F. J. BALL.

REVERSING MECHANISM.

APPLICATION FILED AUG. 8, 1908.

924,956.

Patented June 15, 1909.

2 SHEETS—SHEET 1.

Fig. 1.

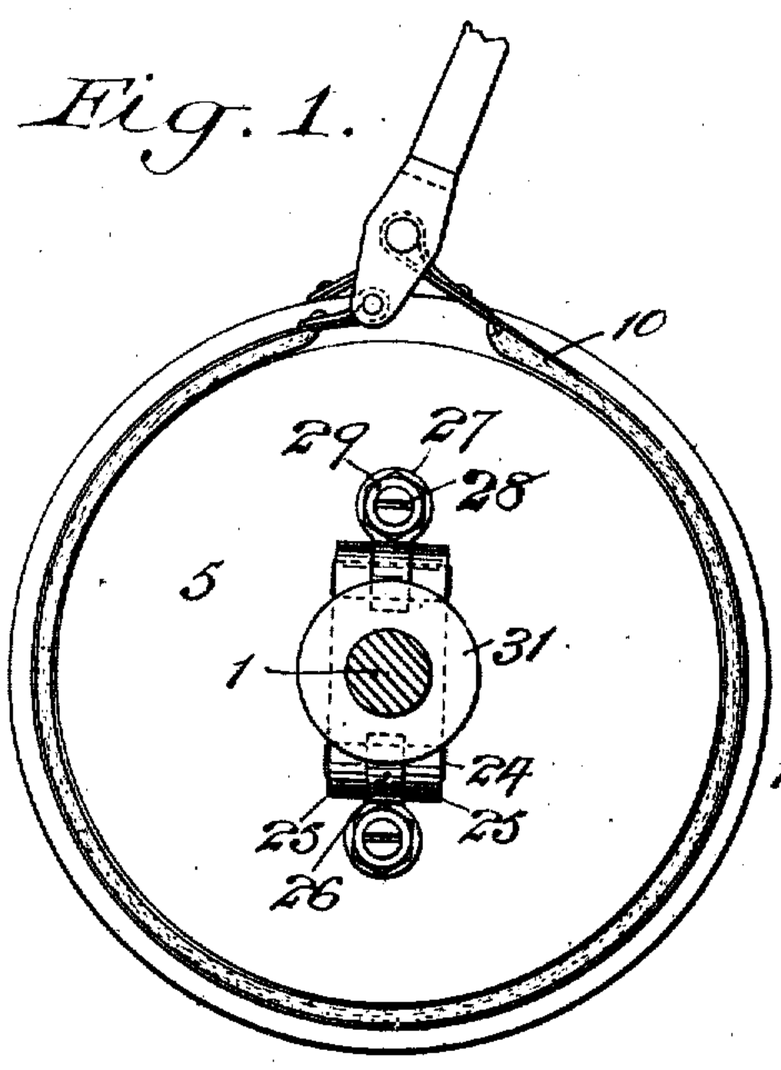


Fig. 2.

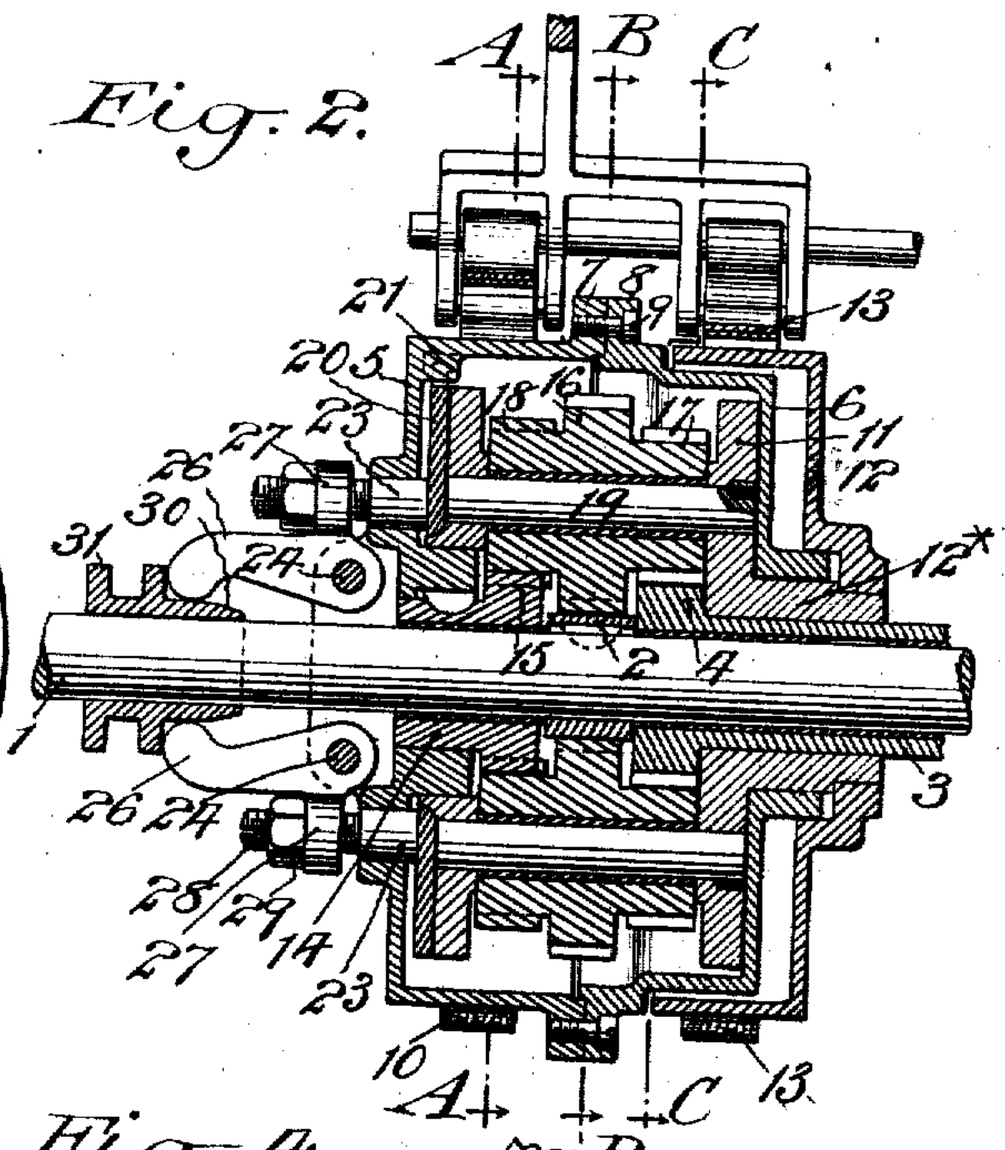


Fig. 3.

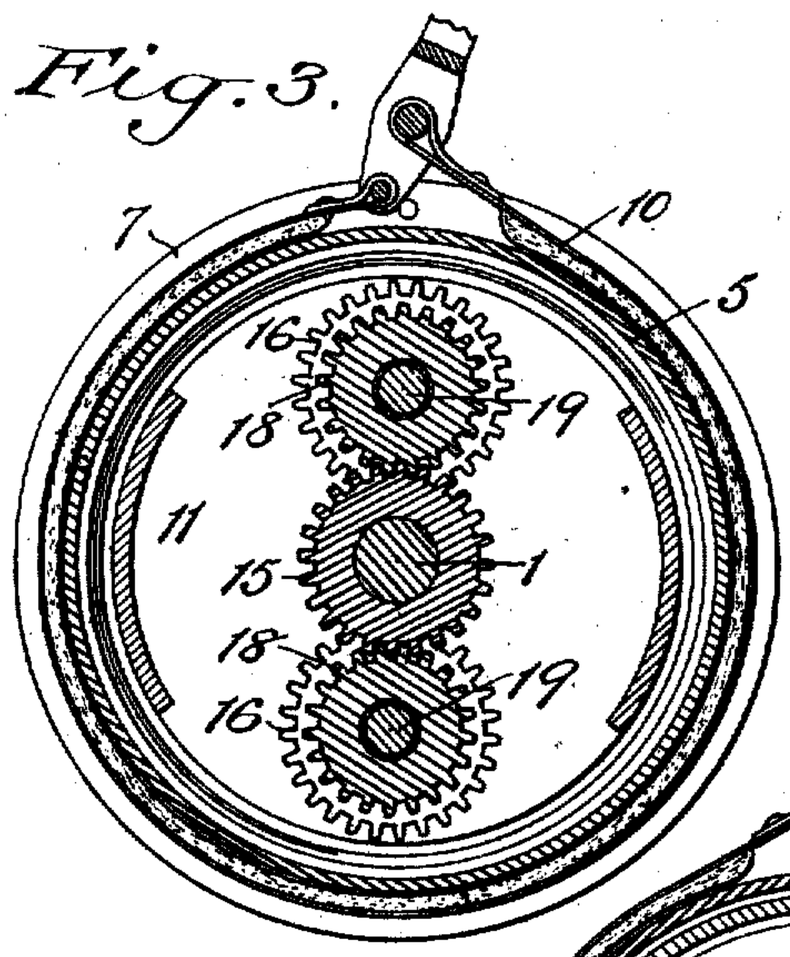


Fig. 4.

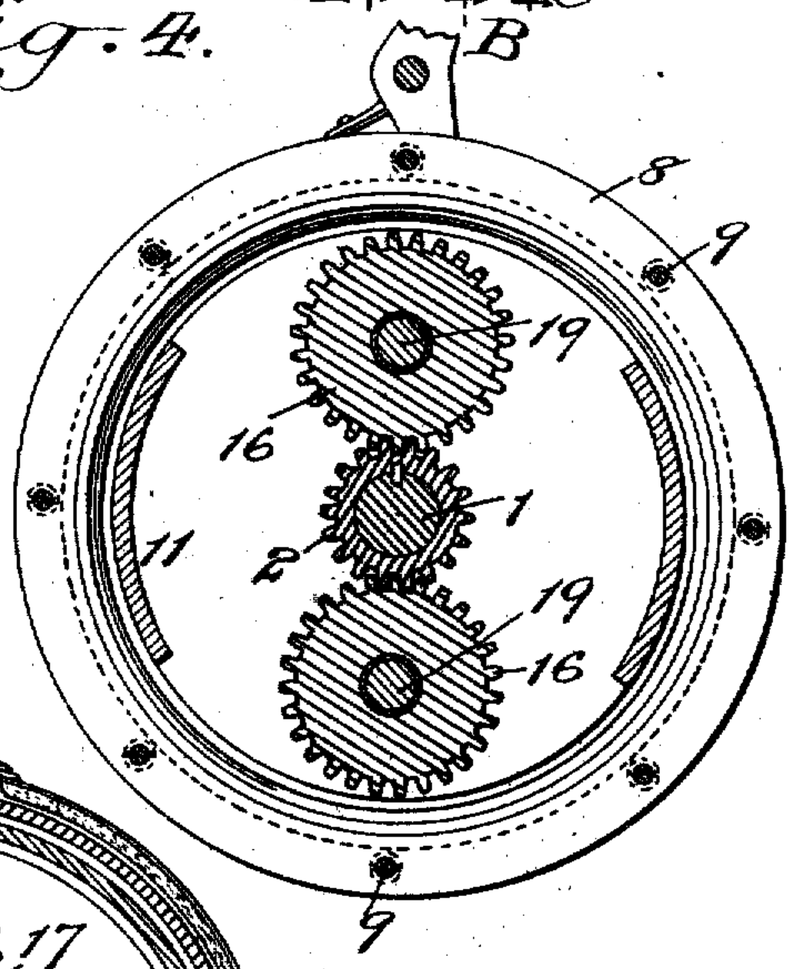
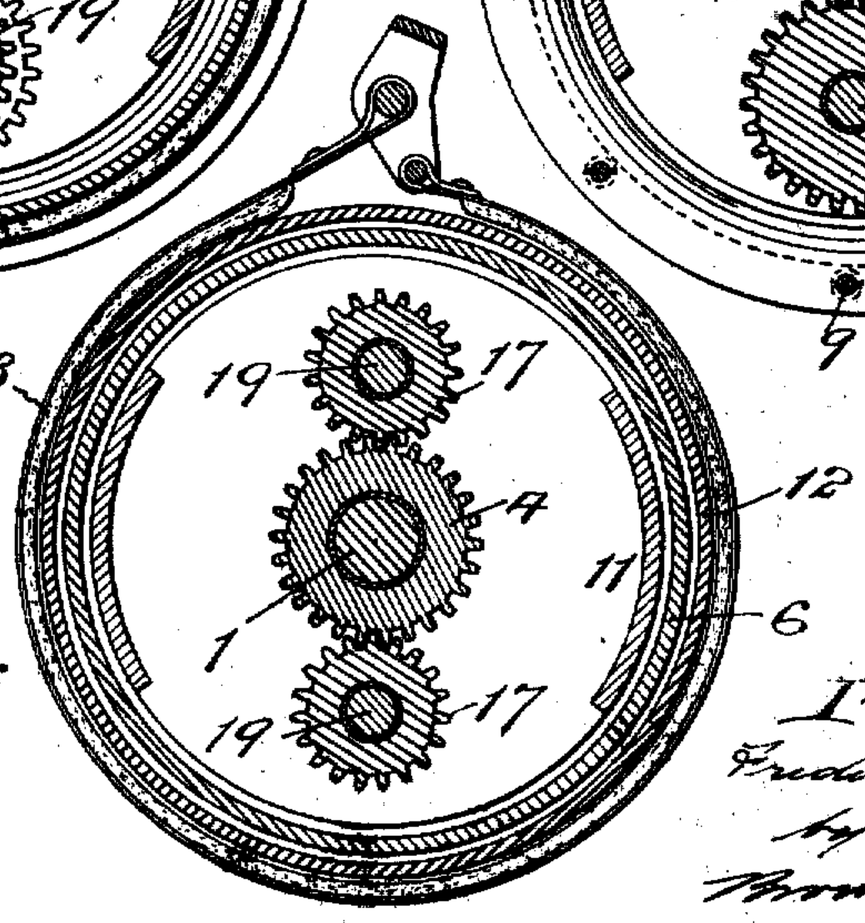


Fig. 5.



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2 SHEETS—SHEET 2.

Fig. 6.

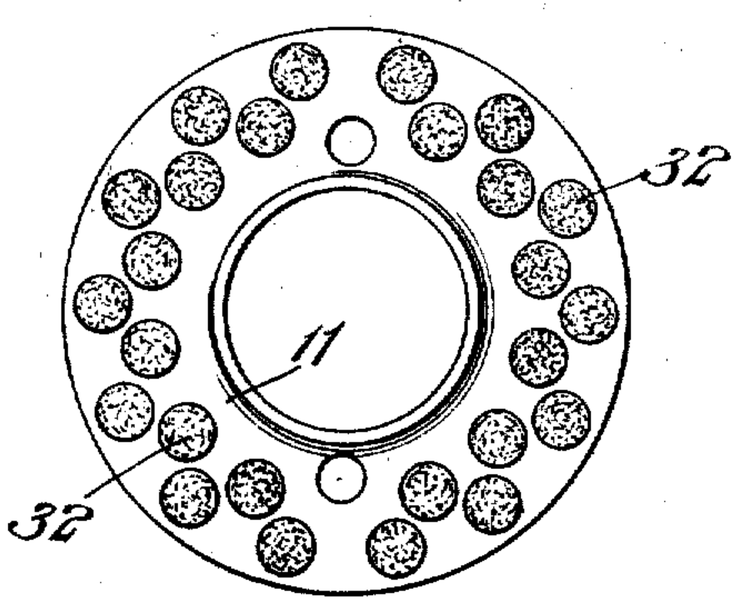


Fig. 8.

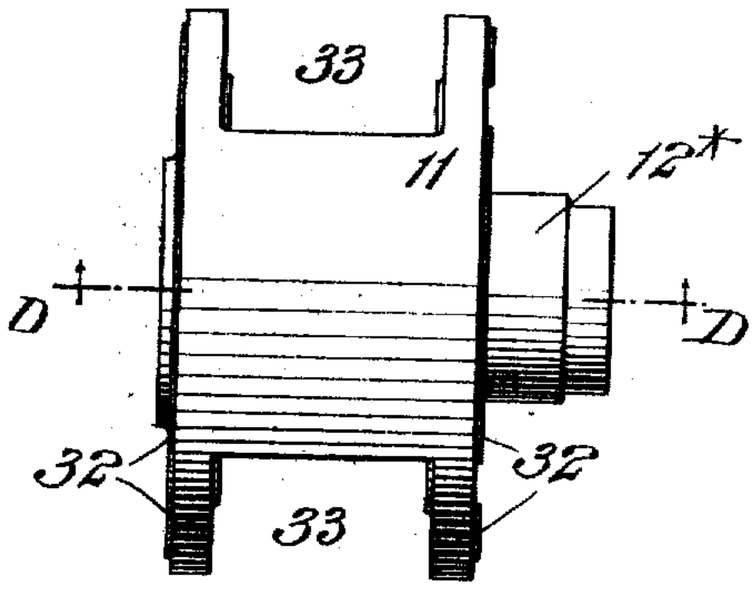


Fig. 7.

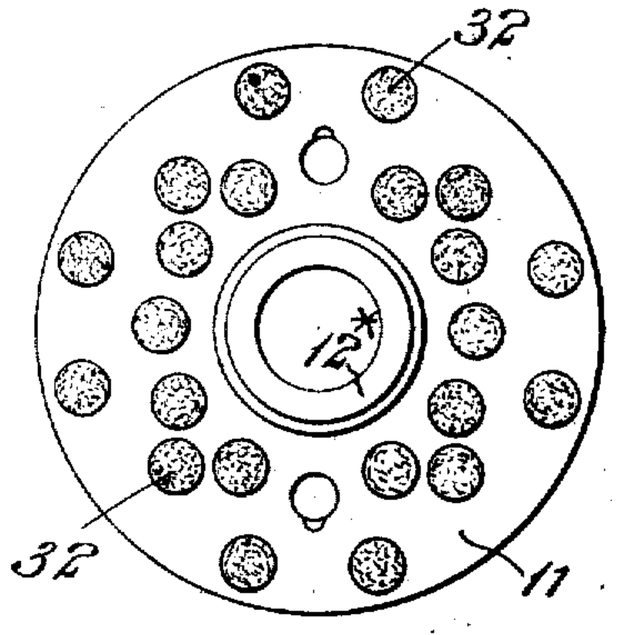


Fig. 9.

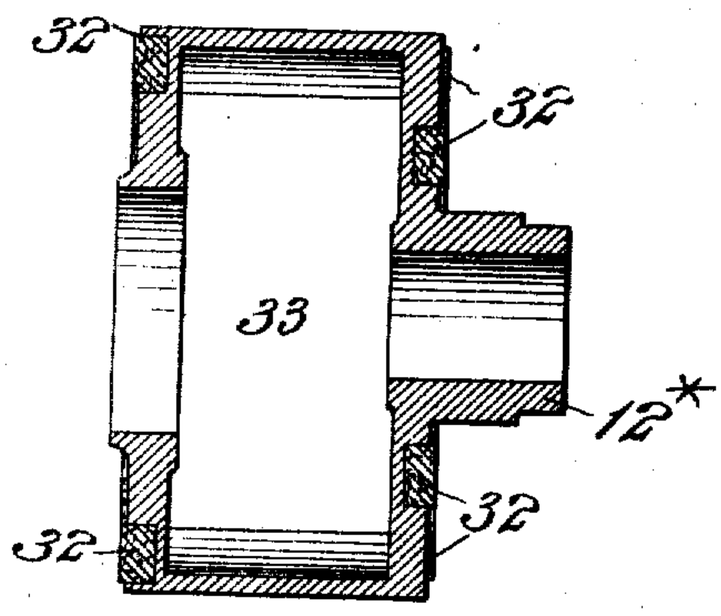
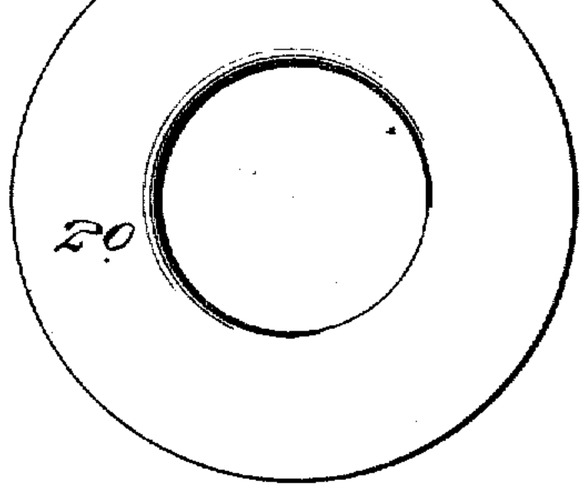


Fig. 10.



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UNITED STATES PATENT OFFICE.

FREDERIC J. BALL, OF NEW YORK, N. Y., ASSIGNOR TO NEW YORK GEAR WORKS, OF BROOKLYN, NEW YORK, A COPARTNERSHIP.

REVERSING MECHANISM.

No. 924,956. Specification of Letters Patent. Patented June 15, 1909.

Application filed August 8, 1908. Serial No. 447,524.

To all whom it may concern:

Be it known that I, FREDERIC J. BALL, a citizen of the United States, and resident of the borough of Brooklyn, in the city and State of New York, have invented a new and useful Improvement in Reversing Mechanism, of which the following is a specification.

My invention relates to an improvement in reversing mechanism and has for its particular object to provide certain new and useful improvements in the construction, form and arrangement of the several parts whereby a very simple and effective mechanism is provided in which the constant rotary movement of a driving shaft in one direction is caused to impart a rotary movement to the power transmitting shaft at varying speeds in the same direction or at a predetermined speed in a reverse direction, at pleasure, with a minimum amount of friction.

A further object is to provide a reversing mechanism comprising a rotary driving shaft, a power transmitting shaft, a pair of drums, a train of gearing connecting the drums and shafts, brakes for holding the one or the other of the said drums stationary or for releasing both drums and means for clutching the two drums together when released from their brakes, said means being so arranged as to insure an absolute non-slipping frictional contact between the two drums when in operation and also to insure an immediate release of the two drums from each other when not in operation.

A practical embodiment of my invention is represented in the accompanying drawings in which—

Figure 1 is an end view of my improved reversing mechanism with the parts in the positions which they assume when both brakes are released and the two drums are clutched together for locking the driving shaft to the power transmitting shaft. Fig. 2 is a longitudinal central section through the same, Fig. 3 is a transverse section taken in the plane of the line A—A of Fig. 2, looking in the direction of the arrows, Fig. 4 is a transverse section taken in the plane of the line B—B of Fig. 2, looking in the direction of the arrows, Fig. 5 is a transverse section taken in the plane of the line C—C of Fig. 2, looking in the direction of the arrows, Fig. 6 is a detail view looking toward one end of one member of one of the drums, Fig. 7 is a view looking toward the other end of said member, Fig. 8 is a side view of the said member. Fig. 9 is a section taken in the plane of the line D—D of Fig. 8, looking in the direction of the arrows, and Fig. 10 is a detail face view of the clutch ring carried by one of the drums.

1 designates the rotary driving shaft which may be driven from any suitable source of power, not shown herein. This shaft is shown as provided with a spur gear 2.

The power transmitting shaft is denoted by 3 and it is provided with a spur gear 4. This power transmitting shaft is shown herein as loosely mounted on the driving shaft with its gear 4 adjacent to the driving shaft gear 2.

One of the drums comprises two members 5 and 6 which are provided with exterior circumferential flanges 7, 8, arranged to be secured together by suitable screws 9. The side wall of the member 5 is cylindrical so as to present a proper surface for the brake band 10 of the band brake of well known or approved form. The other drum consists of two members 11 and 12, the side wall of the member 12 being cylindrical so as to present a proper surface for the brake band 13 of a band brake of any well known or approved form. The member 11 of the drum 11, 12, is located within the drum 5, 6 and is provided with a hub 12* surrounding the power transmitting shaft 3 and fixed to the member 12 exterior to the drum 5, 6. The member 5 of the drum 5, 6, is fixed to a sleeve 14 loosely mounted on the driving shaft 1, which sleeve is provided with a spur gear 15 located adjacent to the driving shaft gear 2. Three spur gears 16, 17, 18, are mounted to rotate together on a stud axle 19 supported in the end walls of the drum member 11. The gear 16 meshes with the driving shaft gear 2; the gear 17 meshes with the power transmitting shaft gear 4 and the gear 18 meshes with the gear 15 of the drum 5, 6. The number of teeth in all three sets of gears is the same but the number of teeth on each gear of each set may be varied to suit different requirements as to speed transmission from the driving shaft 1. In the present instance the gear 16 is shown as provided with twenty-seven teeth and the gear 2 with eighteen teeth; the spur gear 17 is shown as provided with nineteen teeth and the spur gear 4 with twenty-six teeth and the spur gear 18 is shown as provided with twenty-one teeth and the spur gear 15 with twenty-

four teeth. It will thus be seen that each pair of gears is provided with a total of forty-five teeth. In the accompanying drawings, I have shown two sets of these gears 16, 17, 18, arranged diametrically opposite each other but one or more sets may be used as found desirable.

The means which I have shown for clutching the two drums together is constructed, arranged and operated as follows. A ring 20 is interposed between one end of the drum member 11 and the end wall of the drum member 5, which ring is permitted a sliding movement toward and away from the drum member 11 but is locked to rotate with the drum 5, 6. This is provided for in the present instance by forming a lug 21 on the interior of the drum member 5, which lug is embraced by two lugs 22 on the periphery of the ring 20.

A plurality of loosely sliding pins 23 are mounted in the end wall of the drum member 5 with the inner ends in engagement with the ring 20 and their outer ends exposed. Each one of the plurality of dogs is pivoted at 24, between two lugs 25 on the end of the drum member 5. Each dog is provided with a long arm 26 and a short arm 27. The short arm is provided with an adjustable screw 28 arranged to engage the exposed end of one of the sliding pins 23. A lock nut 29 is provided for securing the screw 28 in the proper adjustment. The long arm 26 of each of the dogs is arranged to be swung outwardly by engagement with the beveled end 30 of a clutch slide 31 loosely mounted on the driving shaft 1. To insure a non-slipping frictional lock between the two drums and also to insure an instant release of the two drums and thereby obviate any tendency of the sticking or binding of the parts, the clutch surfaces of the two drums are provided between the end walls of the member 11 of one of the drums and the end wall of the member 6 and the face of the ring 20 of the other drum. The outer faces of the end walls of the member 11 of the drum 11, 12, are provided with cork inserts 32. This member 11 is further provided with suitable openings 33 in its side wall for the purpose of inserting and removing the gears 16, 17, 18.

In operation, if it be desired to drive the power transmitting shaft 3 in the same direction and at the same speed as the driving shaft 1, the brake bands 10 and 13 are released and the clutch slide 31 is moved into position to rock the dogs 26, 27, in a direction to bring the outer faces of the end walls of the drum member 11 into frictional engagement with the inner face of the end wall of the drum member 6 and the clutch ring 20 of the drum member 5. When in this position the drums and shaft all rotate together.

When it is desired to drive the power transmitting shaft in the same direction as the driving shaft but at another speed, the two drums are released by the withdrawal of the clutch slide 31 and the brake band 13 is tightened to cause it to grip the drum member 12 and hold it against movement. This will hold the axis of the gears 16, 17, 18 stationary but will permit the said gears to rotate on their axis. When it is desired to drive the power transmitting shaft in the reverse direction to the driving shaft, the brake band 13 is released and the brake band 10 is tightened on its drum member 5, thus holding the drum 5, 6, stationary. This will permit the gears 16, 17, 18 to rotate on their axis and at the same time permit the axis to rotate around the axis of the driving shaft 1.

What I claim is:

1. A reversing mechanism comprising a driving shaft, a power transmitting shaft, two drums, externally toothed gears connecting the shafts and drums, a brake for each drum and means for forcing adjacent plane surfaces of both drums into frictional engagement with each other for locking the drums together.

2. A reversing mechanism comprising a driving shaft, a power transmitting shaft, two drums, externally toothed gears connecting the shafts and drums, a brake for each drum, means for forcing adjacent plane surfaces of both drums into frictional engagement with each other for locking the drums together and cork inserts for one of said plane co-acting surfaces.

3. A reversing mechanism comprising a driving shaft, a power transmitting shaft, two drums, externally toothed gears connecting the shafts and drums, a brake for each drum and means for forcing a plurality of sets of adjacent plane surfaces on both drums into frictional engagement with each other for locking the drums together.

4. A reversing mechanism comprising a driving shaft, a power transmitting shaft, two drums, externally toothed gears connecting the shafts and drums, a brake for each drum, means for forcing a plurality of sets of adjacent plane surfaces on both drums into frictional engagement with each other for locking the drums together and cork inserts for one of each set of co-acting plane surfaces.

5. A reversing mechanism comprising a driving shaft, a power transmitting shaft, two drums, externally toothed gears connecting the shafts and drums, a brake for each drum and means for forcing end walls of the two drums into frictional engagement with each other for locking the drums together.

6. A reversing mechanism comprising a driving shaft, a power transmitting shaft, two drums, externally toothed gears connecting the shafts and drums, a brake for each drum, means for forcing end walls of the two drums into frictional engagement with each other for locking the drums together and

cork inserts for one of said co-acting end walls.

7. A reversing mechanism comprising a driving shaft, a power transmitting shaft, two drums, externally toothed gears connecting the shafts and drums, a brake for each drum, a friction ring carried by one drum and means for forcing an end wall of the other drum and the friction ring into engagement with each other for locking the drums together.

8. A reversing mechanism comprising a driving shaft, a power transmitting shaft, two drums, externally toothed gears connecting the shafts and drums, a brake for each drum, a friction ring carried by one drum, means for forcing an end wall of the other drum and the friction ring into engagement with each other for locking the drums together, and cork inserts in said end wall.

9. A reversing mechanism comprising a driving shaft, a power transmitting shaft, two drums, one having an inner and an outer member, externally toothed gears connecting the shafts and drums, a brake for each drum and means for forcing one end wall of one drum and one end wall of the inner member of the other drum into frictional engagement with each other for locking the drums together.

10. A reversing mechanism comprising a driving shaft, a power transmitting shaft, two drums, one having an inner and an outer member, externally toothed gears connecting the shafts and drums, a brake for each drum, means for forcing one end wall of one drum and one end wall of the inner member of the other drum into frictional engagement with each other for locking the drums together, and cork inserts for the said end wall of the inner drum member.

11. A reversing mechanism comprising a driving shaft, a power transmitting shaft, two drums, one having an inner and an outer member, gears connecting the shafts and drums, a brake for each drum, a friction ring carried by one drum, and means for forcing the end walls of the inner member of one drum into frictional engagement with said friction ring and an end wall of the other drum for locking the drums together.

12. A reversing mechanism comprising a driving shaft, a power transmitting shaft, two drums, one having an inner and an outer member, gears connecting the shafts and drums, a brake for each drum, a friction ring carried by one drum, means for forcing the end walls of the inner member of one drum into frictional engagment with said friction ring and an end wall of the other drum for locking the drums together and cork inserts for the end walls of said inner drum member.

13. A reversing mechanism comprising a driving shaft, a power transmitting shaft, two drums, one having an inner and an outer member, gears carried by the said inner member connecting the shafts and drums, a brake for each drum, a friction ring carried by one drum, and means for forcing the end walls of the inner member of one drum into frictional engagement with said friction ring and an end wall of the other drum for locking the drums together.

In testimony, that I claim the foregoing as my invention, I have signed my name in presence of two witnesses, this twenty-fourth day of July 1908.

FREDERIC J. BALL.

Witnesses:
F. GEORGE BARRY,
C. L. SUNDGREN.