

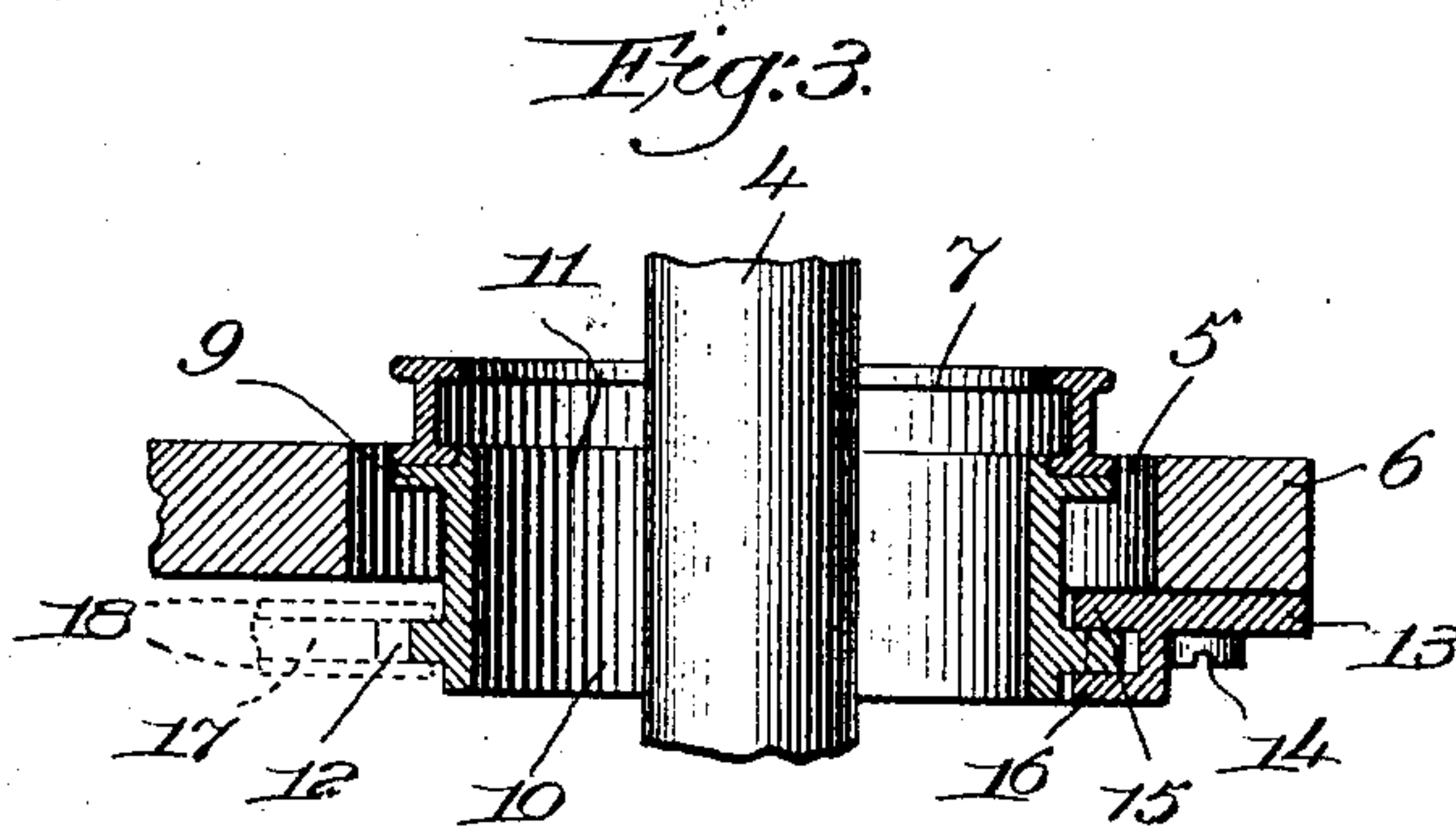
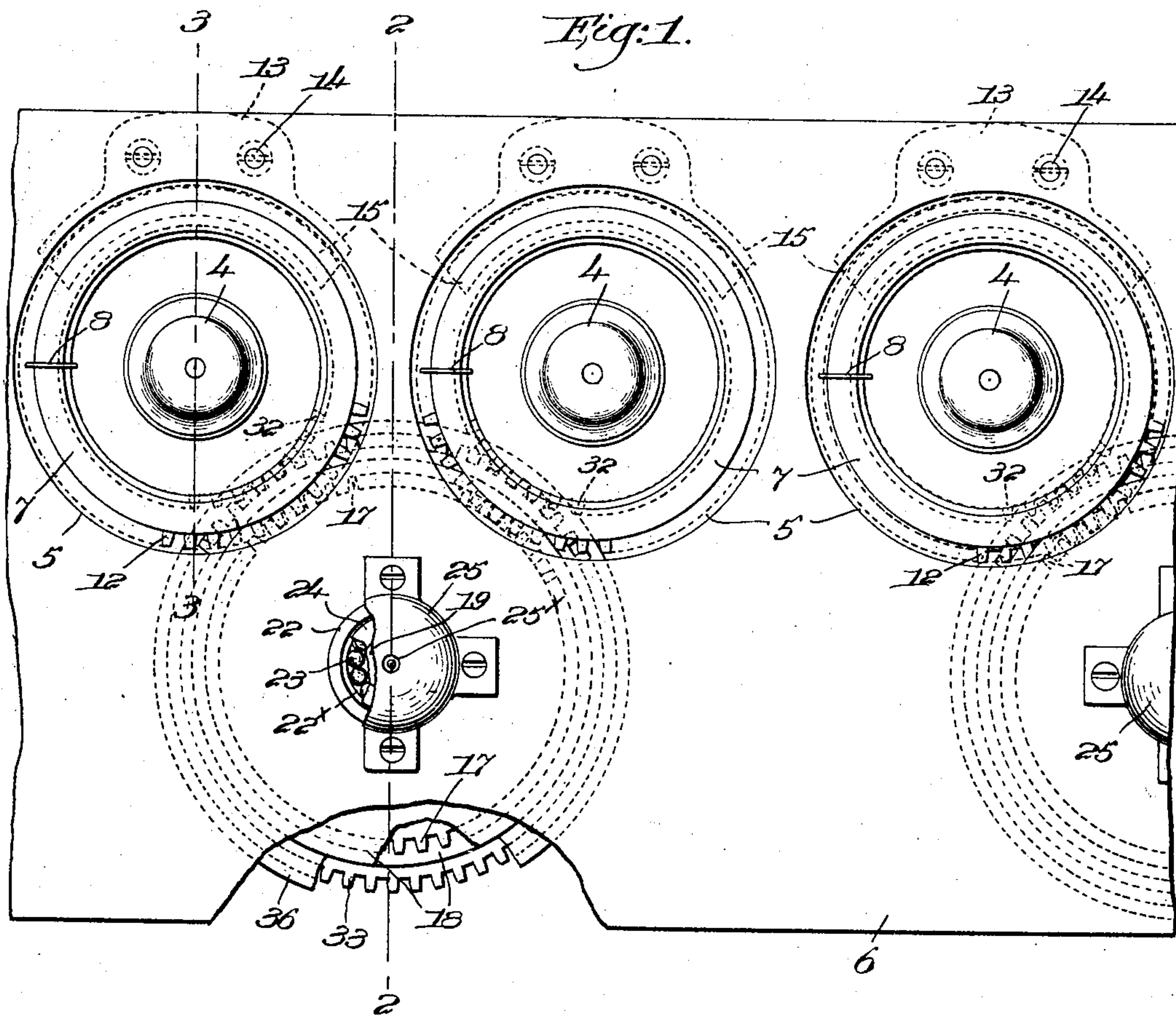
No. 774,744.

PATENTED NOV. 15, 1904.

G. O. DRAPER.
SPINNING APPARATUS.
APPLICATION FILED JAN. 2, 1904.

NO MODEL.

2 SHEETS—SHEET 1.



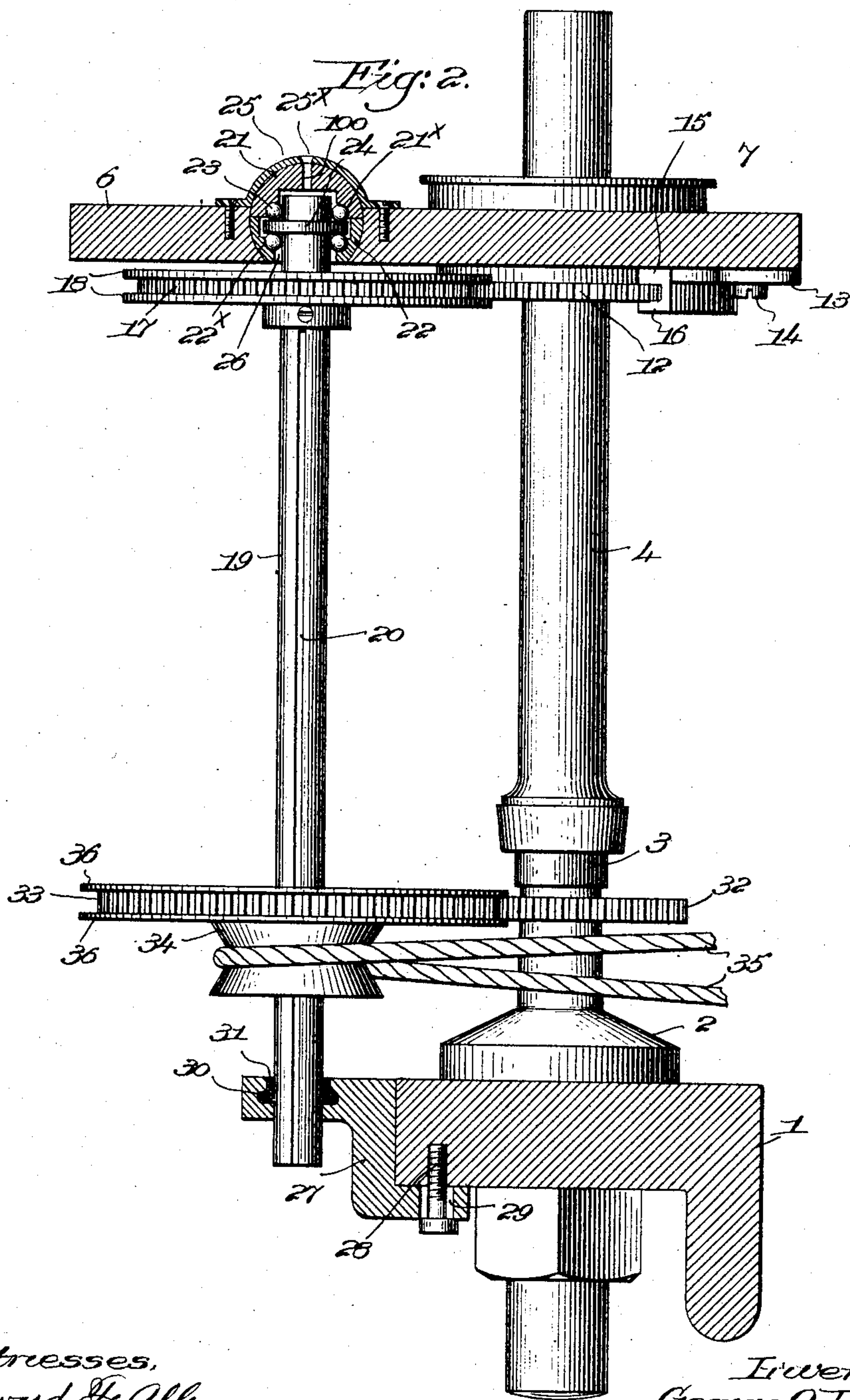
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Inventor:
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UNITED STATES PATENT OFFICE.

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SPINNING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 774,744, dated November 15, 1904.

Application filed January 2, 1904. Serial No. 187,532. (No model.)

To all whom it may concern:

Be it known that I, GEORGE OTIS DRAPER, a citizen of the United States, and a resident of Hopedale, county of Worcester, State of Massachusetts, have invented an Improvement in Spinning Apparatus, of which the following description, in connection with the accompanying drawings, is a specification, like numerals on the drawings representing like parts.

This invention relates to spinning apparatus of the type wherein the rings upon which the travelers move are revolved by or through an agency independent of the pull or drag of the yarn transmitted through the traveler.

In my present invention I have provided a combined spindle and ring driving mechanism for every two spindles and their rings, such driving mechanism comprising a driving-shaft having secured to it a ring-driving gear and a spindle-driving gear mounted to rotate with the shaft, but permitting the latter to slide longitudinally therethrough, the spindle-driving gear meshing with a gear on the spindle, while the ring-driving gear co-operates with a suitable gear secured to or forming part of a ring-holder. The ring-holder is vertically supported, by means of a segmental fixedly-mounted bearing and by the coöperation of the driving and driven gears, the former in the present embodiment of my invention being peculiarly constructed for the purpose. The shafts of the several driving mechanisms are suspended from the reciprocating ring-rail, each by a bearing at its upper end, so that the shafts will rise and fall with the ring, and fixed bearings are provided for the lower ends of said shafts, the latter sliding through the bearings.

The various novel features of my invention will be fully described in the subjoined specification and particularly pointed out in the following claims.

Figure 1 is a top or plan view of a portion of a spinning apparatus embodying one form of my invention, the view being taken above the ring-rail. Fig. 2 is a transverse sectional view on the line 2 2, Fig. 1, looking toward the left; and Fig. 3 is a section on the line 3 3, Fig. 1, through one of the rings and its holder.

The spindle-rail 1, having fixed bearings 2 for spindles 3, adapted to support and rotate yarn receivers or bobbins 4, may be and are all of usual or well-known construction, the series of spindles passing through openings 5 in the ring-rail 6, said openings being of sufficient diameter to receive the rings and ring-holders to be described.

I have herein shown a well-known form of rings 7, having upper and lower flanges, the travelers 8 coöperating with the upper flange, while the lower flange rests upon a laterally-extended annular seat 9 on the ring-holder 10.

The ring-holder 10 is conveniently made as a casting of cylindrical shape with the lateral seat 9 integral therewith and with an upturned lip 11, which enters the bottom of the ring, as clearly shown in Fig. 3. The rings are snapped or forced upon the holders and held firmly thereon by frictional engagement. The ring-holders are deep enough to project below the ring-rail, and each holder is herein shown as provided with an annular external gear 12, the gear of each holder being vertically supported through a portion of its extent by a segmental holder. The segmental holder is made as a trough-like casting, having an attaching-plate 13 secured to the under side of the ring-rail in any suitable manner, as by screws 14, the main body portion of the holder having upper and lower segmental lips 15 and 16, (see Fig. 3,) which extend inward toward the spindle and receive between them the gear 12. By reference to Fig. 3 it will be seen that the lips are wide enough to extend inward beyond the bases of the teeth and that there is slight clearance between the holder and the lips, so that slight lateral movement of the holder 11 is permitted.

The gear 12 of each holder is engaged on the opposite side of its center from the bearing or vertical support described by the ring-driving gear, herein shown as a large gear 17, (see Fig. 2,) having annular flanges 18, which project above and below the teeth of the gear 12 to vertically support the latter and also to effect its rotation through coöperation of the gear 17. Said gear is secured to a driving-

shaft provided with a longitudinal keyway or groove 20 and supported at its upper end above the gear in a suitable bearing in the ring-rail. I have herein shown a very convenient bearing consisting of two cooperating and substantially hemispherical members 21 22, provided, respectively, with annular ball-faces 21^x and 22^x (see Fig. 2) for antifriction-balls 23, arranged in two series and separated by an annular flange 24, fast on the upper end of the shaft 19. A cap 25, secured to the ring-rail, holds the bearing in place in a suitable socket made therefor, the shaft depending through an opening 26 at the bottom of the bearing-socket. The cap has a hole 25^x registering with a duct 100 in the upper member 21 of the bearing, through which oil may be conveyed to the interior of said bearing. A species of ball-and-socket joint is thus provided which is convenient in adjusting the driving-spindle with relation to the ring and spindle gears, the lower end of each driving-shaft sliding through a bearing in a bracket 27, adjustably secured to the ring-rail by a set-screw 28 passed through a wide and elongated slot 29 in the foot of the bracket and screwed into the spindle-rail. The bracket can be adjusted longitudinally of the rail or in and out with relation to the spindles by the single adjusting-screw shown. The bearing portion of the bracket 27 may be cut out to form a chamber 30, (see Fig. 2,) adapted to be filled with oil-soaked packing 31 in order to lubricate the bearing.

Each spindle is provided with a gear 32 instead of the usual band-whirl, and the gears of two spindles mesh with a large driving-gear 33, keyed to the shaft 19 to rotate therewith, but permitting said shaft to slide through the gear. The latter has an attached whirl 34, around which the driving-band 35 passes, said band being driven from a cylinder or drum of usual construction and not herein shown.

The band-pull is usually sufficient to vertically support the driving-gear; but to overcome the effect of any sticking between the gear and the driving-shaft I have shown the driving-gear as provided with upper and lower flanges 36, which extend slightly beyond the teeth and receive between them the spindle-gears 32.

In a construction of the character herein shown, where the power is transmitted through gears, it is necessary to provide bearings to retain the driving-shaft in a constant position relative to the axis of rotation of the spindles in order that the pitch-lines of the gears may not be thrown out of their proper positions. For this reason the lower bearing-bracket 27 is provided, its sole duty being to prevent lateral movement of the driving-shaft, while the end thrust and vertical support of the driving-shaft is taken care of by the bearing at the shaft-head. Any other form of shaft-head

bearing may be employed instead of the one herein shown and described.

By proportioning the ring and spindle driving gears and the gears on the ring-holders and spindles it will be manifest that the rings may be revolved at a speed having any desired ratio to the spindle speed. In Fig. 1 I have only shown a portion of the teeth of the gears 12 in order to avoid undue confusion of the drawing. Inasmuch as the driving-shafts have no lateral movement, it will be manifest that neither the ring nor the spindle is affected in any way by variations in the pull of the driving-band.

My invention is not restricted to the precise construction and arrangement herein shown and described, as various details may be changed or modified in different particulars without departing from the spirit and scope of my invention.

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

1. In spinning apparatus, a rotatable spindle having an attached gear, a revolving ring, a gear connected therewith, a ring-rail, a rotatable driving-shaft movable therewith and having an attached ring-driving gear, a spindle-driving gear, and means to connect it with the shaft to rotate therewith while permitting the shaft to slide through the gear.

2. In spinning apparatus, a rotatable spindle, a revolving ring, a ring-rail, a rotating driving-shaft depending therefrom, and independent trains of gearing between said shaft and the ring and spindle, respectively, to drive said ring and spindle.

3. In spinning apparatus, a rotatable spindle, a revolving ring, a ring-rail, a rotating driving-shaft depending therefrom, and reciprocating therewith, independent trains of gearing between said shaft and the ring and spindle, respectively, and an adjustable lateral bearing for and through which the driving-shaft reciprocates.

4. In spinning apparatus, a rotatable spindle, a revolving ring, a ring-rail, a rotating driving-shaft depending therefrom, gearing intermediate the shaft and ring, to rotate the latter, means to vertically support the ring, and independent gearing intermediate the spindle and driving-shaft and slidably connected with the latter.

5. In spinning apparatus, a rotatable spindle, a revolving ring, a ring-rail, a rotating driving-shaft depending therefrom, and reciprocating therewith, independent trains of gearing between said shaft and the ring and spindle respectively, a rocking bearing for the upper end of the driving-shaft, mounted on the ring-rail, and an adjustable lateral bearing for and through which the driving-shaft reciprocates.

6. In spinning apparatus, a rotating spindle, a reciprocating ring-rail, a revolving ring

through which the spindle extends, a ring-holder having an annular gear, a driving-shaft having an attached gear in mesh with the said annular gear, flanges on the driving-gear extended beyond its teeth and adapted to receive between them the teeth of the annular gear, and a fixed trough-like support for said latter gear, mounted on the ring-rail.

5 7. In spinning apparatus, two rotatable
10 spindles, a revolving ring for each, a reciprocating ring-rail, a rotating driving-shaft suspended therefrom, and gearing between said shaft and the two rings, to effect positive revolution thereof.

15 8. In spinning apparatus, two spindles each having an attached gear, two revolving rings

for said spindles, a reciprocating ring-rail, a rotating driving-shaft suspended therefrom, a driving-gear on said shaft and in mesh with the spindle-gears, a whirl attached to the driving-gear and adapted to receive a driving-band, a hole for each ring, having an annular gear, a gear fast on the driving-shaft and in mesh with both of the ring-holder gears, and means to vertically support the ring-holders. 20 25

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEORGE OTIS DRAPER.

Witnesses:

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ERNEST W. WOOD.