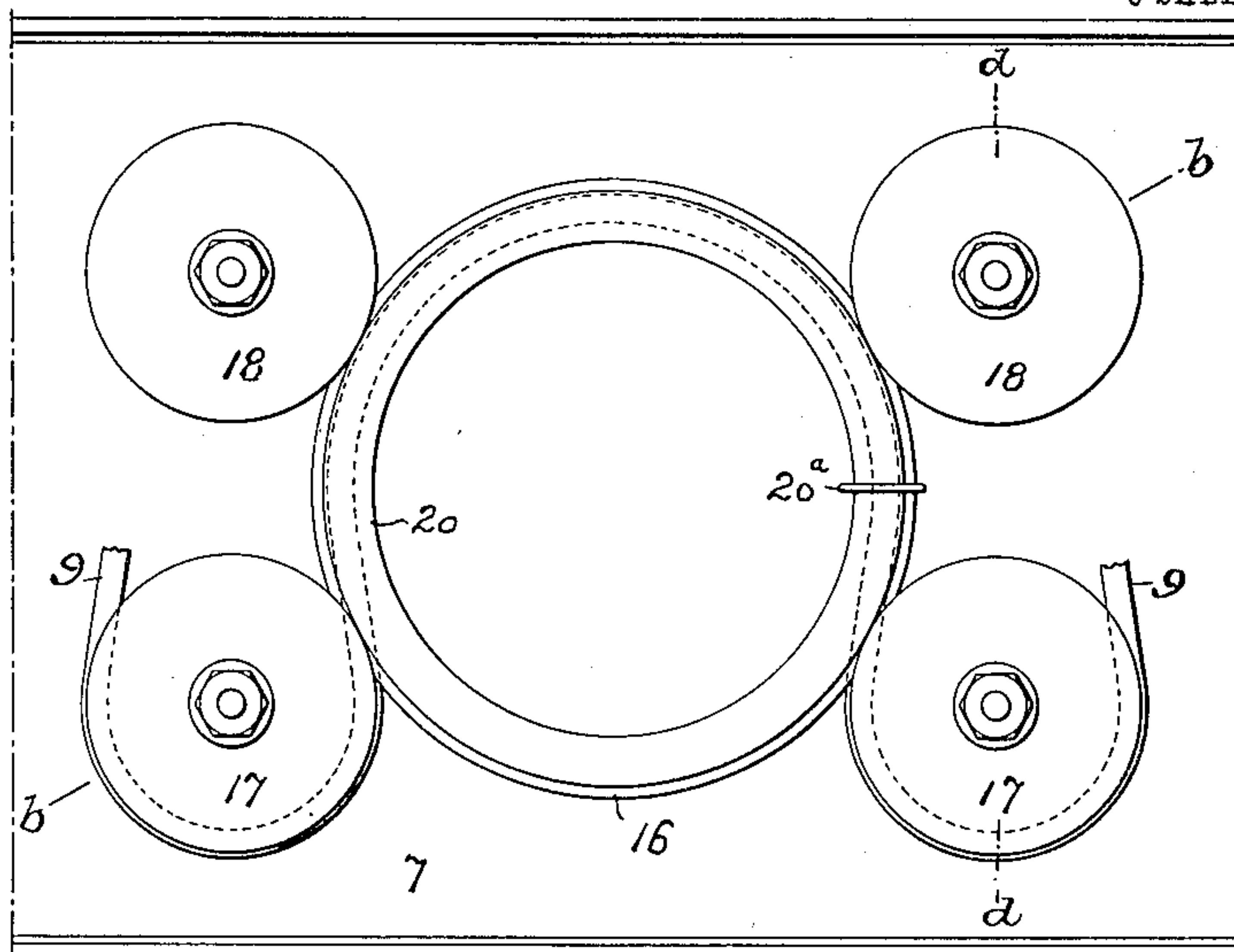


Fig. 5.

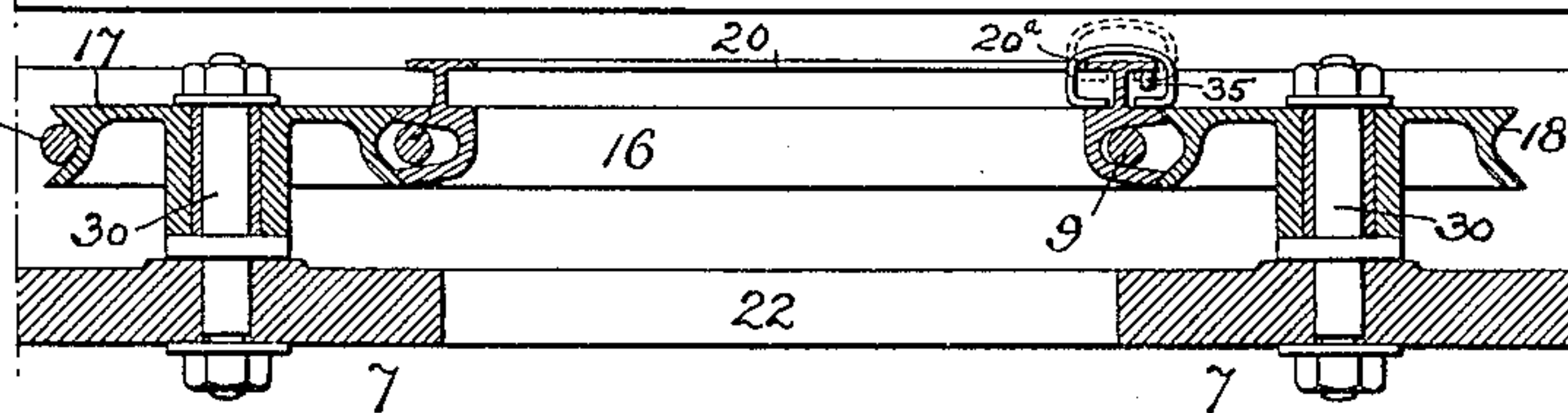


Fig. 6.

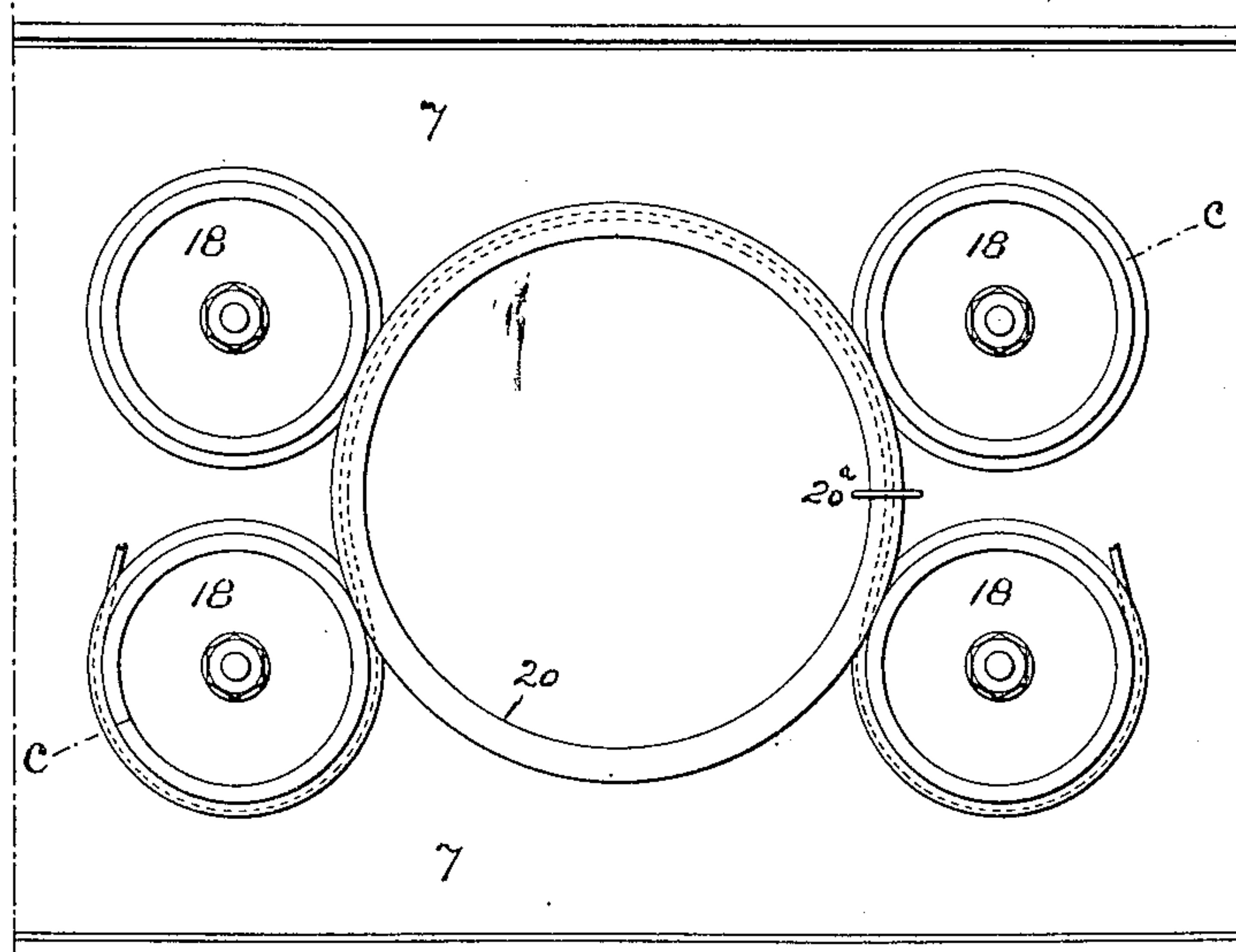
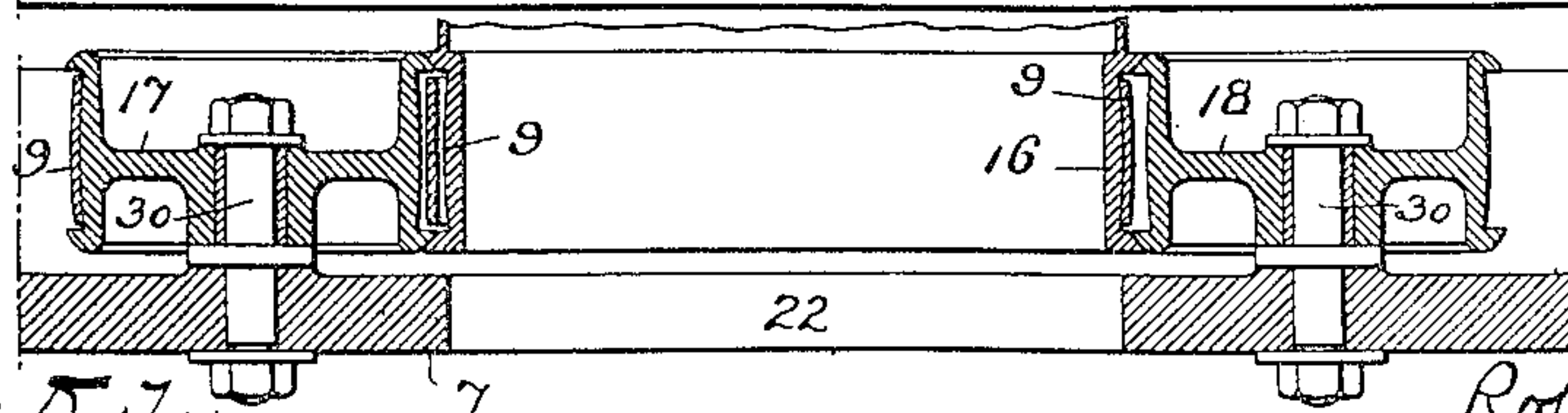


Fig. 7.



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Kate A. Beale

Inventor  
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by his attorneys  
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# UNITED STATES PATENT OFFICE.

ROBERT DAWES, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO HIMSELF, EDMUND DAWES, OF PHILADELPHIA, PENNSYLVANIA, AND EDWARD H. HASKELL, OF NEWTON, MASSACHUSETTS.

## SPINNING, TWISTING, AND WINDING MACHINE.

No. 865,685.

Specification of Letters Patent.

Patented Sept. 10, 1907.

Application filed October 16, 1906. Serial No. 339,216.

To all whom it may concern:

Be it known that I, ROBERT DAWES, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Spinning, Twisting, and Winding Machines, of which the following is a specification.

The object of my invention is to facilitate the operation of the rotative members of the machine, to simplify the mechanism whereby such rotation is effected, to reduce to a minimum the friction upon said rotative members, to provide for the ready splicing of broken threads, without stopping the machine.

In the accompanying drawings:—Figure 1 is a view, partly in side elevation and partly in section, of a spinning, twisting or doubling machine constructed in accordance with my invention; Fig. 2 is a plan view of the same; Fig. 3 is a sectional plan view on the line *a—a*, Fig. 1; Fig. 4 is a plan view, on an enlarged scale, of part of the mechanism shown in Fig. 1; Fig. 5 is a section on the line *b—b*, Fig. 4; Fig. 6 is a view similar to Fig. 4 but illustrating the apparatus as designed for the use of a flat driving belt instead of a round driving belt; Fig. 7 is a section on the line *c—c*, Fig. 6; Fig. 8 is a section on the line *d—d*, Fig. 4; Fig. 9 is a vertical sectional view, on an enlarged scale, of the driving device for one of the spindles of the machine; Figs. 10 and 11 are diagrammatic representations of modifications of my invention; and Fig. 12 is an enlarged sectional view illustrating one of the features of the invention. The machine may be used for spinning single strands and winding them upon spools or bobbins, or for winding upon each spool or bobbin a plurality of separate strands which have been twisted together by the action of the machine prior to such winding of the same.

1, 1 represent the end frames of the machine and 2 a longitudinal bar in which are formed the bearings for the spindles 3, the latter carrying the bobbins 4 upon which the spun or twisted yarns are to be wound, only two of these spindles being shown in the present instance, although the operative machine will be equipped with a larger number of such spindles.

To a suitable bearing in the bar, near one end of the machine, is adapted a vertical shaft 5 upon which is splined a driving pulley 6, which can therefore rise and fall upon the shaft 5 but will be rotated by the latter in any of its various positions thereon. Suitably guided on the frame of the machine is a longitudinal bar or plate 7, to which vertical reciprocating movement can be imparted by any of the traverse motion devices common to this class of machine.

To the pulley 6 is adapted a belt 9 which passes around a tightening sheave 10 mounted in bearings in

a cross head 11, the latter being adapted to suitable longitudinal guides 12 near one end of the bar or plate 7, and being connected to a weight 13 by means of a cord 14 passing over a sheave 15 upon the plate 7, whereby the belt 9 is constantly maintained under tension.

Between the pulley 6 and the tightening sheave 10 the belt 9 engages a series of rings 16, one for each spindle 3, and a series of belt-directing pulleys 17, 18 and 19, the pulleys 17 and 18 being so disposed that projecting flanges thereon will engage with projecting flanges on the rings 16, as shown in Figs. 5 and 7, so as to provide proper vertical support for said rings.

Starting with the draft side of the pulley 6, Fig. 2, the belt 9 passes first partly around a pulley 19, thence part way around a pulley 17, thence part way around the first ring 16, thence part way around a second pulley 17, thence part way around the second ring 16, thence part way around a third pulley 17, thence part way around the tightening sheave 10, and thence over the pulleys 18 and part way around a pulley 19 to the pulley 6.

The flanges of the pulleys 17 and 18 act as roller bearings for the rings 16, and said pulleys, except those at the extreme end of the series, are subjected to the pull of the belt on one side of their axes, and to the push of the rings on the opposite side of the same, consequently, as to these pulleys, spindle friction is practically eliminated and as, in a full sized machine, the intermediate pulleys are greatly in excess of those at the ends of the series, the aggregate friction is very much reduced.

The number and disposition of the pulleys 18 may be varied as desired, or these pulleys may even be dispensed with if means are provided for retaining the rings 16 in case the belt 9 breaks, it having been found in practice that the pulleys 18 are not necessary for the support of the ring when the machine is running, or the belt is subjected to tension. The number and disposition of the pulleys 17 is such that the driving belt passes around a considerable portion of the periphery of each ring 16, in order to exert the desired tractive force thereupon, the rings being free from any driving connection with the return run of the belt, so that any variations in slackness or tension of the driving and return runs of the belt will have no effect upon the proper driving of the rings 16.

In Figs. 10 and 11 I have shown, in a diagrammatic way, two other arrangements of supporting and driving devices which are within the broad range of my invention, and these modifications may serve to suggest to those skilled in the art other modifications embodying the essential features of the invention.

In the modification shown in Fig. 10, one of the pulleys 17 has been abandoned, a single pulley 17 serving



to direct the belt around the ring, and producing an even greater length of tractive contact for said belt than is provided in the construction shown in Fig. 2.

In the construction shown in Fig. 11, the axes of the 5 pulleys 17, are in a diametrical line passing through the axes of the rings 16, and the axes of the pulleys 18, are in diametrical lines at right angles thereto. The driving belt passes but half way around each ring 16, one of the pulleys 18 serving to prevent lateral displacement of the ring against the pull of the belt, and the other serving to prevent lateral displacement of the ring in the opposite direction in the event of the breaking of the belt. In this construction, also, the return run of the belt passes between one of each pair of pulleys 17 10 and the corresponding ring 16, but it is not in driving contact with the ring, for even if it touches the latter, the contact is not such as to prevent the belt from slipping or sliding over the periphery of the ring in response to the take-up action of the sheave 10. Each 20 ring 16 may have a fixed thread guide thereon, but I prefer to provide each ring with a flange 20, for the guidance of a traveler 20\*, the latter guiding the strand or strands to be spun or twisted and wound upon the corresponding bobbin 4, each bobbin passing through an 25 opening 22 in the bar or plate 7, and each of these openings being surrounded by one of the rings 16. In order to materially reduce the drag upon the rings which results when said rings are compelled to rotate the bobbins through the medium of the threads, cords or 30 strands which are being wound upon the latter, I rotate each of the spindles 3 in the same direction as the corresponding ring 16, though at a somewhat lower rate of speed, there being a frictional connection between the bobbin and the driving spindle which permits of the 35 rotation of the bobbin at somewhat higher speed than the spindle, this additional increment of speed being derived from the rotating ring, and being, of course, much less than when the entire rotative movement of the bobbin is derived from the ring.

40 As shown in Figs. 1 and 3, the shaft 5 has a fixed pulley 23 which receives a belt 24, the latter passing part way around directing pulleys 25 suitably mounted upon the bar 2, and so disposed that one of the runs of said belt 24 will be caused to pass in driving contact 45 with the periphery of each of the spindle pulleys 26, the relative diameters of these pulleys and of the pulley 23 being such that the number of revolutions of each spindle in a given time will be slightly less than the number of revolutions of the corresponding ring 16. A 50 tightening pulley or sheave 27 receives the belt 24 and is acted upon by a suspended weight and chain, in order that it may at all times keep said belt in proper driving contact with the pulleys 26. Each of the pulleys 17 and 18 is mounted so as to be free to rotate upon 55 a spindle 30, which passes through a slot 31, in the bar or plate 7, as shown in Fig. 8, and is threaded for the reception of a nut 21, whereby it can be secured to the said bar or plate 7, the slot permitting adjustment of the pulley to proper position for supporting the ring 60 16, or into position which permits of the application or removal of said ring. Secured to or forming part of the hub of each of the pulleys 26, is a cup 32, with internally beveled flange, and this cup receives a disk 33, which has operative connection with the lower flange 65 of the bobbin 4, and has a beveled periphery in con-

tact with the internally beveled flange of the cup 32, (see Fig. 9) the weight of the disk, the bobbin and the load upon the latter serving to maintain a driving connection between the disk and flange, which is closely proportionate to the amount of work to be performed, 70 the friction increasing as the load increases. Either the disk or the flange may be faced with leather or other material for increasing the frictional hold of one upon the other.

In order to permit of the ready splicing of any of the 75 threads, without stopping the machine, I construct the ring and traveler device in such a way that the traveler may be clutched to the ring and caused to rotate therewith when the thread is under tension, but will be released from the control of the ring when the thread 80 breaks. One method of accomplishing this result is shown in Fig. 5, the flange 20 having a depending pin 35 with which the lower hook of the traveler engages when the thread is under tension, and said traveler is 85 lifted, as shown by dotted lines, said hook of the traveler dropping out of the path of the pin when the traveler falls, on the breaking of the thread, as shown by full lines.

Instead of driving the spindles 3 in the manner described they may be independently driven by belts 90 from a longitudinal drum in the usual way, or fixed spindles may be employed.

In order to prevent the sudden jerk upon the thread which occurs when the traveler is positively clutched to the flange of the ring, in the manner before de- 95 scribed, I prefer, in most cases, and especially where fixed bobbin spindles are used, to employ a clutch of the friction type, this result being readily attained by providing the hook of the traveler with a friction shoe, such for instance, as shown at 36 in Fig. 12. 100

I claim:—

1. In a machine of the character described, the combination of a series of thread-guiding rings, a plurality of rotatable ring-supports, a driving pulley and a driving belt having the driving run directed partly around each 105 ring, the return run being free from driving contact with the rings.

2. In a machine of the character described, the combination of a series of thread guiding rings, a plurality of rotatable ring-supports, a driving pulley, and a driving 110 belt having the driving run directed partly around each ring, the return run being free from driving contact with the rings, and some of the rotatable ring-supports also serving as belt-directing pulleys.

3. In a machine of the character described, the combination of a series of thread-guiding rings, a plurality of rotatable ring-supports, a driving pulley, and a driving 115 belt having its driving run directed partly around each ring, the return run being free from contact with the rings but contacting with certain of the ring-supports. 120

4. In a machine of the character described, the combination of a series of thread guiding rings, supporting pulleys therefor, a driving pulley, and a driving belt, one run of the latter passing partly around each ring and partly around certain of the supporting pulleys, the return run being free from contact with the rings but contacting with the other supporting pulleys. 125

5. In a machine of the character described, the combination of a series of thread guiding rings, a plurality of rotatable ring-supports, a driving belt having its driving 130 run directed partly around each ring, and its return run free from driving contact with the rings, a tightening sheave for said belt located at the end of the series of rings, and means for imparting yielding tension to said tightening sheave in a direction parallel with a longitudinal line passing through the series of rings. 135



6. In a machine of the character described, the combination of a series of thread guiding rings, a driving pulley, a driving belt and ring-supporting and belt-directing pulleys contacting with the ring on one side of their axes and with the belt on the opposite side thereof, whereby the pull of the belt is counteracted by the thrust of the rings in order to relieve the pulleys from the spindle friction.
7. In a machine of the character described, the combination of a series of thread guiding rings, a plurality of rotatable ring-supports, a driving pulley, and a driving belt having one run acting as a driver and the other run free from driving contact with the rings, all of the guides for the driving run of the belt being located on one side of a longitudinal line drawn through the axes of the series of rings.
8. In a machine of the character described, the combination of a series of thread guiding rings, a plurality of rotatable ring-supports, a driving pulley, a ring-driving belt, a series of bobbins, driving spindles having frictional connection with said bobbins, pulleys on said spindles, a driving pulley therefor mounted on the same shaft which carries the ring-driving pulley, a driving belt adapted to said second pulley, and means for causing said belt to engage each of the series of spindle pulleys.
9. In a machine of the character described, the combination of a rotating ring, a traveler thereon, and means for clutching said traveler to or releasing it from rotative driving engagement with the ring.
10. In a machine of the character described, the combination of a rotating ring, a traveler thereon, and a clutch for effecting driving engagement of said traveler with the ring when the thread is under tension.
11. In a machine of the character described, the combination of a rotating ring, a traveler thereon, and means for causing frictional driving engagement between the ring and traveler, or releasing such engagement.
12. In a machine of the character described, the combination of a rotating ring, a traveler thereon, and a friction clutch for effecting driving engagement of said traveler with the ring when the thread is under tension.
13. In a machine of the character described, the combination of a rotating ring, a traveler thereon, means for clutching said traveler to or releasing it from rotative driving engagement with the ring, a bobbin, and means for rotating the latter.
14. In a machine of the character described, the combination of a rotating ring, a traveler thereon, means for clutching said traveler to or releasing it from rotative driving engagement with the ring, a bobbin, and means for rotating the latter by friction.
15. In a machine of the character described, the combination of a rotating ring, a traveler thereon, means for causing frictional driving engagement between the ring and traveler, or releasing such engagement, a bobbin, and means for rotating the latter.
16. In a machine of the character described, the combination of a rotating ring, a traveler thereon, means for causing frictional driving engagement between the ring and traveler, or releasing such engagement, a bobbin, and means for rotating the latter by friction.
17. In a machine of the character described, the combination of a rotating ring having a thread guide thereon, a bobbin, and frictional driving devices for the latter whose force is dependent upon the weight of the bobbin and its load.
18. In a machine of the character described, the combination of a rotating ring, a traveler thereon, a bobbin, and a frictional driving device for the latter whose force is dependent upon the weight of the bobbin and its load.
- In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

ROBERT DAWES.

Witnesses:

HAMILTON D. TURNER,  
KATE A. BEADLE.