

No. 708,444.

Patented Sept. 2, 1902.

D. B. WILLOCK.

REVERSING MECHANISM FOR WASHING MACHINES.

(Application filed Oct. 26, 1901.)

(No Model.)

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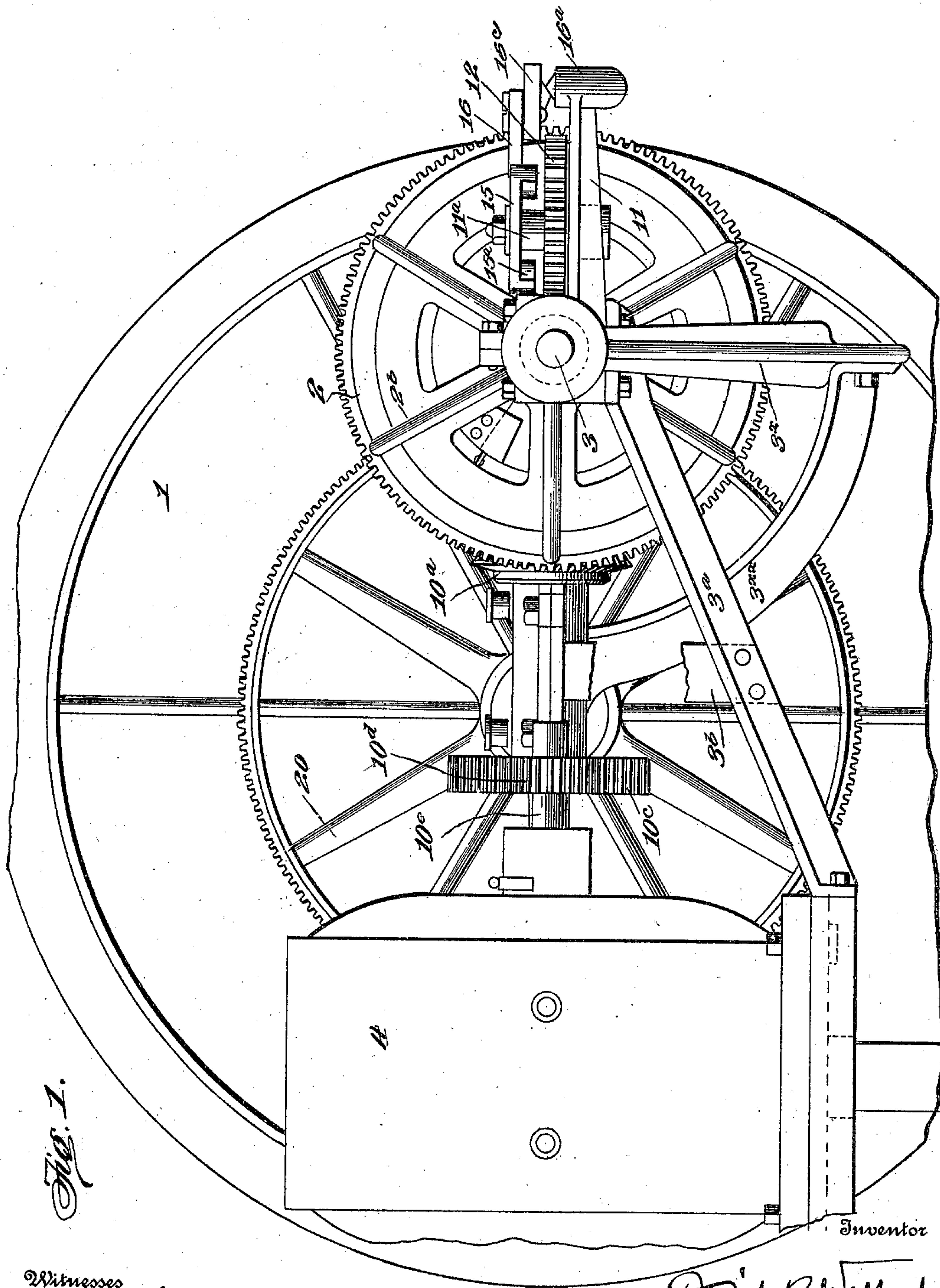


Fig. 1.

Witnesses
Fenton W. Bell,
George F. Rainey

By

David B. Willock
W. J. Johnston
Attorney

Inventor

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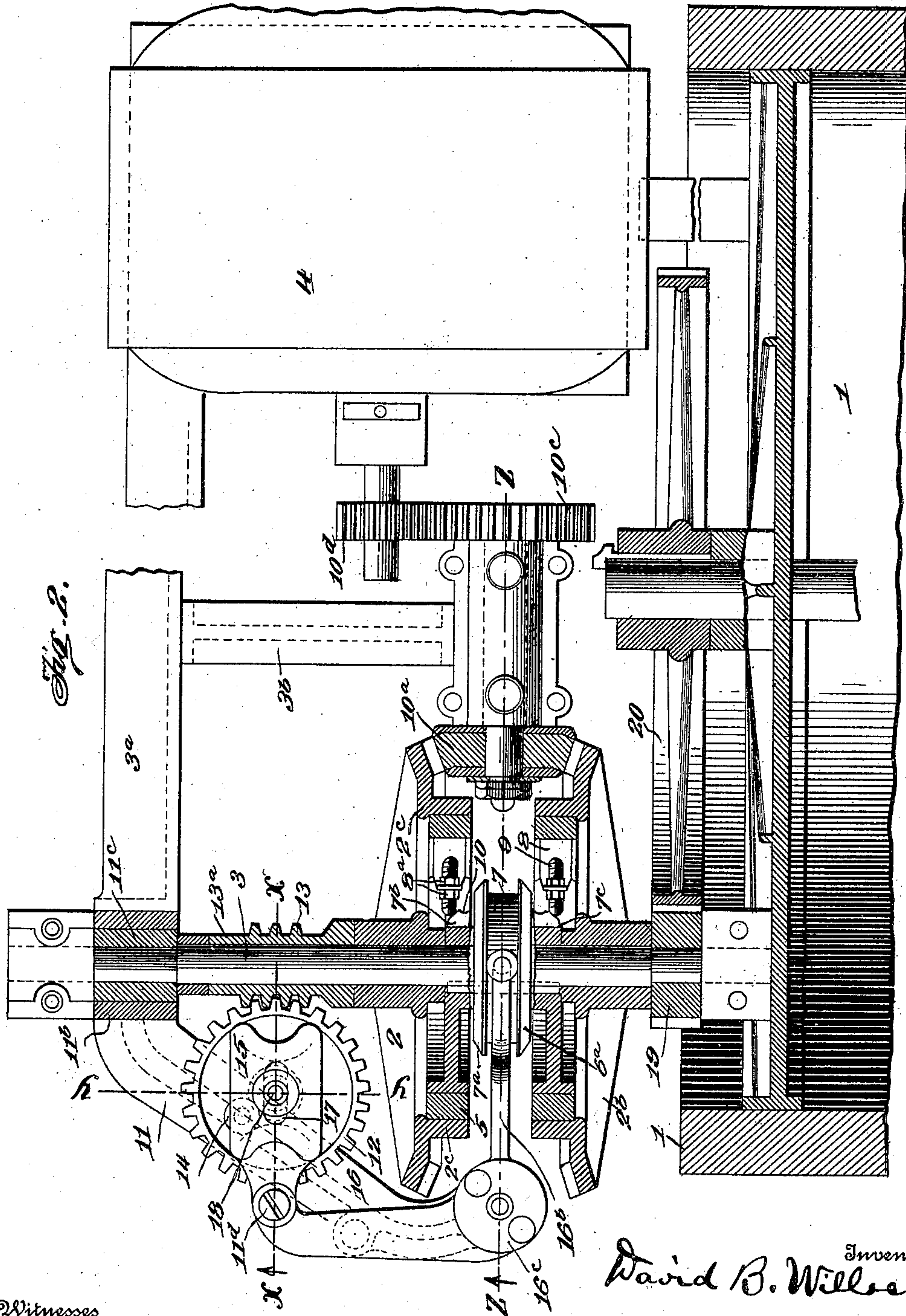
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Witnesses
Anton Belt
George F. Rainey

By

David B. Willock Inventor
Johnston Attorney

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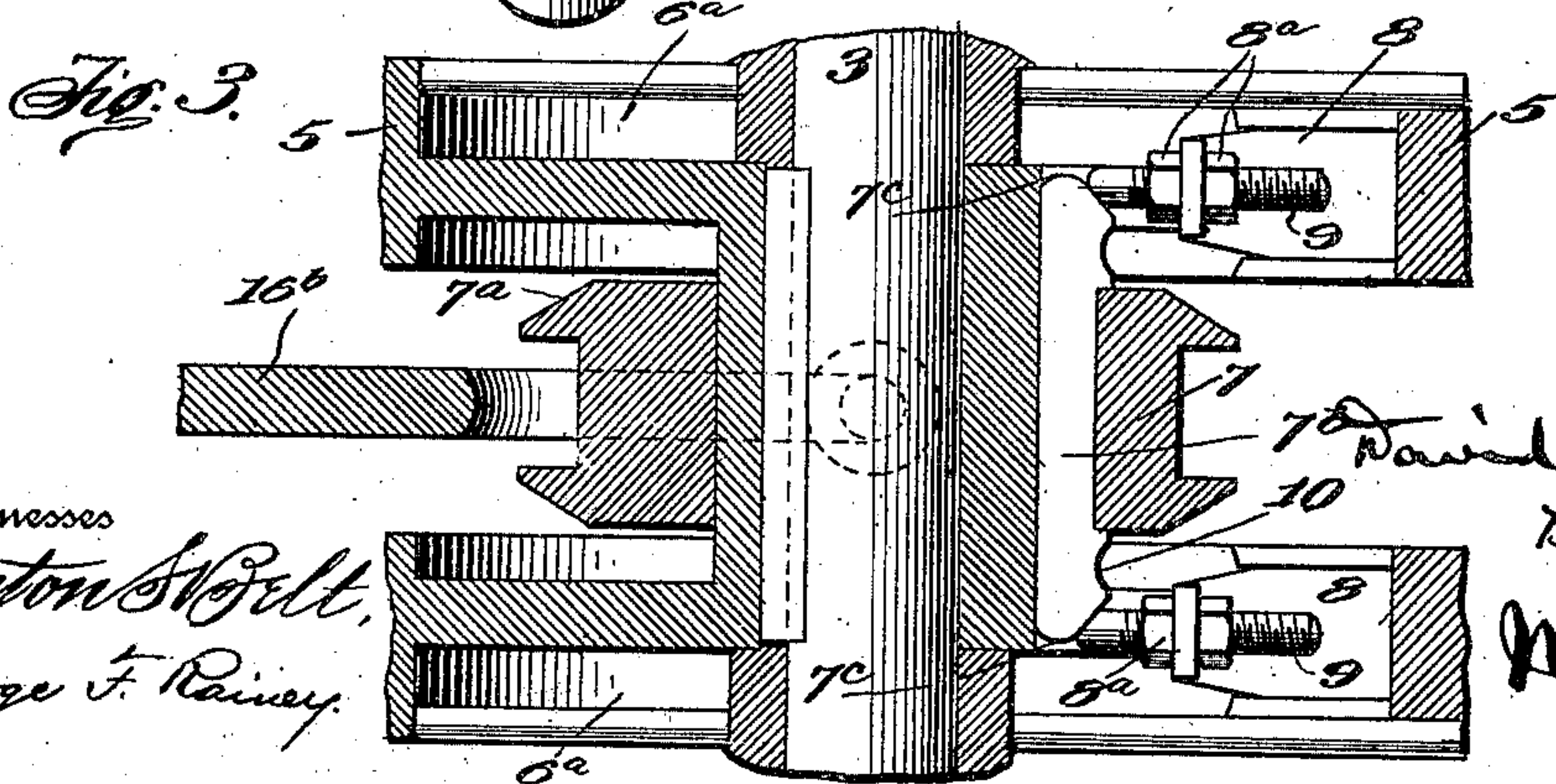
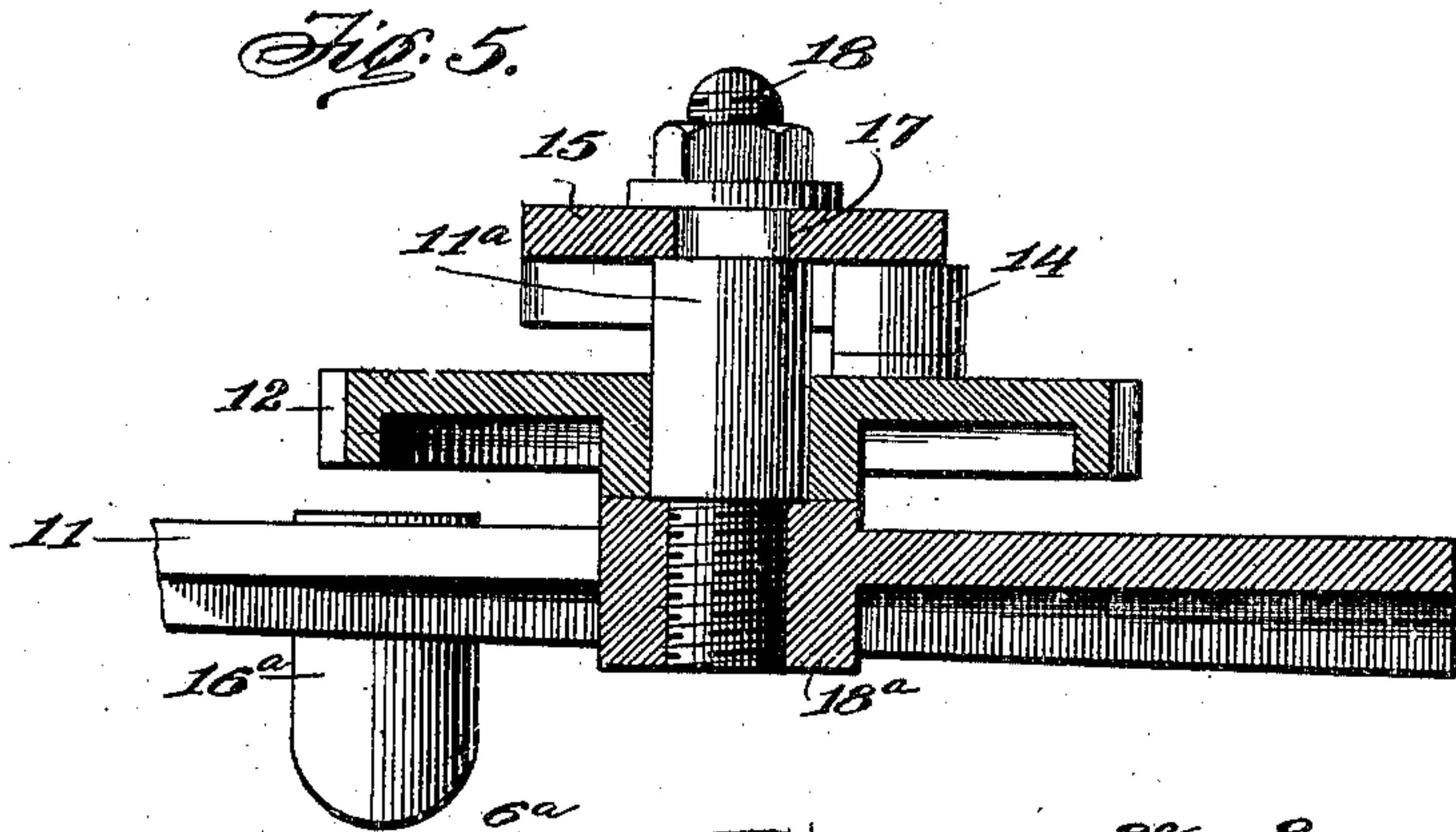
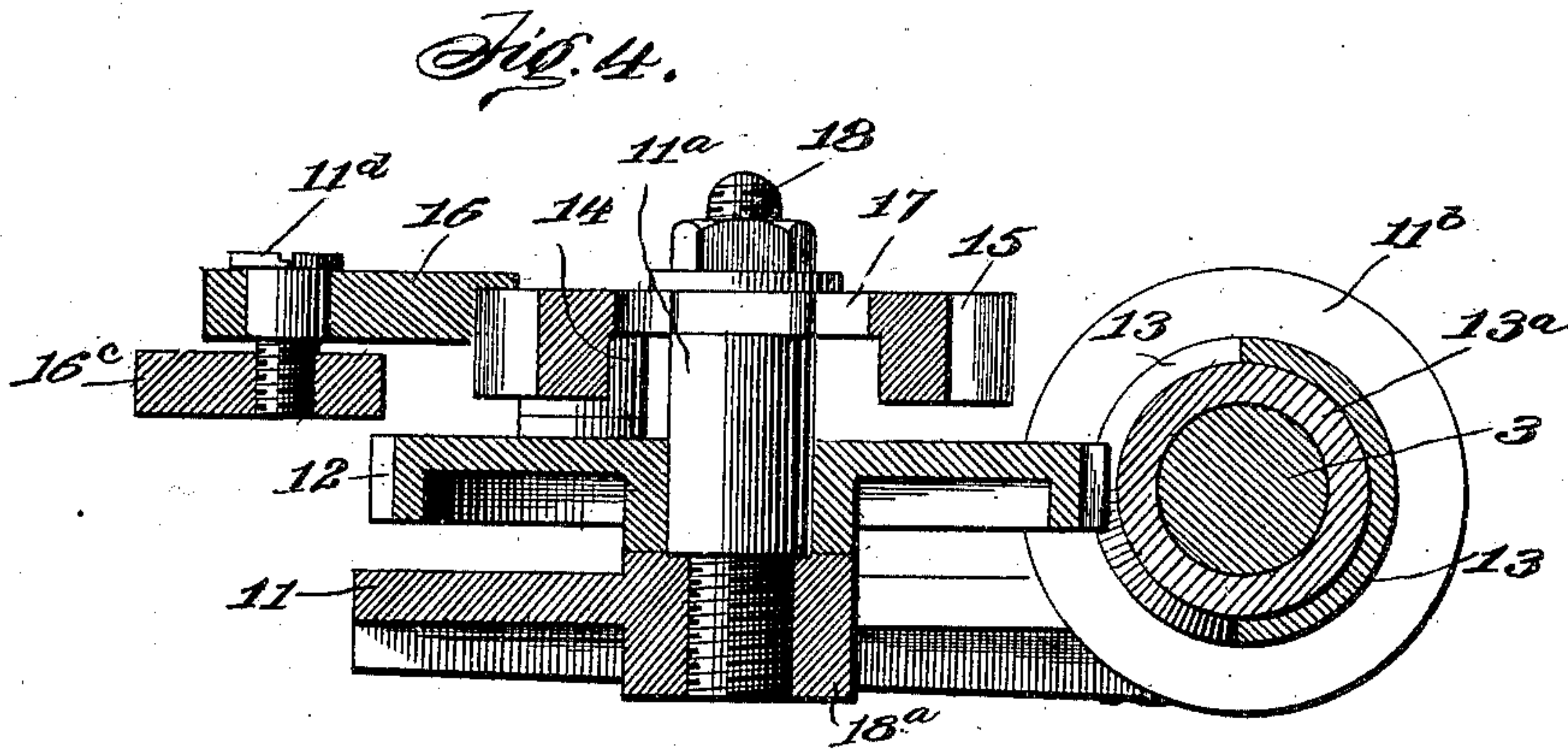
D. B. WILLOCK.

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Witnesses
Anton Stelt.
George F. Rainey.

Inventor
Daniel B. Willock
By
W. H. Blunt
Attorney.

No. 708,444.

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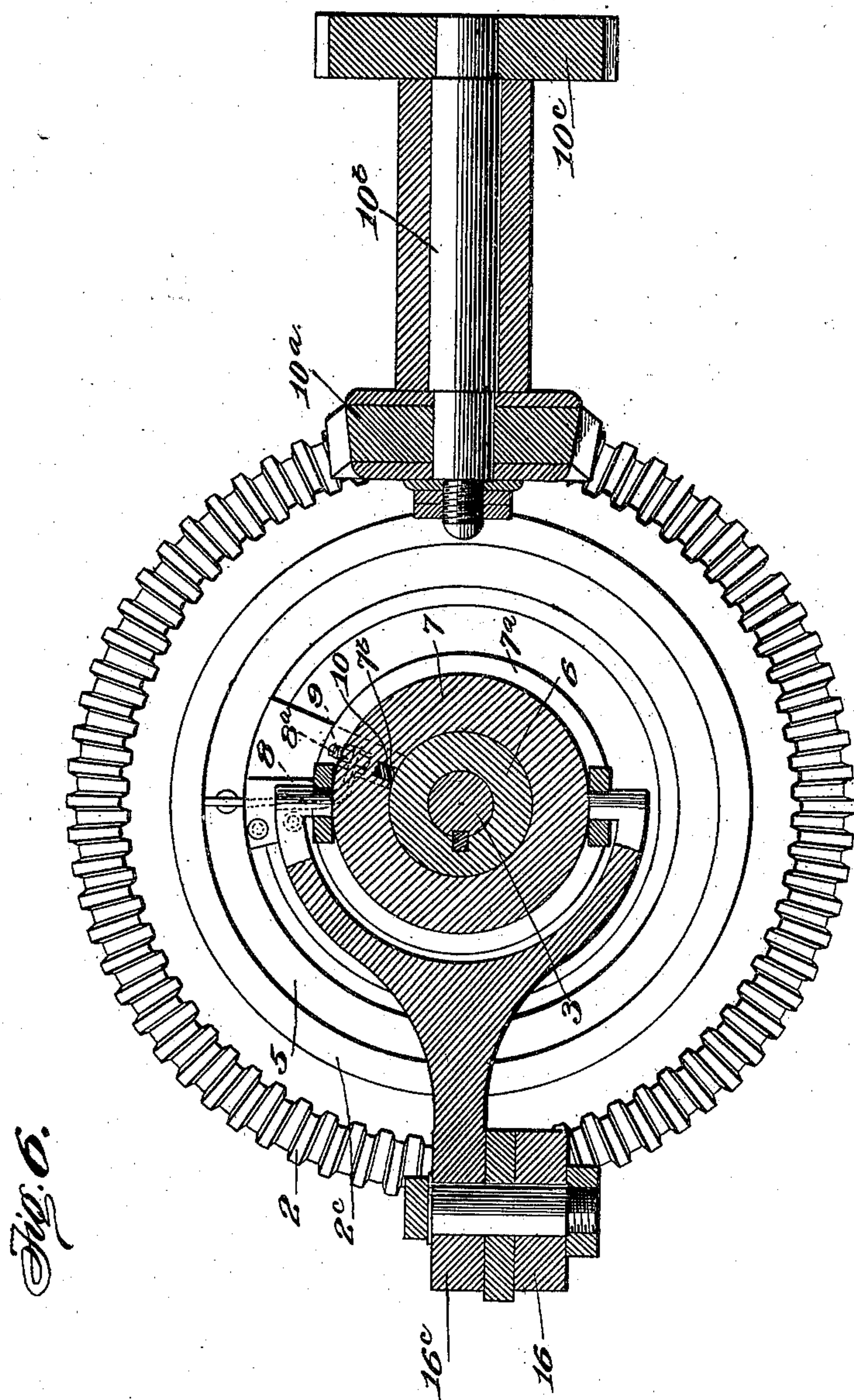
D. B. WILLOCK.

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(Application filed Oct. 26, 1901.)

(No Model.)

5 Sheets—Sheet 4.



Witnesses
Anton S. Belt
George F. Rainey.

By

Inventor
David B. Willock
W. Johnston
Attorney

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Patented Sept. 2, 1902.

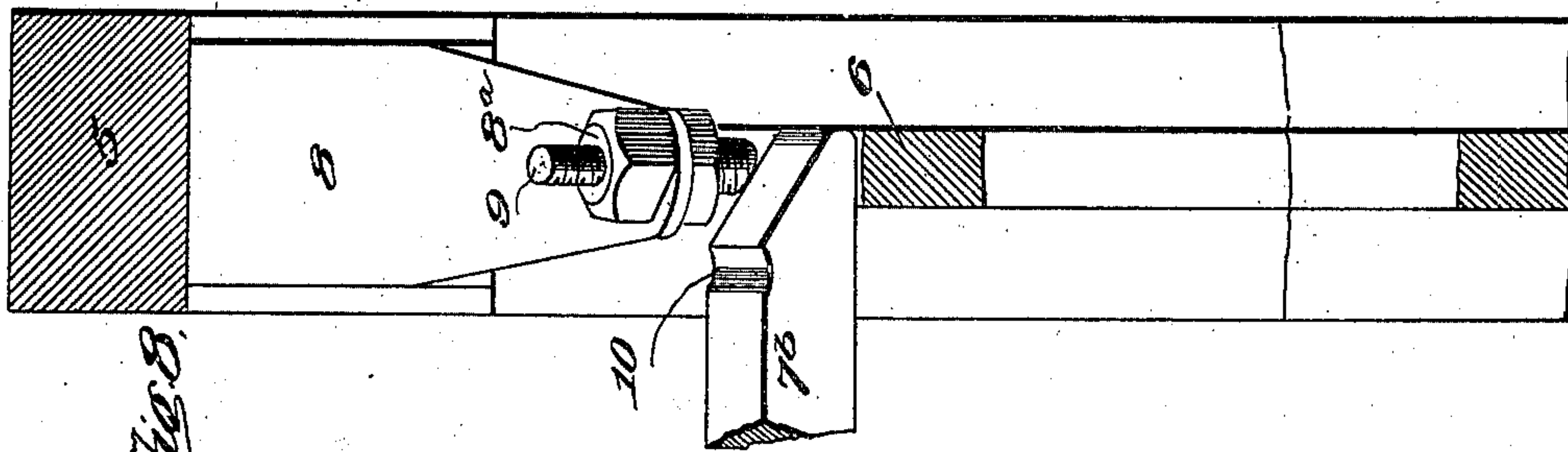
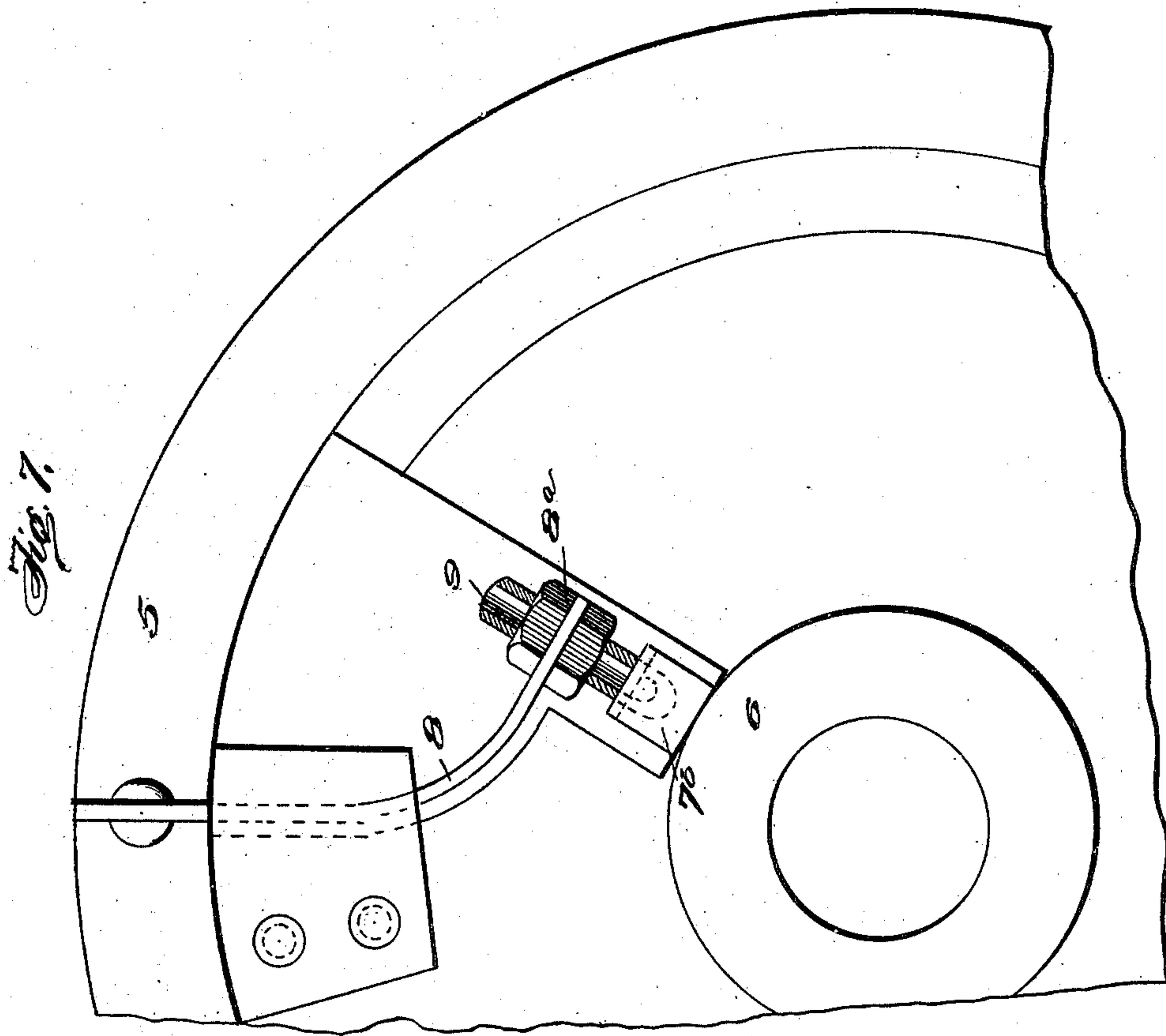
D. B. WILLOCK.

REVERSING MECHANISM FOR WASHING MACHINES.

(Application filed Oct. 26, 1901.)

(No Model.)

5 Sheets—Sheet 5.



Witnesses
Anton Stolt.
George F. Rainey.

By

Inventor
David B. Willock
H. J. Johnston
Attorney

UNITED STATES PATENT OFFICE.

DAVID B. WILLOCK, OF KANSAS CITY, MISSOURI.

REVERSING MECHANISM FOR WASHING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 708,444, dated September 2, 1902.

Application filed October 26, 1901. Serial No. 80,102. (No model.)

To all whom it may concern:

Be it known that I, DAVID B. WILLOCK, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Reversing Mechanism for Washing-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in motors for washing-machines, more particularly as required in laundries.

It has for its object, among other things, principally to dispense with the use of belt-power or belting, two belts, one crossed, being usually employed for obtaining the requisite movement of the operative parts in effecting the washing action, which belts are greatly objectionable, notably because of uncertainty of action, dirt-producing, &c., while all pulleys, shafts, &c., therefor are accordingly omitted.

It consists, primarily, of actuating and reversing mechanism for the main driving gear or shaft of the operative parts of the washing-machine and of the detailed construction, arrangement, and combination of parts, substantially as hereinafter more fully disclosed, and specifically pointed out by the claims.

In the accompanying drawings, illustrating the preferred embodiment of my invention, Figure 1 is a side view. Fig. 2 is a horizontal section, partly in plan. Fig. 3 is a detailed view more particularly of the cam mechanism between the beveled gear and the clutch mechanism. Fig. 4 is a section taken through Fig. 2 on the line *x x*. Fig. 5 is a section taken on the line *y y* of Fig. 2. Fig. 6 is a section taken on the line *z z* of Fig. 2. Fig. 7 is a broken detached view more especially of the key or clamp and adjusting or holding screw and spring of the clutch or coupling. Fig. 8 is a view of the same parts at right angles to the last-named view.

In carrying out my invention I suitably arrange contiguously to the washing machine or apparatus, housed or incased, as at 1, duplicate properly-spaced-apart beveled pinions or gear-wheels 2 2, with their cogs opposed to

each other and having sleeves or hubs at their central outer ends, through which passes a common shaft 3. Said shaft is suitably mounted in position at one end, preferably upon castings or arms 3^a 3^x, one bolted at its lower or inner end to a base or foundation piece, upon which is supported the motor proper; 4, the inner or higher end of said casting or arm having a box bolted thereto to receive and constitute a suitable bearing for said end of said shaft. The opposite end of the shaft 3 is suitably supported or journaled in a boxing securely bolted to the part or casing 1 of the machine or apparatus, as seen in Fig. 2. The arm or support 3^x has preferably bolted to its lower end an additional support or arm 3^{xx}, arranged at right angles thereto and suitably secured at its upper end to any convenient point, as shown. Said pinions or wheels have preferably their rims connected spider fashion or by arms or spokes 2^b 2^b to their sleeves laterally of their radii, and each has an integral annular or circular portion 2^c, arranged or fitting within which is a ring 5, the function of which will be presently apparent.

Upon the shaft 3, intermediately of the pinions 2 2 and suitably keyed to it, is a frictional hub 6, having lateral circular extensions 6^a at its edges, occupying the space between said hub and said ring 5, said extension 6^a being preferably elongated laterally at its outer edge or circumference to effect an extended area or surface of contact with said ring.

A circumferentially-grooved collar 7, having lateral flanges 7^a, preferably having outer beveled edges, is arranged upon the frictional hub 6 between its lateral circular portions 6^a and has inserted transversely through it a key or spline 7^b, providing for its turning with said hub keyed to the shaft 3, as before stated. Said key 7^b, adapted to have endwise movement or to slide in its seat or way 7^c in said hub and collar, is beveled or tapered at its ends, as at 7^d, and is adapted to be alternately moved in either direction so as to be brought into action, as presently described, for either of the beveled wheels. Said rings have suitably connected thereto upon their inner circumferences stout plate-springs 8, one being applied to each ring, and through

or in each plate or spring, near one end, is inserted and held firmly therein by jam-nuts 8^a a screw-bolt 9, preferably rounded at its engaging end, as more clearly shown in Fig. 7. It will be noted that as the spline or cam 7^b is so moved, by accordingly moving the collar 7, as presently described, that one of said screw-bolts 9 shall be engaged by one of the beveled ends of said spline or cam, increased tension or stress will be imparted or transmitted to said spring accordingly, producing a binding action between the frictional hub 6, the shaft 3, and the rings 5, carried by the corresponding beveled pinion 2, thus frictionally coupling up said shaft and pinion. Simultaneously the key or cam 7^b will thus be locked in position as against involuntary endwise movement or displacement.

A small beveled pinion 10^a, adapted to simultaneously drive or gear with the larger corresponding pinions or wheels 2, is carried by a shaft 10^b, whose boxing is suitably supported by a branch arm 3^b of the support or casting 3^a. Said shaft 10^b has fixed to one end a right-line-toothed pinion 10^c, geared to the pinion 10^d of the motor-shaft 10^e, thus providing for actuating the driving-pinion 10^a, imparting motion to the beveled pinion 2. It will be seen from this arrangement that both of the beveled pinions 2 being driven by this same pinion 10^a they are rendered capable of receiving simultaneously a reverse movement—i. e., being revolved in opposite directions at the same time—the motion of only one of which, however, being communicated at one time or operation to the shaft 3 and finally to the washing apparatus, as presently explained.

A bracket or arm 11, having a sleeve 11^b at one end inserted upon the tubular or cylindrical portion 11^c of the casting or support 3^a and suitably fixed in position, has a stud or projection 11^a extending laterally therefrom. Upon the stud or projection 11^a is hung or mounted a worm-wheel 12, meshing with a worm or screw 13, formed upon a sleeve 13^a, abutting the sleeve or hub of one of the beveled pinions 2 and suitably fixed to the shaft 3. Said worm-wheel 12 has a lateral roll-equipped stud 14, and suitably hung from the arm or bracket 11, as at 11^d, is a peculiarly-constructed cam 15, having lateral opposite inwardly-convexed surfaces or faces 15^a, with which engages said roll-equipped stud of said worm-wheel. An angular lever 16, carried by the cam 15, is pivoted to a disk 16^c, having a pivot upon its lower side bearing in a socket 16^a, cast or integral with the free end of the arm 11, and this lever has two or duplicate prongs or a shipper 16^b. These prongs have their inner ends embracing and connected to the hub-embracing collar 7 about centrally thereof in its peripheral or circumferential groove. Said cam 15 has a vertical elongated slot 17, which receives a stud or pin 18, secured, as at 18^a, to the arm 11. A pinion

19, secured upon the opposite end of the shaft 3, is geared or meshed with the main driving gear-wheel 20, secured upon the shaft of the washing apparatus or machine for actuating the last-named therethrough from the motor, as will be readily understood. It will therefore be seen that as motion is transmitted to the gear wheels or pinions 2 by the moving of the pinion 10^a into gear therewith, one of said gear-wheels having been previously shipped or moved so as to effect connection thereof with the shaft 3 by means of the frictional coupling or clutch, as before explained, rotation will be imparted to said shaft, which will continue to rotate a limited period, actuating through intermediate gearing, shafts, &c., the washing apparatus. During such operation or action of parts the shaft worm or screw 13 being in mesh with the worm-wheel 12 the last-named will be actuated, causing its roll-equipped stud 14 to engage one convex surface or face 15^a of the cam 15. Said cam will be shifted under this action, being free to conform to the obliquity of movement thus imparted thereto by reason of its elongated slot and pin or stud connection 17 18 and carry with it and so dispose the angular lever 16 as to accordingly deflect its shipper 16^b, correspondingly moving or sliding the collar 7, in turn carrying its key or cam 7^b, let into the frictional hub 6, laterally into engagement with the opposite beveled end of the screw-bolt 9. Said bolt yielding because of the flexibility of its suspending-spring 8 will permit the passage of said end of said key or cam thereunder, increasing the tension or stress of said spring and accordingly jamming the frictional hub 6, the ring 5, equipped with said spring and screw-bolt, and said key or cam between the gear-wheel 2 and shaft 3. This, it is obvious, effects the connecting or coupling together of the opposite or previously-uncoupled gear-wheel and said shaft, starting the rotation of the shaft in the opposite direction, accordingly effecting the reversal of the washing operation, all without the use of belting, &c., consequently avoiding the objections and disadvantages thereof, as above noted. Said action of parts will be repeated at intervals throughout such washing operation.

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

1. In reversing mechanism of the character described, the combination of a driven shaft, gearing loosely arranged thereon, a shiftable coupling arranged to slide upon said shaft and yet turn therewith, a driving-shaft geared to the said driven shaft, means for shifting said coupling, means for oppositely actuating said shifting means from said driven shaft, and spring-pressed means for engaging said coupling with either of the gears of said driven shaft, substantially as set forth.

2. In reversing mechanism of the character described, the combination of a driven shaft,

gearing loosely arranged on said shaft, a shift-
able coupling arranged to slide on said shaft
and yet turn therewith, a driving-shaft geared
to said driven shaft, means for shifting said
5 coupling, means for oppositely actuating said
shifting means from said driven shaft, a bevel-
ended notched bar carried by said coupling
and spring-pressed studs carried by said gear-
ing and adapted to engage said notched bar,
10 substantially as set forth.

3. In apparatus of the character described,
automatically-reversing mechanism compris-
ing a common shaft, gearing loosely mounted
upon said shaft, spring-equipped rings con-
15 centric with said gearing, a laterally-movable
shipping-collar arranged on said shaft, inter-
mediately of said gears, a cam carried by said
collar, means applied to the springs of said
rings for engaging said cam, means for auto-
20 matically actuating from said shaft said col-
lar, and means for actuating said shaft, sub-
stantially as set forth.

4. In apparatus of the character described,
automatically-reversing mechanism compris-
25 ing a common shaft, duplicate gears loosely
arranged upon said shaft, an intergeared
worm gearing and wheel arranged in connec-
tion with said shaft, means to couple up said
shaft and said duplicate gearing, means to
30 effect connection between said worm-gearing,
and said means of coupling and means for
actuating said shaft, substantially as set
forth.

5. In apparatus of the character described,
35 automatically-reversing mechanism compris-
ing a common shaft, duplicate gears loosely
arranged thereon, a gear common to the first-
named gearing, a worm-and-wheel gearing
arranged in connection with said shaft, a cam
40 suitably arranged in position, and a lever car-
ried by said cam, said cam being engaged by
a projection on said wheel, and means actu-
ated by said lever and adapted to effect the
coupling of said shaft and said duplicate gear-
45 ing, substantially as set forth.

6. In apparatus of the character described,
automatically-reversing mechanism compris-
ing a common shaft, duplicate gears arranged

loosely thereon, a worm and friction-coupling
arranged in connection with said shaft, spring- 50
equipped rings carried by said duplicate gear-
ing, screw-bolts carried by said springs of said
rings, a hub interposed between said duplicate
gearing and rings, a collar applied to said hub
and equipped with a bevel-ended cam adapted 55
to engage said screw-bolts, means for effect-
ing connection between said worm-and-wheel
gearing and collar to move the last-named
with its cam endwise, and means for actu-
ating said shaft, substantially as set forth. 60

7. In apparatus of the character described,
automatically-reversing mechanism compris-
ing a shaft, duplicate gears adapted to be
driven simultaneously in opposite directions,
means for clutching or coupling said dupli- 65
cate gearing and shaft together, a worm-and-
wheel gearing actuated from said shaft, a cam
suitably arranged in position, and actuated
from said worm-and-wheel gearing, and a le-
ver carried by said cam and having prongs or 70
a shipper engaging said coupling, and means
for transmitting motion from said shaft, sub-
stantially as set forth.

8. In apparatus of the character described,
automatically-reversing mechanism compris- 75
ing a shaft, duplicate gears loosely mounted
thereon, means for simultaneously driving
the wheels of said gearing in opposite direc-
tions, means for coupling said gearing and
said shaft together, worm-and-wheel gearing 80
arranged upon said shaft, a cam having lat-
eral opposite convexed surfaces or faces and
a slot therethrough a fixed pivot pin or stud
passing through said slot, a lever carried by
said cam and a shipper carried by said cam 85
and connected up with said coupling, means
for actuating said lever from said cam, and
means for transmitting motion from said
shaft, substantially as set forth.

In testimony whereof I affix my signature 90
in presence of two witnesses.

DAVID B. WILLOCK.

Witnesses:

C. J. TOMPKINS,
EDWARD P. CLARK.