F. H. RICHARDS.

DRIVING MECHANISM.

APPLICATION FILED JAN. 5, 1901.

997,209. Patented July 4, 1911.

2 SHEETS—SHEET 1.

Fig. 1.

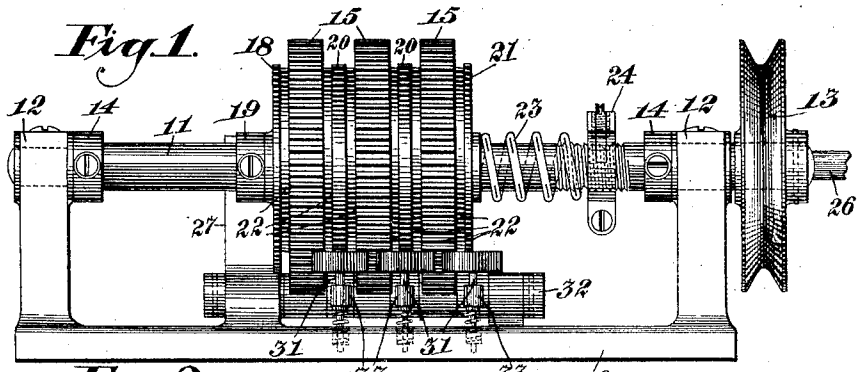


Fig. 2.

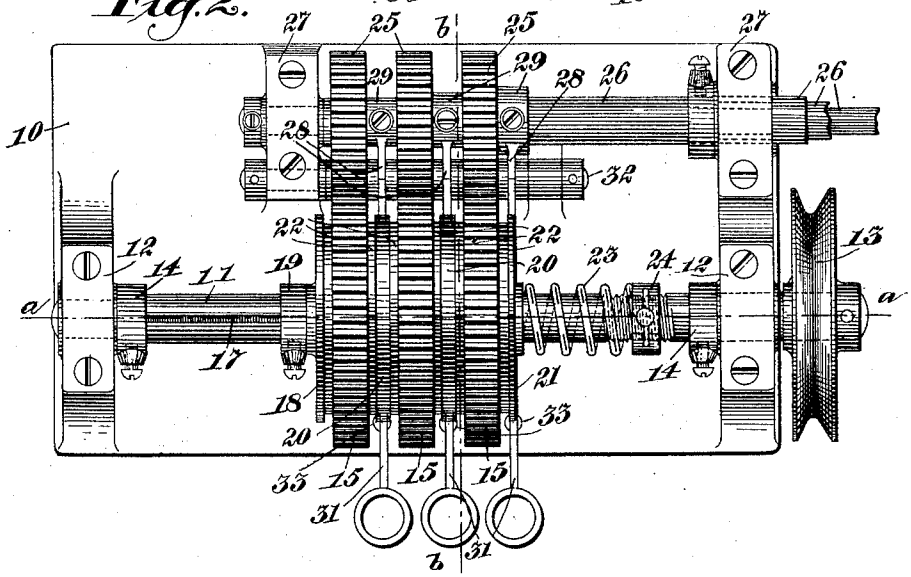
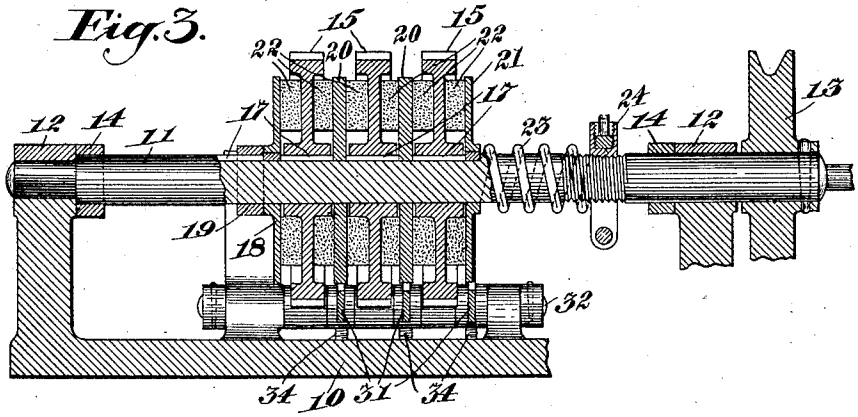


Fig. 3.



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2 SHEETS—SHEET 2.

Fig. 4.

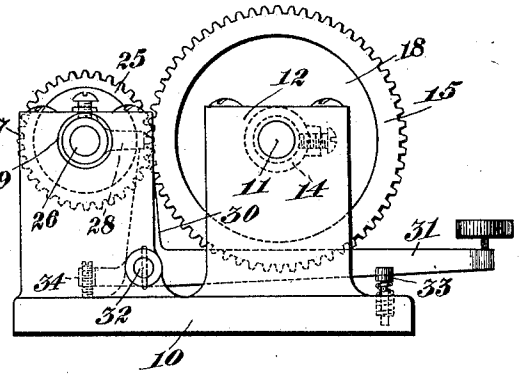


Fig. 5.

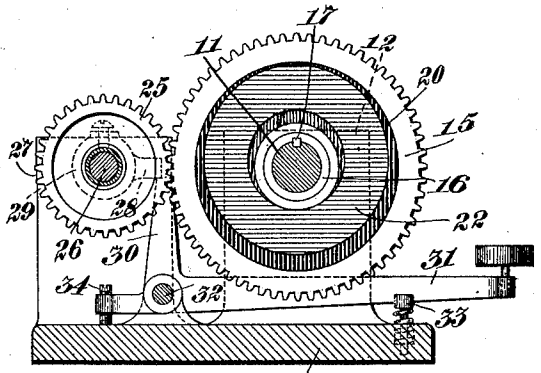


Fig. 6.

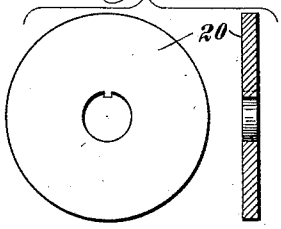


Fig. 8.

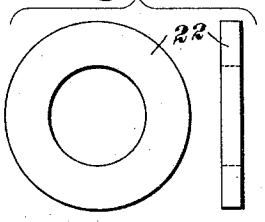


Fig. 7.

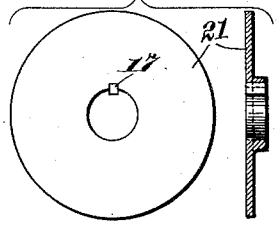
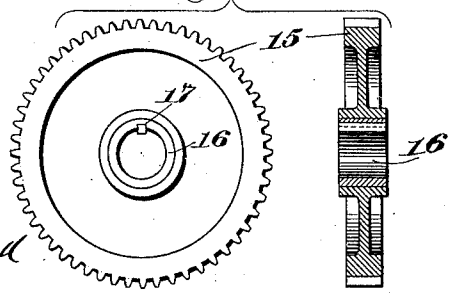


Fig. 9.

Fig. 10.



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UNITED STATES PATENT OFFICE.

FRANCIS H. RICHARDS, OF HARTFORD, CONNECTICUT, ASSIGNOR, BY MESNE ASSIGNMENTS, OF ONE-HALF TO AMERICAN TYPOGRAPHIC CORPORATION, A CORPORATION OF ARIZONA TERRITORY.

DRIVING MECHANISM.

997,209. Specification of Letters Patent. **Patented July 4, 1911.**

Application filed January 5, 1901. Serial No. 42,185.

To all whom it may concern:

Be it known that I, FRANCIS H. RICHARDS, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Driving Mechanism, of which the following is a specification.

This invention pertains to the relationship and organization of various members constituting a mechanism designed to effect the operation of any one of a number of driven members through the instrumentality of intermediate power-transmitting members which are adapted to be operated in common by a prime driver. In mechanism designed for this purpose it is deemed advisable to interpose frictional contact surfaces between the driving and driven members, and in mechanism forming the particular embodiment chosen for illustrating my present invention, such contact is continuously operatively maintained between a prime driver and intermediate power-transmitters; motive power being thus constantly supplied by the prime driver and rendered instantly available upon the release of any of the power transmitters.

The organization herein set forth as one presentation of means embodying my present invention, is illustrated in the accompanying drawings.

Figure 1 is a side elevation of one form of my invention. Fig. 2 is a top plan view thereof. Fig. 3 is a longitudinal, vertical section on the line *a*—*a* of Fig. 2. Fig. 4 is an end elevation looking from the left in Fig. 1. Fig. 5 is a transverse, vertical section on the line *b*—*b* of Fig. 2. Figs. 6 and 7 are each an end elevation and a central, longitudinal section of two friction-disks. Fig. 8 shows similar views of a friction-ring. Fig. 9 is an end and side elevation of the shaft; and Fig. 10 is an end elevation and a central, longitudinal section of a gear, illustrating another arrangement for journaling from that shown in the preceding figures.

Similar characters designate like parts throughout the different figures of the drawings.

Upon a base, designated by the numeral 10, is supported a shaft 11, journaled in standards 12—12, and provided with a pulley or driving element 13 by which it may be rotated from some source of power. The shaft 11 may be retained against longitudinal movement in its bearings by collars 14—14 secured to it by set screws and abutting against the standards. Upon the shaft are carried the driven elements, here shown as three in number and in the form of spur-gears 15 loosely turning either directly upon the shaft or upon a collar 16 splined thereto, as is illustrated in Fig. 10, this latter arrangement avoiding the rotation of a part in contact with the edges of a groove or keyway 17 which extends along the shaft within the driven elements. Adjacent to the outer side of one of the outer gears is a disk or plate 18, constituting one member of the connecting device between the shaft and the gear, splined in the groove 17 and abutting against a collar 19 secured to the shaft by a set screw which retains the device and other parts to be later described against longitudinal movement in this direction. Between each pair of gears is a disk or member 20, keyed in the groove so that it is free to move along the shaft, and outside the other outer gear is a disk 21 similar to the disk 18. Between the face of each disk and the face of the adjacent gear is a friction ring or member 22, which may conveniently be of fiber. These rings preferably have at their centers an opening larger than the part which they surround, and also some free space at their outer edges. This permits a lateral shifting of the rings during their rotation between the disks and gears, their inner edges rolling in contact with the gear-hubs, and prevents their being circumferentially grooved by any irregularities in the surfaces with which they contact, which grooving would tend to change the coefficient of friction between the parts.

The disposition of disks and rings above described provides a pair of them in proximity to each gear, one disk upon each side with an interposed ring. To secure proper frictional engagement between the connecting members and the driven elements a means common to all is preferably provided for actuating them, this being here shown as a spiral spring 23 surrounding the shaft and having one end resting against the disk 21, and the other against a collar or contact piece 24 adjustably secured to the shaft

by a means here shown as a threaded connection between the two, and a set screw.

The gears 15 are shown as applied to the work of driving coacting gears 25, mounted upon concentric shafts 26, journaled in standards 27 from the base. To control their rotation each of the shafts 26 may be provided with one or more tappets 28 projecting from a hub 29 fastened by a set screw, and situated in the path of each of said tappets is an arm 30 of an angular key-lever 31, pivoted at 32 to the base. A spring-operated stud 33 engages the under side of each lever and holds the arm 30 normally in the path of the tappet. A screw 34 threaded through a rearward extension of the lever contacts with the base to adjustably limit the backward movement of the arm.

In operation, the shaft 11 is continuously rotated by its pulley and with it will turn the connecting disks 18, 20, and 21, and these and the loose gears 15, being continuously pressed toward one another by the spring 23, the rings 22 will be forced into contact therewith and the gears will tend to turn with the shaft by virtue of the frictional engagement. But as their engaging gears 25 are normally held against rotation by the controlling devices, the former gears and the rings will slip between the disks, the shaft turning in them. Then when one of the key-levers is pressed so that its arm will be withdrawn from the path of the tappet 28 the friction in the connecting devices will be sufficient to rotate its gear 15 and with it the coacting gear 25, while the neighboring gears remain stationary. The tension of the spring 23 may be adjusted by the position of its contact piece, so that, while the engagement between the parts is sufficient for the work to be done, there will not be so great friction as to cause unnecessary wear.

Although the driving and driven elements have been shown as of a particular form and applied in a particular way, it is evident that they might be of various forms and applied to any work to which the organization of the connecting device is suited.

Having thus described my invention, I claim—

1. In a driving mechanism, the combination with a driver, of a member mounted thereon and operating therewith; an orbitally movable friction annulus loosely mounted on the driver and engaging with said member; a power transmitter mounted on the driver and adapted to frictionally engage with said annulus; means for preventing the operation of the power transmitter, manipulative means to permit the power transmitter to operate, and automatic means offering lateral pressure for creating frictional engagement.

2. In a driving mechanism, the combination with a driver of a member mounted thereon and rotating therewith; an orbitally movable friction annulus engaging with said member; a power transmitter mounted on the driver and adapted to be engaged by the annulus, thereby constantly tending to operate the power transmitter; means for preventing the operation of the power transmitter; manipulative means to permit the power transmitter to operate, and automatic means for creating end thrust to maintain frictional contact.

3. In a driving mechanism, the combination with a driving shaft, of a plurality of members mounted thereon and operating therewith; a plurality of friction annuli surrounding said shaft and of larger inside diameter than the shaft and engaging with said members; power transmitters mounted on the shaft and adapted to engage with the annuli; means preventing the operation of the power transmitters, manipulative means to permit the several power transmitters to operate, and automatic means for offering an end thrust to maintain frictional contact.

4. In a driving mechanism, the combination with a driver, of a plurality of members operated thereon and rotating therewith; a plurality of orbitally movable annuli engaging with said members, power transmitters mounted on the driver and adapted to engage with the annuli, means for preventing the operation of the power transmitters, manipulative means for permitting the several power transmitters to operate, and automatic means for creating an end thrust to maintain frictional contact.

5. In a driving mechanism, the combination with a driver, of a disk mounted thereon and operating therewith; an orbitally movable friction annulus engaging with said disk; a power transmitter mounted on the driver and frictionally engaging with the annulus, means for preventing the operation of the power transmitter, manipulative means to permit the power transmitter to operate, and automatic means to press the elements in the direction of the axis of the driver for creating contact.

6. In a driving mechanism, the combination with a driver, of a disk mounted thereon and rotating therewith; a friction annulus engaging with the disk and adapted to move in an irregular orbit; a power transmitter mounted on the driver and adapted to engage with the annulus, means preventing the operation of the power transmitter, manipulative means to permit the power transmitter to operate, and automatic means exerting its force longitudinally of the driver for pressing the elements together for creating contact.

7. In a driving mechanism, the combination with a driver of a plurality of disks

mounted thereon and operating therewith, a plurality of orbitally movable frictional annuli engaging with said disks; power transmitters mounted on the driver and adapted to engage with the annuli, means for preventing the operation of the power transmitters, manipulative means for permitting several power transmitters to operate, and a spring adapted to move the elements together along the driver to create frictional contact.

8. In a driving mechanism, the combination with a driver; a plurality of disks mounted thereon and rotating therewith; a plurality of orbitally movable frictional annuli engaging with said disks; power transmitters mounted on the driver and adapted to engage with the annuli, means for preventing the operation of the power transmitters, manipulative means to permit any one of the several transmitters to operate, and an adjustable spring for causing end thrust to create frictional contact.

9. In a driving mechanism the combination with a driver of a member mounted thereon and operating therewith; an annulus adapted to frictionally engage with said member and of orbital movement; a power transmitter mounted on the driver and adapted to frictionally engage with the annulus, means for preventing the operation of the power transmitter, manipulative means to permit the power transmitters to operate, and adjustable automatic means for creating an end thrust to maintain frictional contact.

10. In a driving mechanism, the combination with a driver, of a member mounted thereon and rotating therewith; an annulus adapted to frictionally engage with said member and to move in an orbit; a power transmitting device mounted on the driver and adapted to frictionally engage with the annulus so that when the driver and annulus operate the transmitter will be moved, means for preventing the operation of the power transmitter, manipulative means to permit the power transmitter to operate, and adjustable automatic means for creating frictional contact.

11. In a driving mechanism, the combination with a driving shaft of a plurality of members mounted thereon and operating therewith, a plurality of annuli having openings larger than the shaft and mounted thereon and engaging with said members by frictional contact; power transmitters mounted on the driver and engaging with the annuli by frictional contact; means for preventing the operation of the power transmitters, manipulative means to permit the driver and power transmitters to operate, and adjustable and automatic means for forcing one element against the other.

12. In a driving mechanism, the combination with a driver, of a plurality of members mounted thereon and rotating therewith; a plurality of orbitally movable annuli frictionally engaging with said member; power transmitters mounted on the driver and on either side of the annuli, and engaging frictionally with said annuli, means for preventing the operation of the power transmitters, manipulative means to permit the several power transmitters to operate, means for automatically creating contact, and means to adjust said means.

13. In a driving mechanism, the combination with a rotating driver; a disk mounted thereon and operating therewith; an annulus in friction engagement with the disk and adapted to move out of engagement with said driver; a power transmitter loosely mounted on the driver and engageable frictionally with the annulus; means for preventing the operation of the power transmitter, manipulative means to permit the power transmitter to operate, means to automatically create contact, and an adjusting member for the means.

14. In a driving mechanism, the combination with a driver, of a disk, mounted thereon and rotating therewith; an annulus mounted on said driver and free to move out of engagement therewith and in frictional engagement with said disk; a power transmitting device also mounted on the driver and frictionally engaging with the annulus, means for preventing the operation of the power transmitter, manipulative means to permit the power transmitter to operate, and means associated with the driver for automatically creating contact.

15. In a driving mechanism, the combination with a driving shaft, of a plurality of disks suitably mounted thereon, and in separated positions and operated therewith, a plurality of annuli mounted on said shaft between and in frictional engagement with said disks and there to move out of engagement with the shaft; power transmitters mounted on the driver and frictionally engaging with the annuli. means for preventing the operation of the power transmitters, manipulative means to permit the several power transmitters to operate, means for automatically creating frictional contact, and a device for adjusting said means.

16. In a driving mechanism, the combination with a driving shaft, of a member mounted thereon and operating therewith; an annulus also mounted on said shaft and free to move out of engagement therewith and in adjustable frictional engagement with said member; a power transmitting device on said driver and in adjustable frictional agreement with the annulus, the latter being between the two; means preventing the operation of the power transmitter, manipulative means to permit the power

transmitter to operate, and means for moving the members longitudinally to create contact.

17. The combination of a plurality of independently operative frictionally driven transmitters, separate driven members actuated from the transmitters, a driver; and escapements for restraining the driven members from movement and for releasing at will a selected driven member to the action of the driver.

18. The combination of a plurality of independently operative frictionally driven transmitting gears; separate driven gears actuated therefrom; a driving shaft upon which the transmitting gears are mounted; and escapements for restraining the driven gears from movement and for releasing at will a selected driven gear to the action of said shaft.

19. The combination of a plurality of independently operative frictionally driven transmitting gears; separate driven gears actuated therefrom; concentric shafts on which said driven gears are mounted; a driving shaft upon which the transmitting gears are mounted; and escapements for restraining the driven gears from movement and for releasing at will a selected driven gear to the action of said shaft.

20. The combination of a driving shaft; a plurality of transmitting gears loosely mounted on the shaft; disks interposed between said gears and rotative from said shaft; a friction ring interposed between each disk and the adjacent loosely mounted gear; driven gears meshing with the transmitting gears; and escapements for restraining the driven gears from movement and for releasing at will a selected driven gear to the action of the driving shaft.

21. The combination of a driving shaft; a plurality of transmitting gears loosely mounted on the shaft; disks interposed between said gears and rotative from said shaft; a friction ring interposed between each disk and the adjacent loosely mounted gear; driven gears meshing with the transmitting gears; a stop arm rigid with each driven gear; and vibratory escapements cooperating with the stop arms.

22. The combination of a driving shaft; a plurality of transmitting gears loosely mounted on the shaft; disks interposed between said gears and rotative from said shaft; a friction ring interposed between each disk and the adjacent loosely mounted gear; driven gears meshing with the transmitting gears; concentric shafts to each of which a driven gear is secured; a stop arm rigid with each driven gear; and vibratory escapements coöperating with the stop arms.

23. The combination of a driving shaft; a plurality of transmitting gears loosely mounted on the shaft; disks interposed between said gears and rotative from said shaft; a friction ring interposed between each disk and the adjacent loosely mounted gear; driven gears meshing with the transmitting gears; and escapements for restraining the driven gears from movement and for releasing at will a selected driven gear to the action of the driving shaft; said transmitting gears and interposed disks being longitudinally adjustable on the shaft.

24. The combination of a driving shaft; a plurality of transmitting gears loosely mounted on the shaft; disks interposed between said gears and rotative from said shaft; a friction ring interposed between each disk and the adjacent loosely mounted gear; a collar adjustably secured to said shaft; a spring for regulating the driving friction exerted by said friction rings interposed between said collar and the parts on the shaft; driven gears meshing with the transmitting gears; and escapements for restraining the driven gears from movement and for releasing at will a selected driven gear to the action of the driving shaft.

25. Gearing consisting of a plurality of toothed disks arranged side by side and frictionally held against rotation in the same direction independently of one another.

26. Gearing consisting of a number of toothed disks loosely mounted upon a rotary holder, friction disks keyed to the holder between adjacent toothed disks, and means for crowding said disks together longitudinally on the holder for frictionally resisting independent movement of the toothed disks

27. Gearing consisting of a plurality of toothed disks arranged side by side and frictionally held against rotation in both directions independently of one another.

28. Gearing consisting of a number of toothed disks rotatably and slidably mounted upon a rotatable holder, friction disks keyed slidable but non-rotatable on the holder between adjacent toothed disks, and means for crowding said friction and tooth disks together longitudinally on the holder for frictionally resisting independent movement of the toothed disks.

29. Gearing consisting of a plurality of toothed elements arranged side by side and yieldingly held against rotation in both directions independently of one another and regulable means for adjusting the yieldability of said elements.

30. A gear member comprising independent toothed elements arranged side by side and capable of yieldingly resisted rotation and means for adjusting the yieldability of said elements.

31. A gear member comprising toothed elements arranged side by side and capable of yieldingly resisted independent circum-

ferential movement and regulable means for adjusting the yieldability of said elements.

32. A pair of coöperating gears, one of which is composed of a plurality of toothed elements arranged side by side and capable of yieldingly resisted independent circumferential movement and means employing an adjusting screw for regulating the yieldability of said elements.

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