No. 721,018. PATENTED FEB. 17, 1903.

E. W. CLARK.

COASTER BRAKE.

APPLICATION FILED AUG. 15, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1

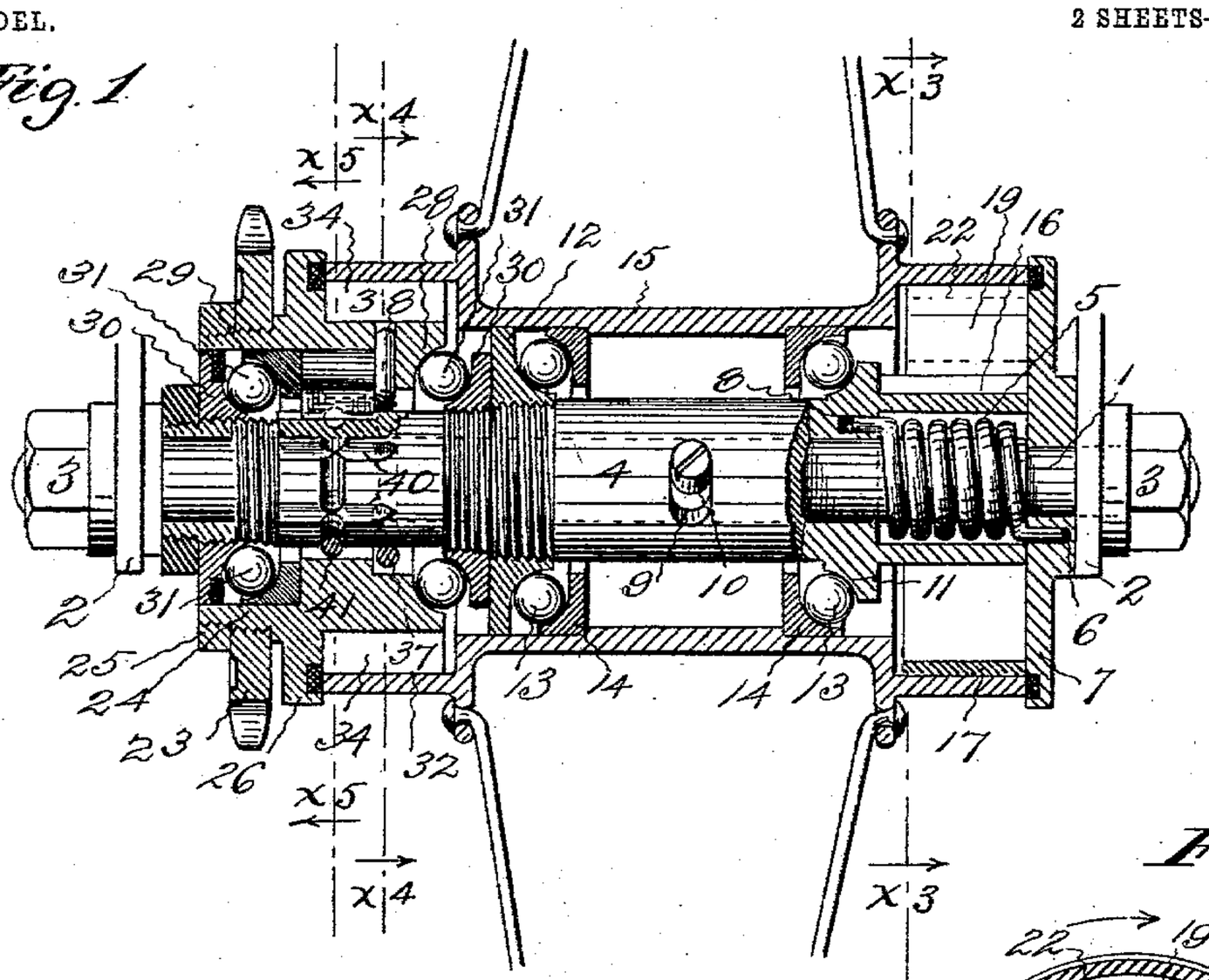


Fig. 2

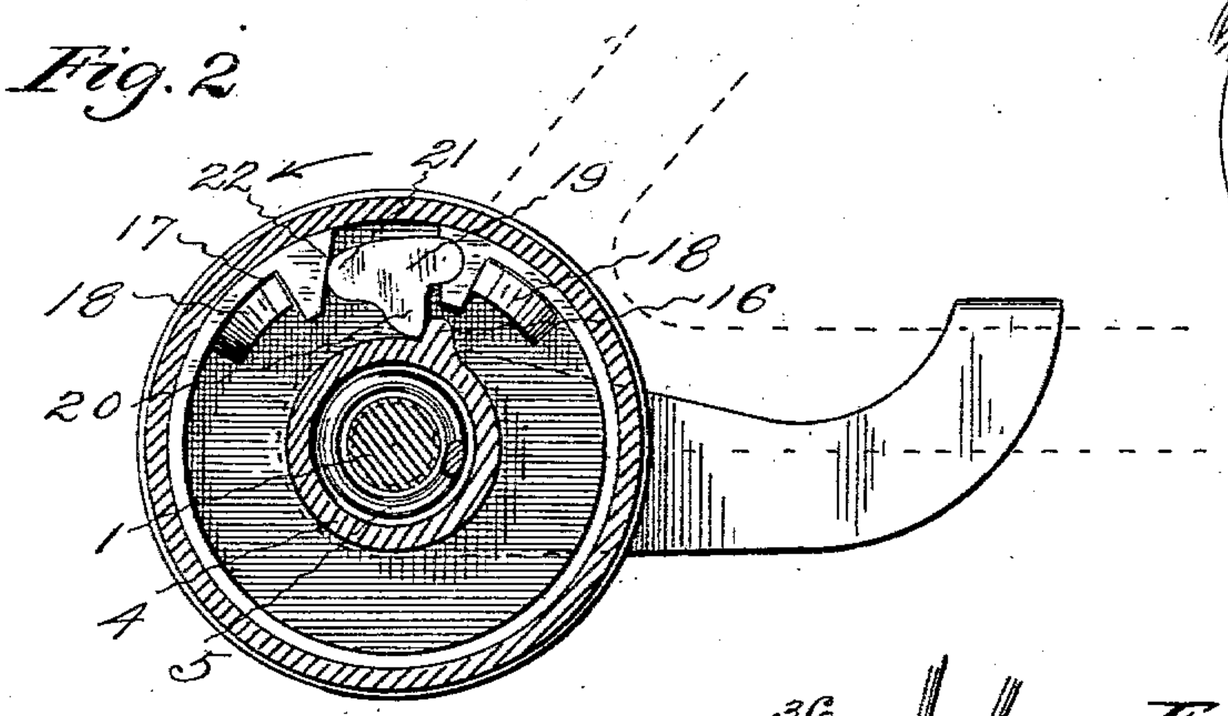


Fig. 3

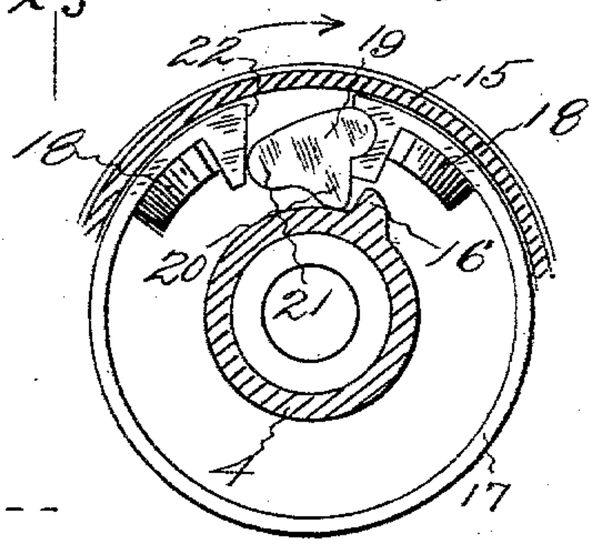
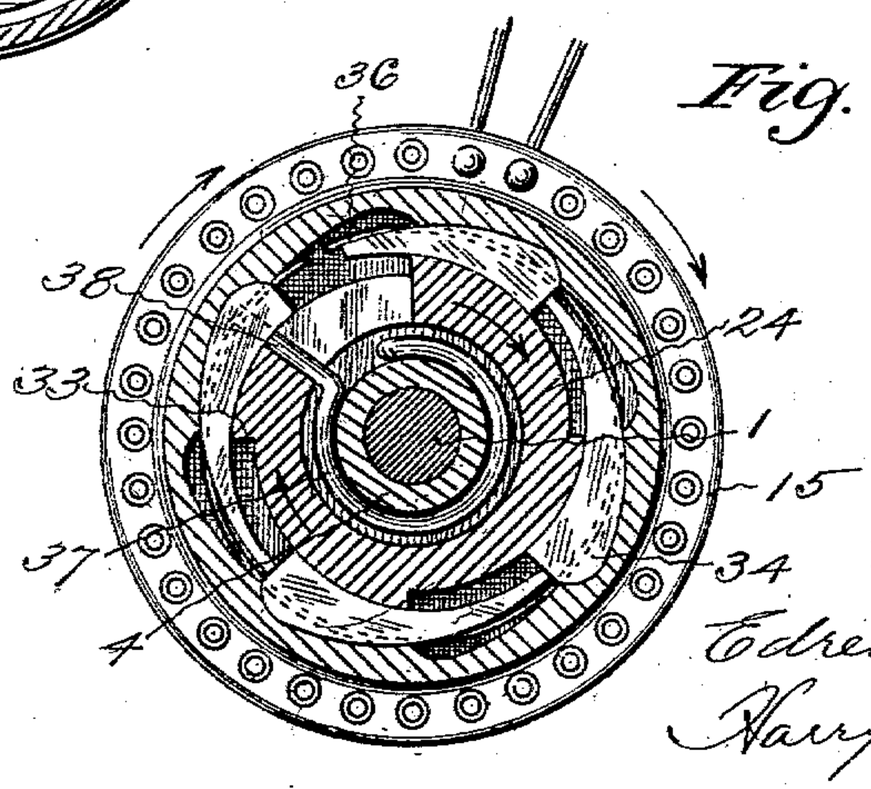


Fig. 4



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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 6.

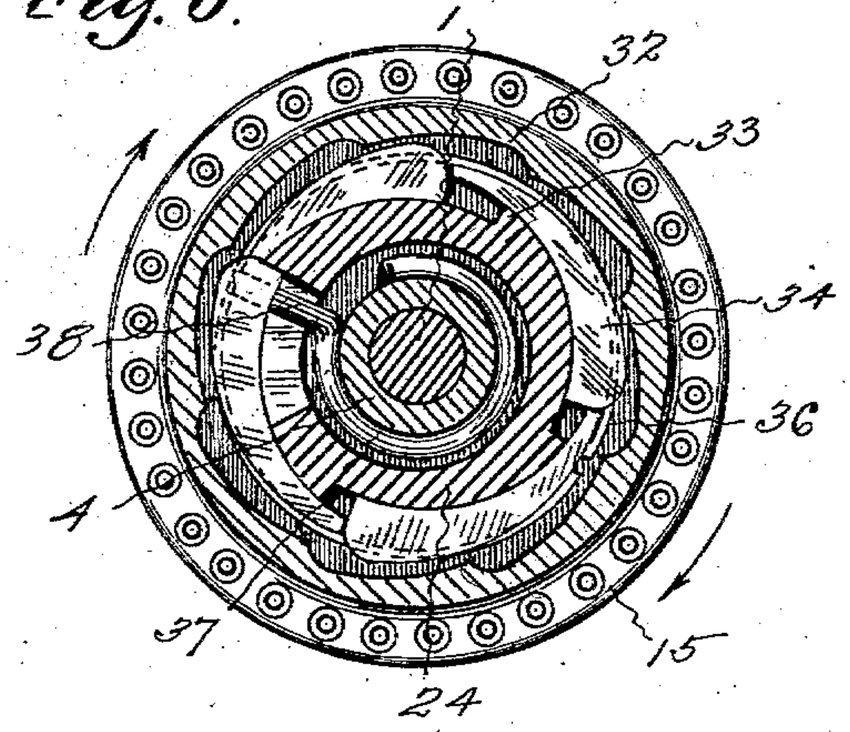


Fig. 7

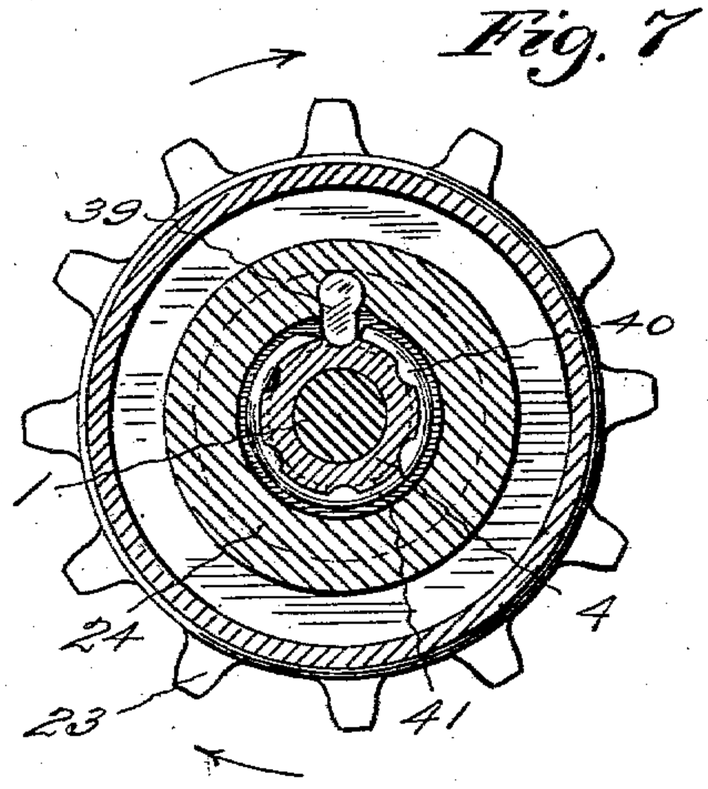


Fig. 8

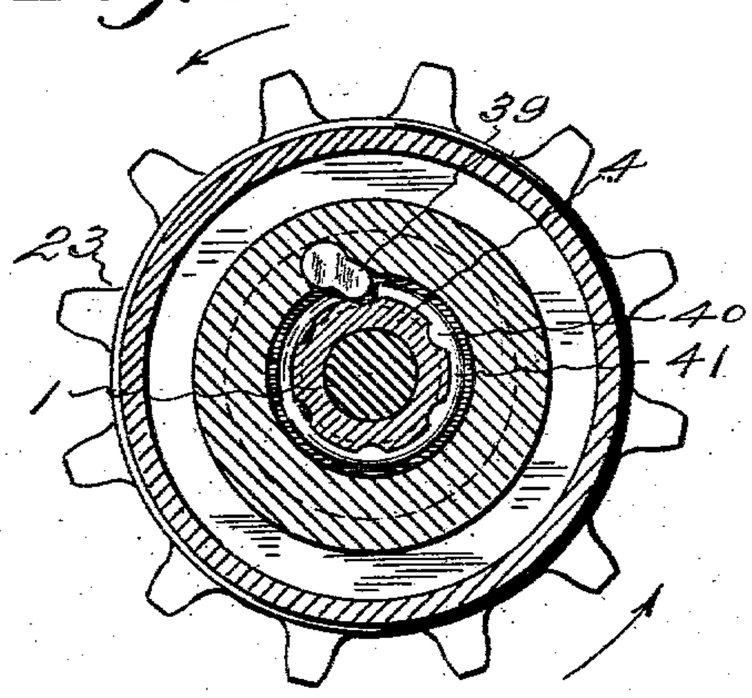
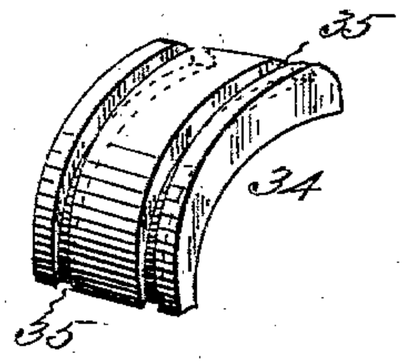


Fig. 5



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UNITED STATES PATENT OFFICE.

EDRED W. CLARK, OF HARTFORD, CONNECTICUT.

COASTER-BRAKE.

SPECIFICATION forming part of Letters Patent No. 721,018, dated February 17, 1903.

Application filed August 15, 1902. Serial No. 119,687. (No model.)

To all whom it may concern:

Be it known that I, EDRED W. CLARK, 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 Coaster-Brakes, of which the following is a specification.

This invention relates to a brake mechanism for bicycles which is actuated by a back pressure upon the pedals.

The object of the invention is to provide a simple, durable, quick-acting, and powerful mechanism of this nature which is so constructed that the hub of the wheel and the driving parts are strongly connected when the pedals are being used to drive the wheel forward and which are completely disconnected when the pedals are not being used to drive the wheel, so that the wheel will run freely in either direction when the pedals are not in use.

Figure 1 of the accompanying drawings, which illustrate an embodiment of the invention, shows a central section of a wheel-hub and driving-sprocket with my improved coaster-brake mechanism. Fig. 2 is a section on the plane indicated by the broken line x^3 x^3 of Fig. 1, showing the brake-applying parts with the friction-band expanded, as when the brake is applied by back-pedaling. Fig. 3 is a similar view showing the friction-band contracted, as when the brake is off. Fig. 4 is a sectional view taken on the plane indicated by the broken line x^4 x^4 of Fig. 1, showing the driving parts in the positions occupied when connected with the hub for driving the wheel forward. Fig. 5 is a perspective view of one of the driving-wedges. Fig. 6 is a section taken on the same plane as Fig. 4, showing the parts in the positions occupied when the driving-wedges are disconnected from the wheel-hub, as when the pedals are idle. Fig. 7 is a sectional view taken on the plane indicated by the broken line x^5 x^5 of Fig. 1, with the parts in the positions occupied when there is back pressure applied to the driving-sprocket for setting the brake; and Fig. 8 is a view on the same plane as Fig. 7, with the parts in the positions occupied when there is no back pressure upon the driving-sprocket.

The axle 1 is secured to the ends of the frame 2 in the common manner by washers and nuts 3. On the axle is a sleeve 4. In a chamber in one end of this sleeve is a spring 5, which has an end extending into a socket 6 in the fixed dust-cap 7 and an end extending into the socket 8 in the sleeve. This sleeve has a slight movement upon the axle, the amount of movement being determined by the length of the slot 9 in the sleeve, through which the screw 10 projects from the axle. A ball-cone 11 is formed on one part of the sleeve and a ball-cone 12 is screwed onto another part of the sleeve, and the balls 13 between these cones and the ball-cups 14 in the hub 15 form the bearings for the wheel. On the exterior of one end of the sleeve is a lug 16. In the interior of the end of the hub about this end of the sleeve is a band 17, that is formed of spring metal, and is supported by lugs 18, that project from the hub. One end of the brake-band is hollowed out, so as to receive an end of a rocking wedge 19, that has an arm 20 adjacent to the lug 16 on the sleeve and an end 21 in contact with the inclined surface 22 on the other end of the band.

When the sleeve is given a slight movement against the tension of the coil-spring 5, the lug 16 engages the end of the rocking wedge 19 and causes it to expand the brake-band against the inner walls of the hub, as shown in Fig. 2. This movement of the sleeve is caused by a back pressure on the driving-sprocket. When there is no back pressure on the driving-sprocket, as when the wheel is being driven forward or is running forward freely, the coil-spring 5 turns the sleeve so that the lug is disconnected from the arm of the rocking wedge and the brake-band is allowed to contract from the walls of the hub, as shown in Fig. 3.

The driving-sprocket 23 is clamped on the end of a clutch-cylinder 24 by a nut 25. This clutch-cylinder has a flange 26, with a dust-packing adjacent to the end of the hub.

The clutch-cylinder has a fixed ball-cup 28 and a movable ball-cup 29, between which and the ball-cones 30, screwed upon the sleeve, are the balls 31, which form the bearing for the clutch-cylinder. Around the interior walls of the sprocket end of the hub is a series of wedge-recesses 32, and on the exterior surface of this end of the clutch-cylinder opposite these wedge-recesses is a series of ratchet-

teeth 33. In the space between the wedge-recesses and the ratchet-teeth are a number of curved wedges 34. The inner faces of the wedges are shaped to fit the ratchet-teeth on the exterior of the cylinder, and the outer faces are shaped to fit the wedge-recesses in the wall of the hub. These wedges have narrow grooves 35, in which lie split spring-rings 36, that tend to hold the wedges against the ratchet-teeth on the cylinder. A friction-ring 37, wound about the sleeve, has an end 38 extending into an opening in one of the wedges. This friction-ring tends to retard the movement of the wedges when pedaling is commenced, so that they will be moved out into the wedge-recesses.

When the clutch-cylinder is driven forward by the sprocket-wheel as a rider of the machine-pedals, the wedges are moved out until their outer faces fit into the wedge-recesses in the hub and their inner faces bind against the faces of the ratchet-teeth on the cylinder. With the wedges in these positions the cylinder, which is being rotated forwardly by the sprocket, is practically made solid with the hub at four different sections by means of the wedges, as shown in Fig. 4. The wedges occupy these positions and bind the part together as long as driving pull is being transmitted to the sprocket. When the pedaling ceases and the sprocket stops rotating, the driving-cylinder is held and the wedges are carried down the ratchet-inclines until the front end of the one that is engaged by the friction-spring engages a ratchet-tooth. With the wedges in these positions the hub of the wheel is free to revolve in either direction, as illustrated in Fig. 6.

In a socket in the interior of the clutch-cylinder is a pawl 39, the free end of which is adapted to enter notches 40, formed in the sleeve. A spring-ring 41, with its ends adapted to engage the pawl 39, encircles the sleeve at this point. When the sprocket-wheel is being rotated for driving the wheel, the pawl drags along over the notches in the sleeve in the manner illustrated in Fig. 8. When back pull is applied to the sprocket-wheel, as for applying the brake, the pawl is engaged with one of the notches in the sleeve, as shown in Fig. 7, so as to lock the clutch-cylinder and the sleeve together. Continued back pressure upon the sprocket and clutch-cylinder then moves the sleeve backwardly and applies the brake by expanding the friction-band, as described.

When the sprocket-wheel is not rotated, the hub of the wheel is absolutely free to be rotated in either direction; but when the sprocket-wheel is given a forward rotation the clutch-cylinder is very firmly wedged at four sections to the hub, so that the wheel will be driven powerfully without causing a bending or binding of any of the parts. When back-pedaling pressure is applied to the sprocket-wheel, the brake is set in a very powerful manner.

I claim as my invention—

1. A driving mechanism consisting of an axle, a sleeve on the axle, a wheel-hub rotatable on the sleeve, a clutch-cylinder rotatable on the sleeve, a sprocket secured to the clutch-cylinder, wedge-surfaces on the exterior of the clutch-cylinder, wedge-recesses in the interior of the wheel-hub, and wedge-blocks having their inner faces fitting the wedge-surfaces on the cylinder and their outer faces adapted to fit the wedge-recesses in the hub, substantially as shown.

2. A driving mechanism consisting of an axle, a sleeve having a limited movement on the axle, a wheel-hub rotatable on the sleeve, a clutch-cylinder rotatable on the sleeve, a sprocket secured to the clutch-cylinder, wedge-surfaces on the exterior of the clutch-cylinder, wedge-recesses in the interior of the wheel-hub, wedge-blocks having their inner faces fitting the wedge-surfaces on the cylinder and their outer faces adapted to fit the wedge-recesses in the hub, a pawl carried by the clutch-cylinder and adapted to engage the sleeve, an expansible friction-band located in the hub and a wedge-block adapted to expand the band when engaged by the sleeve, substantially as specified.

3. A driving mechanism consisting of an axle, a sleeve having a limited movement on the axle, a spring on the axle and engaging the sleeve for holding it in one position, a screw projecting from the axle through a slot in the sleeve for limiting its movement, a hub rotatable on the sleeve, a clutch-cylinder rotatable on the sleeve, a sprocket secured to the clutch-cylinder, wedge-surfaces on the exterior of the clutch-cylinder, wedge-recesses in the interior of the hub, wedge-blocks having their inner faces fitting the wedge-surfaces on the cylinder and their outer faces adapted to fit the wedge-recesses in the hub, a friction-spring encircling the sleeve and engaging one of the wedge-blocks, a pawl located in the clutch-cylinder and adapted to engage the sleeve, an expansible band located in the hub, and a wedge adapted to expand the band when engaged by the sleeve, substantially as specified.

4. A driving mechanism consisting of an axle, a sleeve having a limited movement on the axle, a spring on the axle and engaging the sleeve for holding it in one position, a screw extending from the axle through a slot in the sleeve for limiting its movement, a hub rotatable upon the sleeve, a clutch-cylinder rotatable upon the sleeve, a sprocket secured to the clutch-cylinder, wedge-surfaces on the exterior of the cylinder, wedge-recesses in the interior of the hub, wedge-blocks having their inner faces fitting the wedge-surfaces of the cylinder and their outer faces adapted to fit the wedge-recesses in the hub, spring-rings encircling the wedge-blocks and tending to contract them, a friction-spring encircling the sleeve and extending through the cylinder into engagement with one of the wedge-blocks,

a pawl located in the cylinder and adapted to engage notches in the sleeve, a spring encircling the sleeve and adapted to hold the pawl out of engagement with the notches in the sleeve, an expansible band located within the hub, an oscillating wedge adapted to expand the band, and a lug on the sleeve adapted to engage the expanding-wedge, substantially as specified.

5. A driving mechanism consisting of an axle, a sleeve mounted on the axle, a wheel-hub rotatable on the sleeve, a clutch-cylinder rotatable on the sleeve, a driving-sprocket secured to the clutch-cylinder, curved wedge-surfaces on the exterior of the clutch-cylinder, opposing curved wedged recesses in the interior of the wheel-hub, and curved wedge-blocks having their inner faces shaped to fit the curved surfaces of the cylinder and their outer faces shaped to fit the curved wedged recesses in the hub, and having sections that are thicker than the distance between the high portions of the curved wedge-surfaces on the cylinder and the walls of the curved wedged recesses in the sleeve but thinner than the distance between the lower sections of the curved wedge-surfaces on the cylinder and the walls of the curved wedge-recesses in the hub, and means tending to move the wedge-blocks to the higher portions of the curved wedges on the cylinder when the cylinder is driven forwardly by the forward rotation of the sprocket, substantially as specified.

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Witnesses:
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