

No. 724,449.

PATENTED APR. 7, 1903.

W. N. DUMARESQ.
VARIABLE SPEED GEAR.
APPLICATION FILED AUG. 2, 1902.

NO MODEL.

3 SHEETS—SHEET 1.

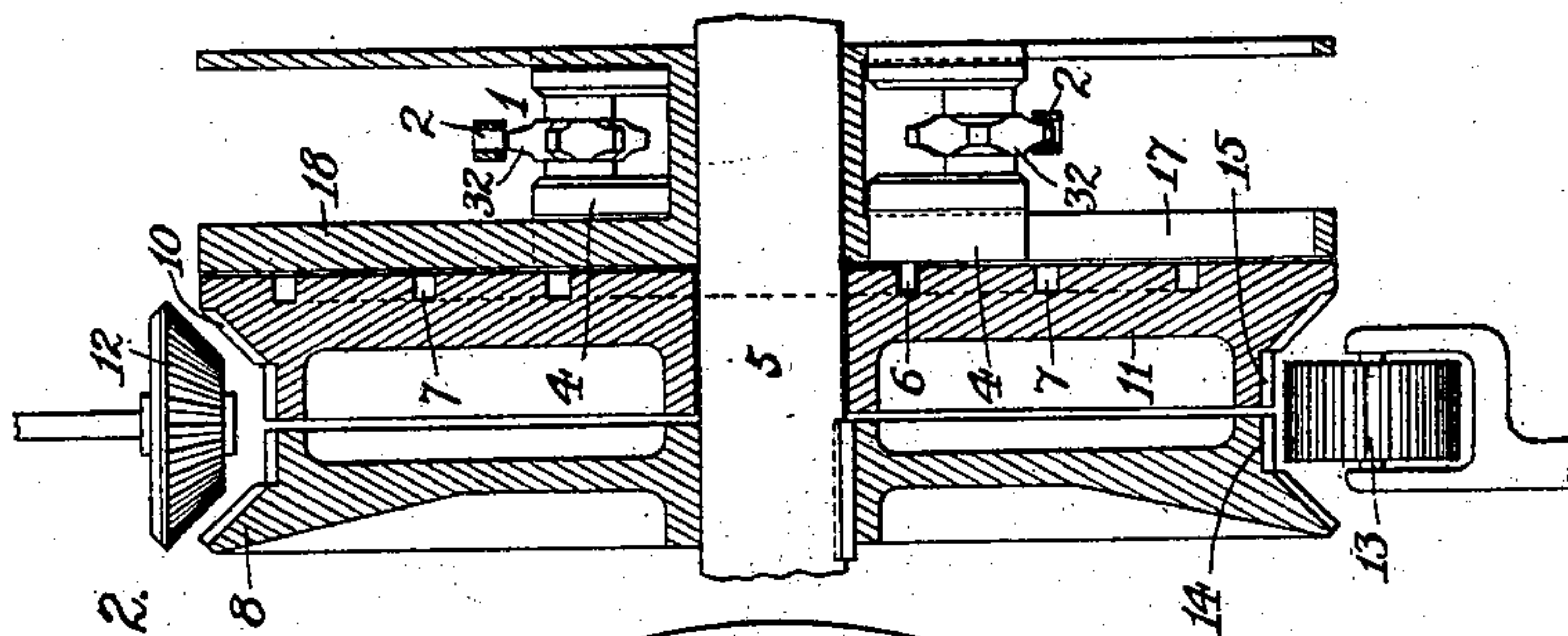


Fig. 2.

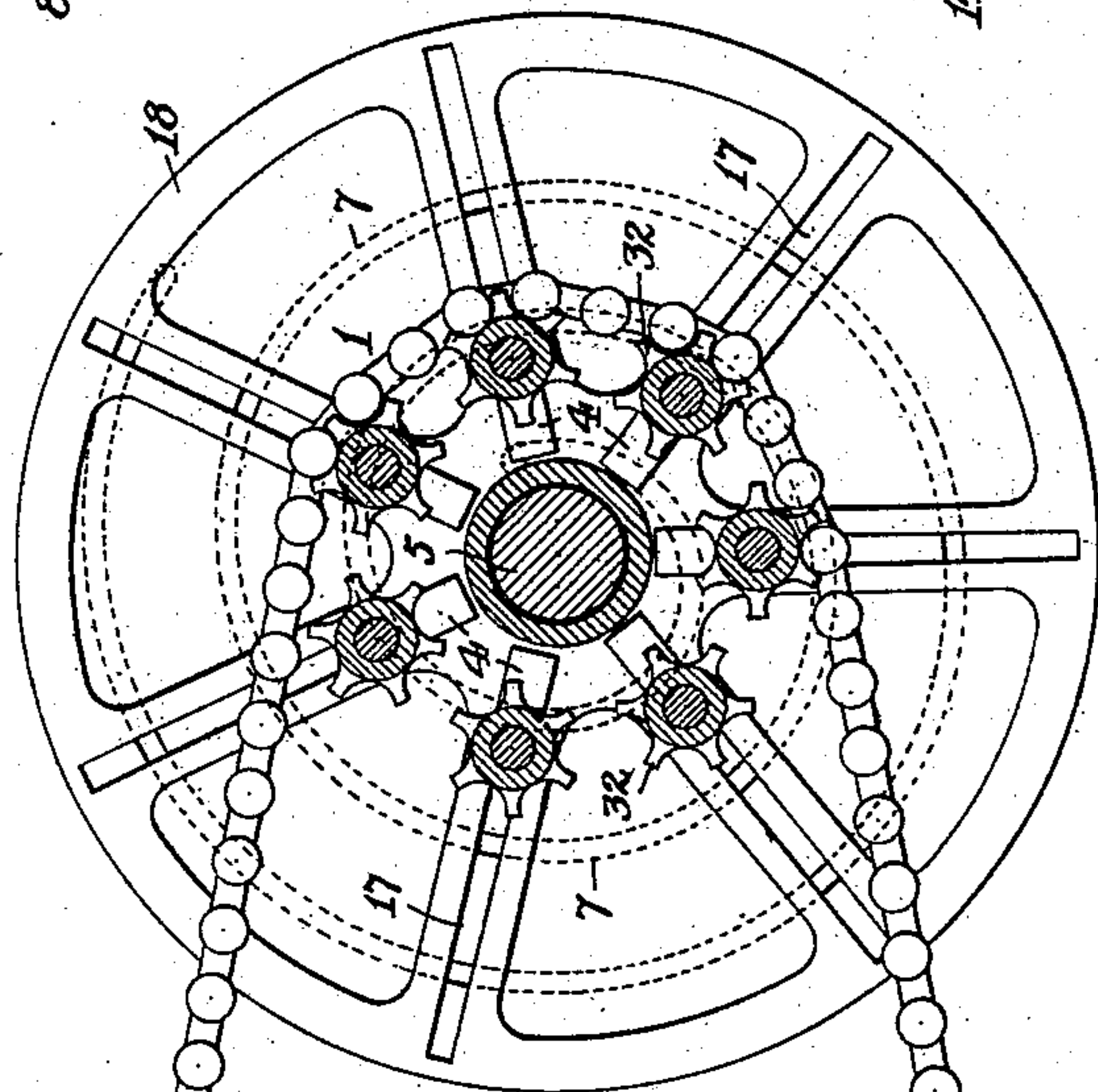
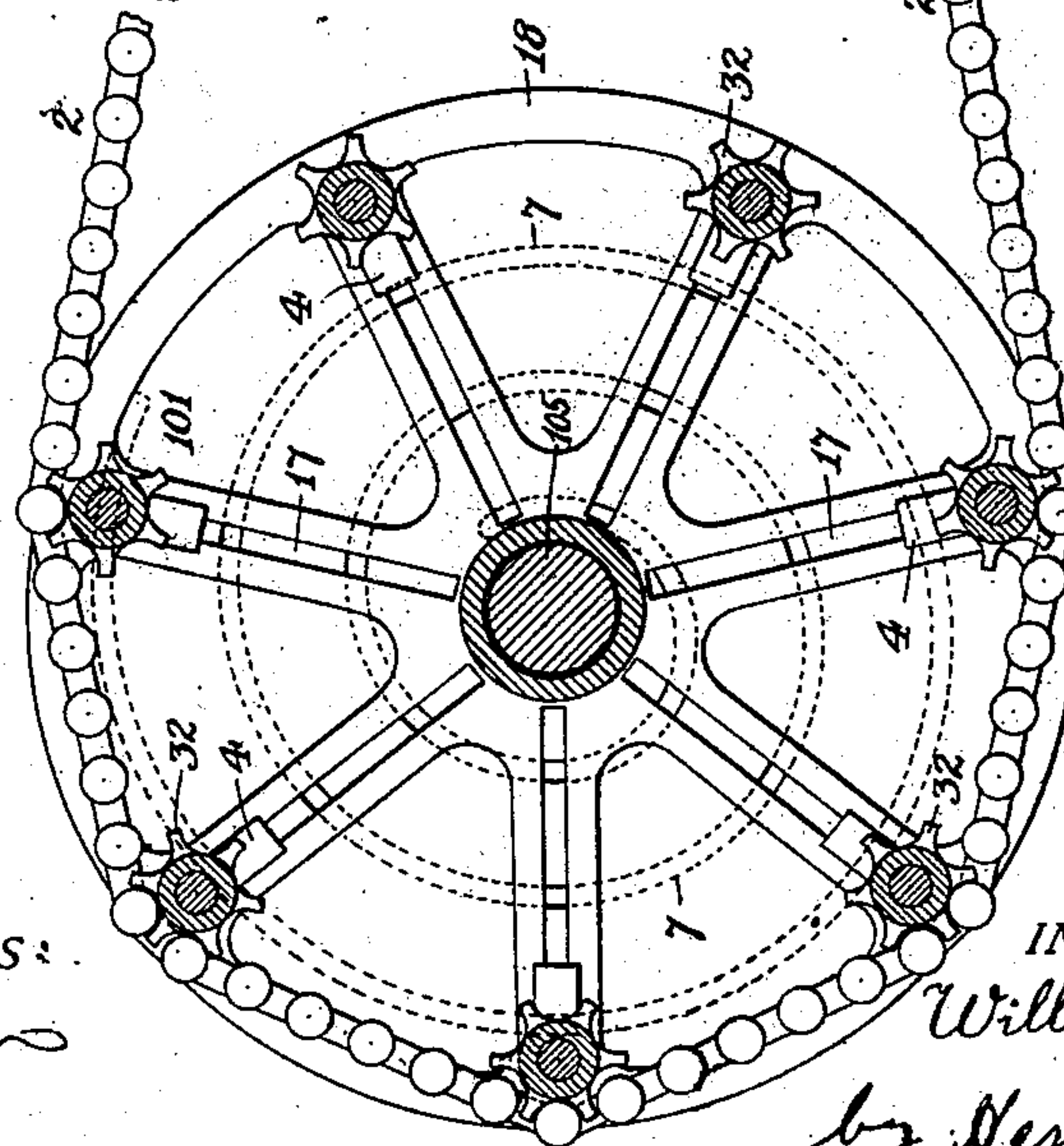


Fig. 1.



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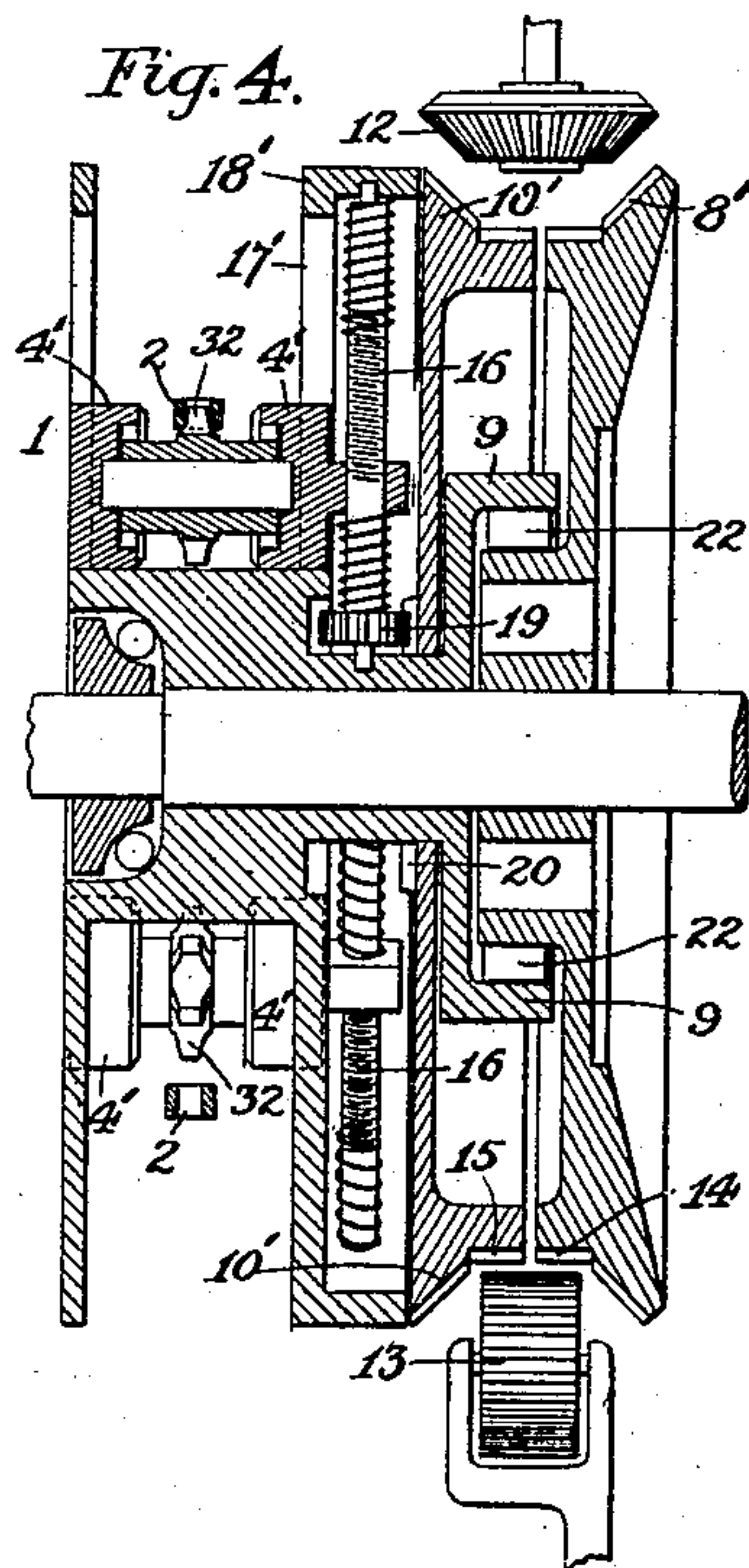
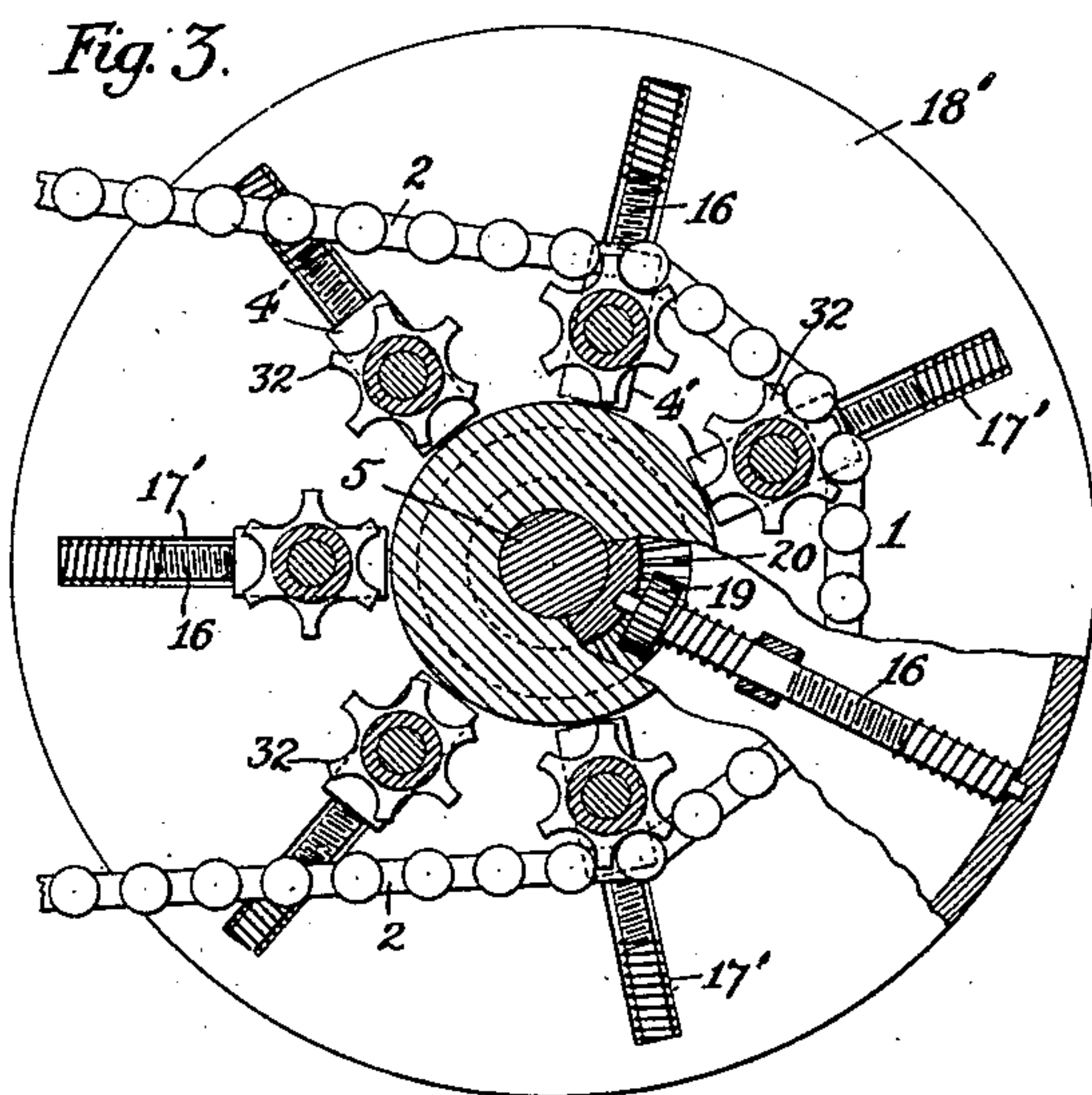
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3 SHEETS—SHEET 3.

Fig. 5.

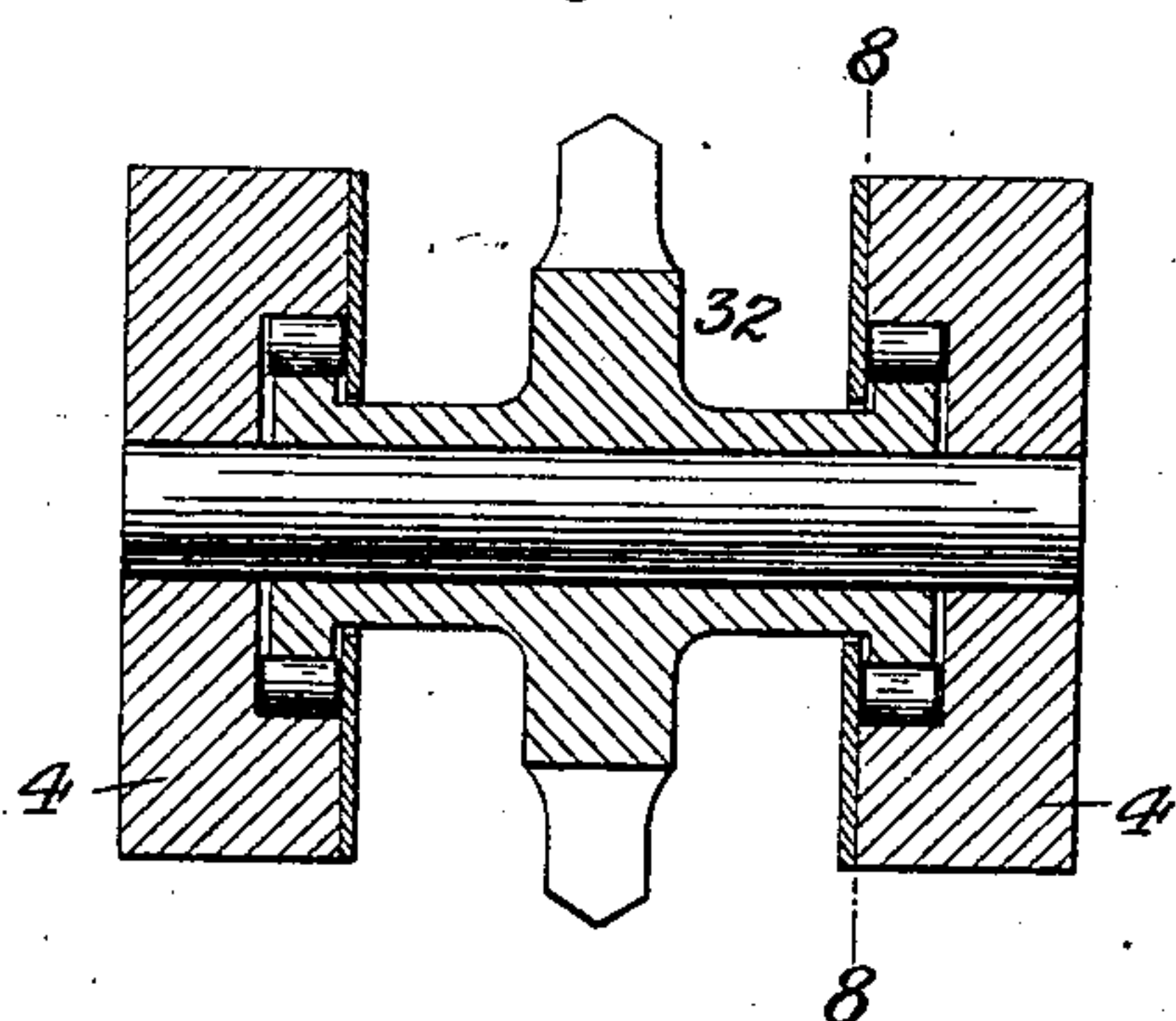


Fig. 6.

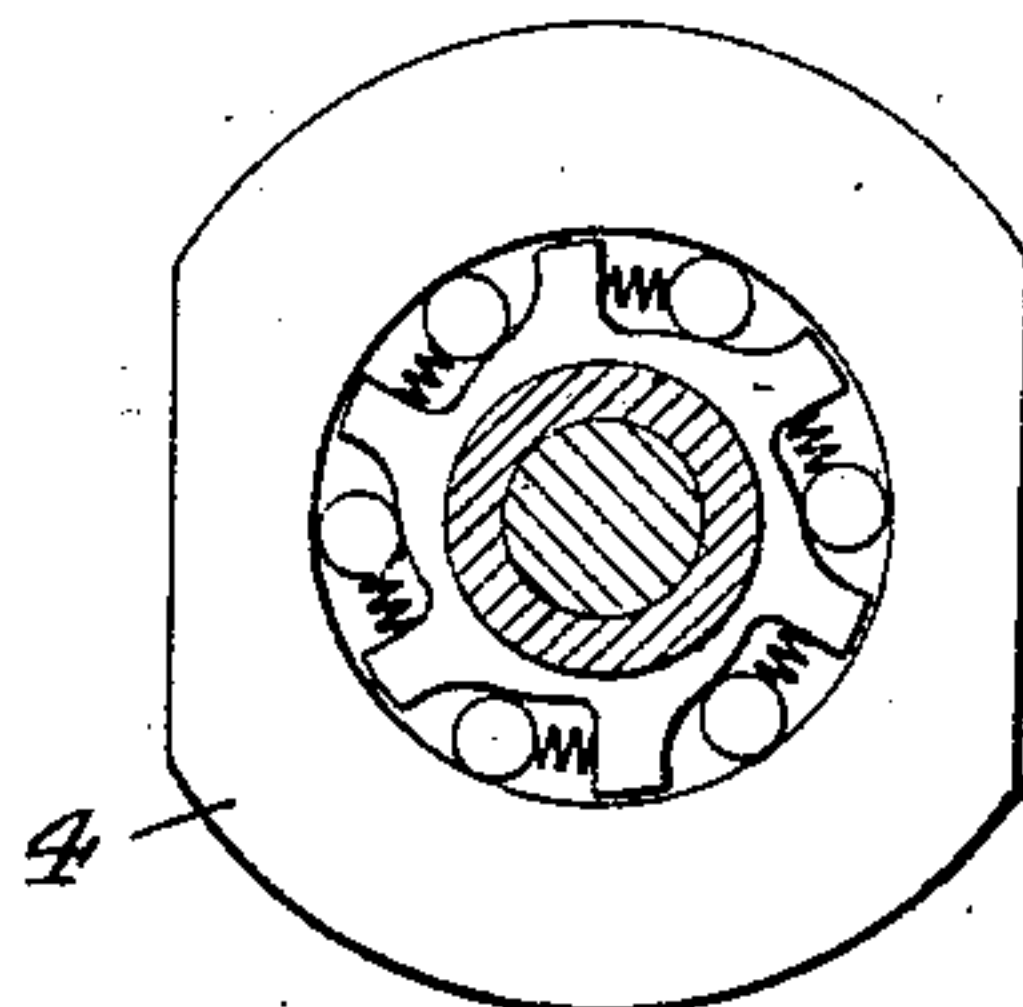
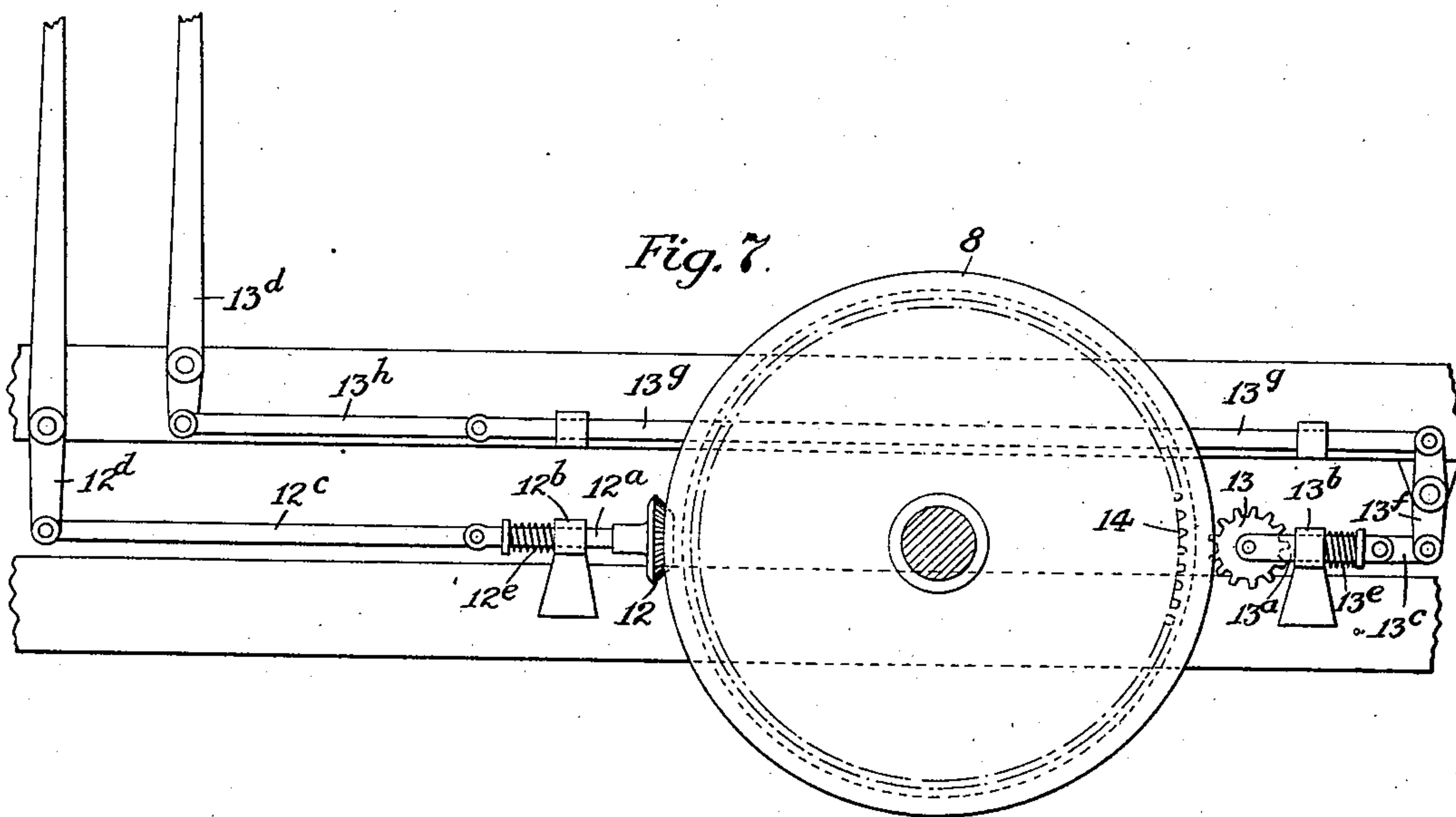


Fig. 7.



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UNITED STATES PATENT OFFICE.

WILLIAM NEWTON DUMARESQ, OF LONDON, ENGLAND.

VARIABLE-SPEED GEAR.

SPECIFICATION forming part of Letters Patent No. 724,449, dated April 7, 1903.

Application filed August 2, 1902. Serial No. 118,174. (No model.).

To all whom it may concern:

Be it known that I, WILLIAM NEWTON DUMARESQ, a subject of the King of Great Britain, residing at 12 Rylett Crescent, Shepherd's Bush, London, in the county of Middlesex, England, have invented new and useful Improvements in Variable-Speed Gear, of which the following is a specification.

The present invention relates to an improved means for driving cycles, motor-cars, and other similar vehicles, and also motor-launches, the object being to enable the speed transmitted from the driving to the driven shaft to be varied to suit varying circumstances, such as in the case of road-vehicles those presented by the gradient of the road along which the vehicle is to be propelled and in the case of motor-launches to allow of same being propelled at different speeds.

The invention is applicable to cycles driven by chain transmission either by the rider or by a suitable motor and also to motor-cars or other road-vehicles, including tramways and railways, and to motor-launches.

The essential feature of the invention consists in the construction of the wheel or wheels over which the transmission chain or chains passes or pass, so that same can be expanded or contracted at will.

In order that my invention may be fully understood, I will proceed to describe the same by the aid of the accompanying drawings, in which—

Figure 1 is a side elevation of the two wheels over which the transmission-chain passes and shows a suitable manner of carrying my invention into effect. Fig. 2 is a transverse section of Fig. 1. Fig. 3 is a side elevation of one of the expanding wheels with a modified means of expanding same, and Fig. 4 is a transverse section of Fig. 5. Fig. 5 is a vertical section, on a larger scale, taken through the bearings of one of the sprocket-wheels. Fig. 6 is a transverse section of Fig. 5, the plate for retaining the rollers of the roller-clutch being removed. Fig. 7 illustrates a means which may be employed for operating pinions 12 and 13, said pinions for convenience of illustration being shown side by side instead of opposite.

It will be seen that in carrying out my invention in place of the ordinary chain-wheels

each of such wheels is composed of a series of sprocket wheels or pinions 32, each mounted upon a separate bearing 4, which is capable of moving toward or away from the center of the wheel to which same are applied, such pinions being normally locked so as not to be capable of revolving, and the outer teeth of same engaging the links of the driving-chain 2. These pinions 32 are mounted so as to revolve with a disk or part 18, secured to the axle of the wheel to be driven, and they are normally locked so as not to be capable of revolving upon the axes carried by the bearings 4, on which they are mounted. When it is desired to reduce or increase the speed of the driven wheel, the pinions 32 are released, so as to permit them to be capable of rotating on their axes, and then the bearings 4 are caused to approach or recede from the center of the wheel by sliding along slots 17, formed in the disk 18, such movement being imparted to the bearings 4 by any suitable arrangement, the capability of the pinions to rotate permitting such movement by causing other teeth of such pinions to engage the links of the driving-chain 2.

In order to permit the shifting of the chain 2, which is necessary when the diameters of the drums 101 are being altered, each of the sprockets or pinions 32, carried by the expanding bearings 4, is capable of being liberated, so that same can revolve on its axis, such pinions being normally locked so that they cannot revolve themselves, but only rotate or are carried around by the part 18, in which the bearings are mounted. A suitable means of effecting this (shown in Figs. 5 and 6) consists in mounting each of such pinions 32 on a roller-clutch constructed so that the pinions cannot revolve in the direction in which the pull of the transmission-chain is exerted upon same, but only in the opposite direction to such pull, so that when the bearings are contracted or expanded the pinions can revolve and allow the chain to adjust itself to the different diameters of the drums. It will be seen that the roller-clutch on which pinion 32 is mounted is of ordinary well-known construction, and consequently requires no especial description.

The means for imparting simultaneous movement to the bearings 4, carrying the

sprockets or pinions 32 toward or away from axis 5 or 105, are similar to those employed in what is known as the "scroll-chuck" of a lathe, each bearing 4 being provided with a part or pin 6, engaging the scroll-thread 7, formed in the plate 11, mounted so as to normally rotate with the different pinions, but which when actuated independently of the drum 1 causes the bearings 4, carrying the pinions 32, to move inward or outward, according to the direction in which such scroll-thread 7 is rotated.

A suitable method of actuating the scroll-thread 7 consists in a bevel-wheel 8, mounted on the hub of the driving-wheel, and a corresponding wheel 10, secured to the plate 11, carrying the scroll-thread 7, a bevel-pinion 12 being mounted so that same is normally held out of gear, but which can be moved so as to engage said wheels 8 and 10, whereby the scroll-thread 7 will be rotated in the opposite direction to the driving-wheel and the pinions 32 consequently moved outward and the diameter of the drum 1 or 101 thereby increased. To move the pinions 32 inward, a roller 13 is mounted so that same can be brought to bear on a cylindrical part 14, secured to the bevel-wheel 8, carried by the driving-wheel, and also on a corresponding part 15, secured to the bevel-wheel 10 of the scroll-thread plate 11, whereby the latter will be driven in the same direction as the driving-wheel and the pinions 32 consequently moved inward, so as to diminish the diameter of the drum 1 or drum 101, as the case may be. The bevel-wheels 8 and 10 and pinion 12 and also the cylindrical parts 14 and 15 and the roller 13, bearing on same, may be either plain or toothed. Both the bevel-pinion 12 and the roller 13 are, as shown in Fig. 7, under the control each of a separate lever within reach of the driver. The pinion 12 is mounted on a shaft 12^a, capable of sliding in a bearing 12^b and connected by a link 12^c to one end of lever 12^d, the other end of which is operated by the driver. A spring 12^e tends to keep the pinion 12 normally out of gear with the wheels 8 and 10. Similarly pinion 13 is mounted on a shaft 13^a, capable of sliding in a bearing 13^b, connected by link 13^c to one end of lever 13^d, the other end of which is operated by the driver. A spring 13^e tends to keep the pinion 13 normally out of gear with the wheels 14 15. 13^e is a shaft connecting lever 13^d with the intermediary link 13^b and the operating-lever 13^d.

In the arrangement above described it is evident that the disk 18 will not be keyed to shaft 5, but be connected thereto by a roller-clutch and held stationary during the expanding or contracting action.

It will be readily understood that instead of both drums being capable of expansion and contraction only one of same may, if desired, be capable of so doing, in which case in order to take up the slack of the chain I may

cause same to pass over or under a jockey-pulley.

It is obvious that by suitable well-known mechanical means the power to move the bearings 4, carrying the spindles of the sprockets or pinions 32, toward or away from the axis 5 may be applied to each end of such spindles instead of to one end only, as in the arrangement previously described.

Instead of actuating the bearings 4, carrying the different pinions 32 of the drums 1 and 101, by means of a scroll-thread 7, as hereinbefore described, I may, as shown in Figs. 3 and 4, mount a screw 16 in suitable bearings in each of the slots 17' in which the pinion-bearings work and cause a nut on each of said pinion-bearings 4' to engage such screw.

The whole of the screws 16 will be provided with suitable means whereby same may be simultaneously rotated, and according to the direction of rotation it will be seen that the bearings 4', guided in the slots 17', will be consequently simultaneously moved either away from or toward the central axis 5 or 105.

The means for actuating the screws 16 may consist of pinions 19, with which gears a crown-wheel 20, formed in one with the bevel-wheel 10', to which motion is imparted from the bevel-wheel 8' either by pinion 12 or roller 13 when either one or the other is moved to the operative position in the manner previously described in connection with Figs. 1 and 2. The screws 16 are mounted in the plate or disk 18', which has a part 9 extended so as to form a boss, between which and the boss of the bevel-wheel 8' a roller-clutch 22 is introduced.

The drawings show in Fig. 4 means for actuating screws 16 analogous to the means employed in the alternative form of Fig. 2, where a scroll-thread or spiral effects the expansion and contraction of the sprocket-wheels, the two being mechanically equivalent.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In variable-speed gear, a drum, a series of radially-movable bearings in said drum, sprocket-pinions mounted in said bearings, a driving-chain engaging with said pinions, and means for simultaneously moving said pinions radially inward or outward, substantially as specified.

2. In variable-speed gear, a driving-drum, a driven drum, radially-movable bearings in said drums, sprocket-pinions mounted in said bearings, a driving-chain engaging with said pinions, and means for simultaneously moving said pinions radially inward or outward, substantially as specified.

3. In variable-speed gear, a drum, a series of radially-movable bearings in said drum, sprocket-pinions mounted in said bearings, a chain engaging with said pinions, means for simultaneously moving said pinions radially inward or outward, and means, as a clutch, for locking said pinions against rotation in one direction while permitting their rotation

in the opposite direction, substantially as specified.

4. In variable-speed gear, a drum, a series of radially-movable bearings in said drum, sprocket-pinions mounted in said bearings, a driving-chain engaging with said pinions, a scroll-threaded disk mounted facing said drum, means for engagement between said scroll-thread and said pinion-bearings whereby when the said drum and scroll-threaded wheel are rotated in relatively opposite directions said pinion-bearings and pinions will be moved radially inward or outward, substantially as specified.

5. In variable-speed gear, a driving-drum, a driven drum, radially-movable bearings in said drums, sprocket-pinions mounted in said bearings, a driving-chain engaging said pinions, and scroll-threaded disks mounted in engagement with the pinion-bearings of each drum, whereby when the said drums and corresponding scroll-threaded disks are rotated in relatively opposite directions said pinion-bearings and pinions will be moved radially inward or outward, said scroll-threads being relatively reversely operated, so that when the pinions of one drum move radially outward the pinions of the other drum move radially inward, and vice versa, substantially as specified.

6. In variable-speed gear, a drum-shaft, a drum thereon, a series of radially-movable bearings in said drum, sprocket-pinions mounted in said bearings, a chain engaging said pinions, a scroll-threaded disk mounted facing said drum, independently rotative on the shaft, means for engagement between said scroll-thread and said pinion-bearings whereby said pinions are moved radially inward or outward when any relative rotative displacement occurs between said drum-face and said disk, a gear-wheel mounted on the drum-shaft outside of the scroll-disk, having both bevel and cylindrical engagement devices, corre-

sponding bevel and cylindrical engagement devices on the scroll-disk facing said gear-wheel, a bevel-pinion movably mounted to engage simultaneously with the gear-wheel and the scroll-disk, and a cylindrical pinion movably mounted to engage the gear-wheel and the scroll-disk simultaneously, whereby said scroll-disk and gear-wheel may be rotated simultaneously in the same direction or in opposite directions at will, substantially as specified.

7. In variable-speed gear, a drum-shaft, a drum thereon, a series of radially-movable bearings in said drum, wheels mounted in said bearings, a bevel and spur toothed wheel mounted on said shaft at a short distance from said drum, a loosely-mounted disk on said shaft between said drum and said gear-wheel, having bevel and spur gear teeth parallel with and facing the teeth of said gear-wheel, a bevel-pinion movably mounted to engage with the bevel-teeth of said gear-wheel and disk simultaneously, a spur-pinion movably mounted to engage with the spur-teeth of the said gear-wheel and said disk simultaneously, whereby said gear-wheel and disk may be rotated simultaneously in the same direction or in opposite directions at will, and expansion means between said disk and said drum, in engagement with the said wheels, bearings borne on said drum, whereby said wheels are moved radially inward or outward when any relative rotative displacement occurs between said drum and said disk, the latter being in operative connection with said expansion means, substantially as specified.

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

WILLIAM NEWTON DUMARESQ.

Witnesses:

WILLIAM JAS. TERRY,
HARRY A. MCLELLAN.