Feb. 17, 1925. 1,527,061

S. MUNSON

APPARATUS FOR OPERATING CLUTCH OR BRAKE MECHANISMS

Filed Sept. 30, 1922 2 Sheets-Sheet 1

Fig 1

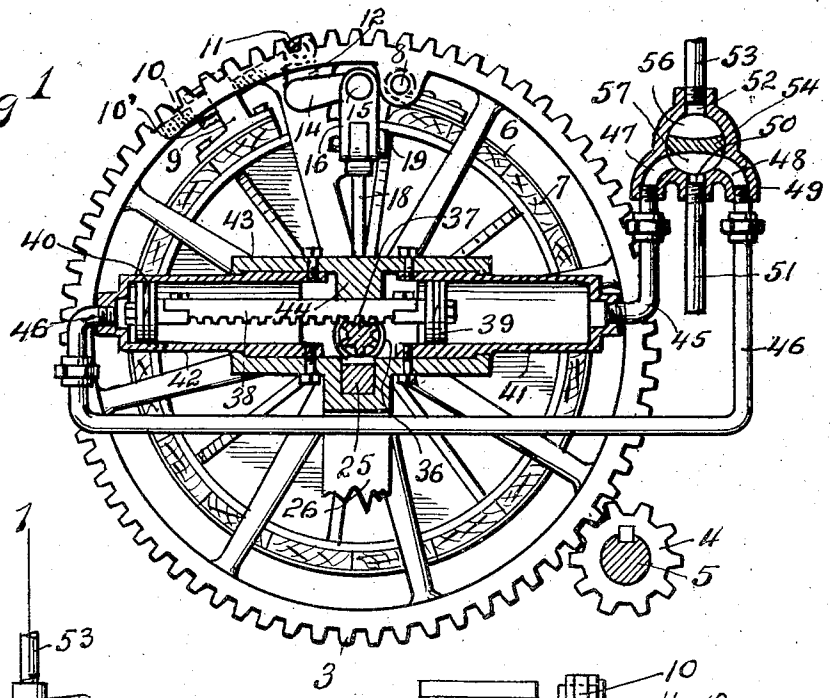
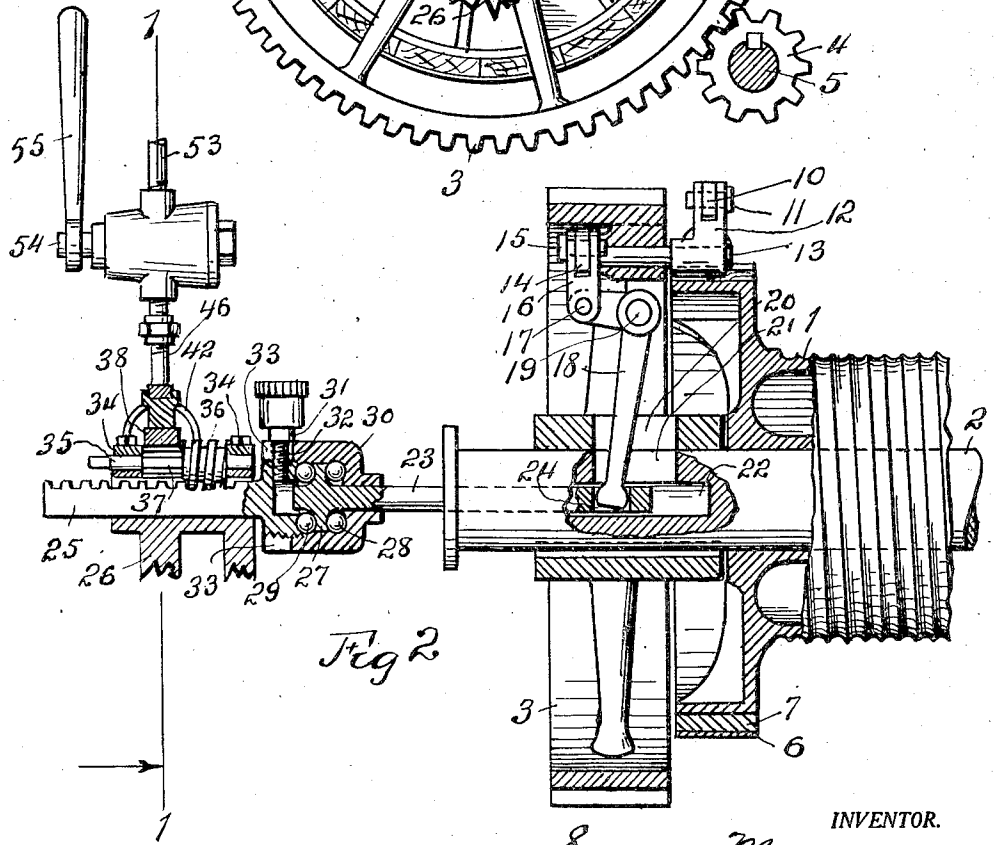


Fig 2



Witness:

R. C. Hamilton

INVENTOR.

Sweney Munson

BY

Warren D. House

His ATTORNEY.

Feb. 17, 1925. 1,527,061

S. MUNSON

APPARATUS FOR OPERATING CLUTCH OR BRAKE MECHANISMS

Filed Sept. 30, 1922 2 Sheets-Sheet 2

Fig 3

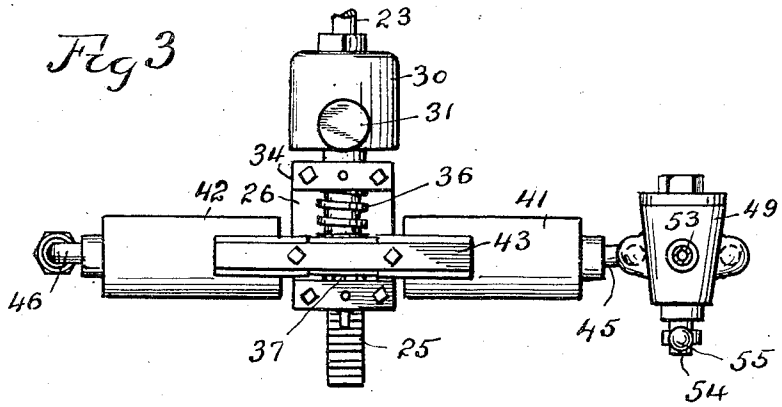


Fig 4

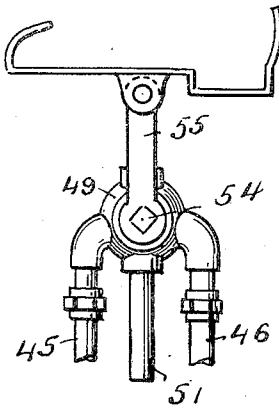
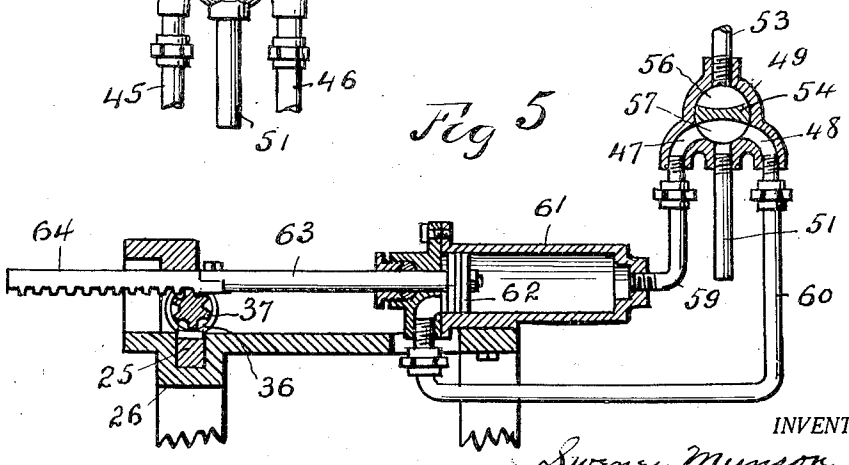


Fig 5



INVENTOR.

Sweney Munson

BY

Warren D. House

His ATTORNEY.

Witness:

R. C. Hamilton

Patented Feb. 17, 1925.

1,527,061

UNITED STATES PATENT OFFICE.

SWENEY MUNSON, OF SCAMMON, KANSAS.

APPARATUS FOR OPERATING CLUTCH OR BRAKE MECHANISMS.

Application filed September 30, 1922. Serial No. 591,617.

To all whom it may concern:

Be it known that I, SWENEY MUNSON, a citizen of the United States, residing at Scammon, in the county of Cherokee and State of Kansas, have invented a certain new and useful Improvement in Apparatus for Operating Clutch or Brake Mechanisms, of which the following is a specification.

My invention relates to improvements in apparatus for operating clutch or brake mechanisms.

It is particularly adapted for use in connection with clutch and brake mechanisms of the type in which a friction strap is arranged to clampingly engage the periphery of a rotary member.

One of the objects of my invention is to provide novel means by which the clutch or brake may be operated and reliably held in the position in which it is set.

A further object of my invention is to provide novel means by which the apparatus may be operated by fluid under pressure.

A further object of my invention is the provision of novel means by which my improved apparatus may be employed in connection with hoisting mechanisms now in use.

Still another object of my invention is to provide an apparatus of the kind described which is simple, cheap to make, durable, strong, not liable to get out of order, which may be easily operated, and which is efficient in operation.

The novel features of my invention are hereinafter fully described and claimed.

In the accompanying drawings, which illustrate my invention

Fig. 1 is a vertical sectional view of the preferred form of my invention, on the line 1—1 of Fig. 2, showing my invention applied to a hoisting apparatus of an ordinary type, a portion only of which is shown.

Fig. 2 is a side view of the same, shown partly in elevation and partly in vertical section.

Fig. 3 is a top view of my improved apparatus.

Fig. 4 is an elevation of the three way valve provided with a foot support on the valve lever,

Fig. 5 is a vertical sectional view of a modified form of my invention, in which but a single cylinder and piston are employed.

Similar reference characters designate similar parts in the different views.

Referring particularly to Figs. 1 to 3, there is illustrated a portion of a hoisting engine of an ordinary type with which my apparatus is adapted to be used.

1 designates an ordinary hoisting drum rotatably mounted on a horizontal rotary driving shaft 2, on which is keyed a spur gear wheel 3, which meshes with and is driven by a pinion 4, keyed on a shaft 5, Fig. 1, which may be rotated by any suitable means, not shown.

A friction clutch is arranged to connect the wheel 3 and drum 1 and comprises the following described parts.

6 designates a friction strap or band, which encircles the drum 1 at one end thereof and which has attached at its inner side clamping blocks 7 which are adapted to clampingly engage the periphery of the drum 1, so as to serve as a clutch member to drive the drum or to serve as braking means for holding the drum when the latter is permitted to run free.

One end of the strap or band 6 is attached by a pin 8 to the wheel 3, Fig. 1, the other end of the band or strap 6 having attached to it a member 9 having a hole through which extends and in which is loosely fitted a screw 10, one end of which has fitted on it a nut 10′ bearing on the member 9. The screw 10 is pivoted by a bolt 11 to a crank 12 which is rigidly secured to one end of a horizontal oscillatory shaft 13, which is rotatably mounted in the wheel 3, and which at its other end is provided with a crank 14, having mounted in it a pin 15, to which is pivoted the outer end of a link 16, the inner end of which is pivoted by a pin 17 to one arm of a bell crank lever 18, which is pivoted at its angle by a pin 19 to the wheel 3.

The other arm of the bell crank lever 18 extends through slots 20 and 21 provided respectively in the hub of the wheel 3 and in the shaft 2. The latter at one end is provided with an axial hole 22, which com-

municates with the slot 21 and in which is slidably mounted an oscillatory member comprising preferably a reciprocative operating bar 23, which is provided with a slot 24 into which the adjacent arm of the lever 18 extends.

When the bar 23 is reciprocated, the bell crank lever 18 will be oscillated, so as to tighten and loosen the strap or band 6 with respect to the drum 1.

An oscillatory member comprising preferably a reciprocative rack 25 is slidably mounted in a suitable support 26 and is disposed in longitudinal alinement with the bar 23 which is provided with an annular flange 27 against opposite sides of which bear respectively two sets of balls 28 and 29, located in a housing 30 in which the bar 23 is rotatable, and which has an internally screw threaded end fitted on the adjacent screw threaded end of the rack 25. The balls 28 and 29 bear respectively against the housing 30 and the adjacent end of the rack 25.

An oil or grease cup 31 has a threaded inner end fitted in a threaded hole provided in the rack 25. The threaded stem 32 of the grease or oil cup is adapted to be removably mounted in any one of one or more notches 33 provided in the open end of the housing 30, whereby the latter is locked against rotation on the rack 25.

Rotatably mounted in bearings 34 supported by the support 26 is a horizontal shaft 35, disposed parallel with the rack 25, and having rigidly secured thereto a worm 36, which meshes with the teeth of the rack 25, and a pinion 37 which meshes with the teeth of a horizontal rack 38, the ends of which are rigidly attached to the inner sides respectively of two pistons 39 and 40 which are respectively reciprocative in two horizontal cylinders 41 and 42, which are disposed in alinement with each other at opposite sides respectively of the piston 37, and each of which has an open inner end and a closed outer end.

The cylinders 41 and 42 are mounted on and rigidly secured to the support 26.

A horizontal brace plate 43 is attached to and connects the cylinders and is provided on its under side with a lug 44 against which the upper edge of the rack 38 has a sliding bearing.

Manually controlled fluid operated means may be provided for effecting the reciprocation of the pistons 39 and 40.

For this purpose two conductors 45 and 46 are respectively mounted at one set of ends in holes provided therefor in the closed outer ends of the cylinders 41 and 42.

The other ends of said conductors respectively connect with two passages 47 and 48 provided in a valve casing 49, which is provided intermediate of said passages with an outlet opening 50 in which is fitted an exhaust pipe 51. The casing 49 is provided with an inlet opening 52 in which is fitted one end of a fluid supply pipe 53, which may be connected to a boiler, not shown, or to a tank containing compressed air, or a tank containing water, neither tank being shown.

Rotatably mounted in the casing 49 is a valve 54 to which is attached an operating lever 55. The valve 54 is provided at opposite sides thereof with two passages 56 and 57, by which the fluid under pressure can pass, when the valve is in the proper positions, alternately through the passages 47 and 48, so as to alternately enter the cylinders 41 and 42 through the conductors 45 and 46 respectively, for the purpose of alternately reciprocating the pistons 39 and 40 in opposite directions.

By turning the valve 54 to the position shown in Fig. 1, the passage 57 connects the passages 47 and 48 with the exhaust pipe 51, thus permitting both cylinders to discharge, when it is desired to leave the clutch in any set position, either free or in the clamping position.

In the operation of the form of my invention shown in Figs. 1 and 2, the parts being as shown, the clutch being in the release position, to clamp the clutch blocks 7 on the drum, the valve 54 is turned so as to connect the passage 56 with the passage 48, and the passage 57 with the passage 47. The fluid will then pass from the pipe 53 into the cylinder 42 through the conductor 46, thus forcing the pistons 39 and 40 and rack 38 to the right, as viewed in Fig. 1, thus turning the pinion 37 and worm 36, so that the latter will force the rack 25 to the right as viewed in Fig. 2, thus through the intermediacy of the balls 29 and bar 23 swinging the lever 18, so as to contract the band or strap 6 to the clamping position, whereby if the wheel 3 is standing still, and the drum 1 running free the blocks 7 will serve as brake shoes for holding the drum from turning. If the wheel 3 is being driven, and the clutch is set as described, the blocks 7 will engage and clamp the drum 1, thereby transmitting to the latter the rotation of the wheel 3.

To release the clutch, the valve 54 is turned to connect the pipe 53 and passage 47 through the passage 57. The pressure fluid will then pass through the conductor 45 into the cylinder 41, thus forcing the pistons 39 and 40 to the left, as viewed in Fig. 1, thereby moving the rack 38 so as to turn the pinion 37 and worm 36 in the reverse direction, to that already described, thereby moving the rack 25 and the bar 23 together with the lever 18 to the release positions shown in Fig. 2.

As shown in Fig. 4, the upper end of the lever 55 may have pivoted to it a foot

rest 58 by which the operator may swing the valve lever 55 to any desired position, within its range of movement.

In Fig. 5, is shown a modification in which conductors 59 and 60, corresponding in function to the conductors 45 and 46 are connected respectively to opposite ends of a cylinder 61, which has closed ends and has slidably mounted in it a piston 62, which has a piston rod 63 extending through and slidably mounted in the adjacent end of the cylinder, and which at its outer end is attached to a rack 64, corresponding in function to the rack 38 and which meshes with the pinion 37 corresponding to the pinion already described. The remaining portions of the modified form correspond in structure and in function to corresponding parts shown in Figs. 1 and 2.

In the operation of the modified form, the valve 54 is operated in the same manner as already described with reference to the other form of my invention, thereby effecting reciprocation of the single piston 62 for setting the clutch by means of the rod 63, rack 64 and pinion 37 and parts connected with the latter, in the manner which has been described.

I do not limit my invention to the structure shown and described, as other modifications may be made, within the scope of the appended claims, without departing from the spirit of my invention.

With the form having two cylinders, no packing is required, such as is required with the use of the single cylinder, shown in Fig. 5.

What I claim is:

1. In an apparatus of the kind described, the combination with a reciprocative operating bar, of a rack connected to and reciprocative therewith, a rotary worm meshing with said rack, a cylinder, a piston reciprocative in said cylinder, means connecting the piston and worm by which the latter is rotated alternately in opposite directions when the piston is reciprocated, and fluid operated means for reciprocating the piston, substantially as set forth.

2. In an apparatus of the kind described, the combination with a reciprocative operating bar, of a rack connected to and reciprocative therewith, a rotary worm meshing with said rack, a cylinder, a piston reciprocative in said cylinder, a pinion connected to and rotative with said worm, a second rack meshing with said pinion and connected to and reciprocative with said piston, and fluid operated means for reciprocating said piston, substantially as set forth.

3. In an apparatus of the kind described, the combination with a reciprocative operating bar, of a rack connected to and reciprocative therewith, a rotary worm meshing with said rack, a cylinder having an open end and a closed end, a piston reciprocative in said cylinder, a second rack connected to and reciprocative with said piston and located in and projecting from the open end of said cylinder, a pinion connected to and rotative with said worm and meshing with said second rack, and fluid operated means connected with the closed end of said cylinder and with said second rack for reciprocating the latter and said piston, substantially as set forth.

4. In an apparatus of the kind described, the combination with a reciprocative operating bar, of a rack connected to and reciprocative therewith, a rotary worm meshing with said rack, two cylinders having open inner ends and closed outer ends, two pistons respectively reciprocative in said cylinders, a second rack connecting said pistons, a pinion rotative with and connected to said worm and meshing with said second rack, and fluid operated means respectively connected with the closed ends of said cylinders for reciprocating said pistons, substantially as set forth.

5. In an apparatus of the kind described, the combination with a reciprocative operating member, of a rack connected to and reciprocative therewith, a rotary worm meshing with said rack, two cylinders having open inner ends and closed outer ends, two pistons respectively reciprocative in said cylinders, a connecting member connecting said pistons, means connected to and actuated by said connecting member by which the worm is rotated alternately in opposite directions when the pistons are reciprocated, and fluid operated means connected to the closed ends of said cylinders by which the pistons are reciprocated, substantially as set forth.

6. In an apparatus of the kind described, the combination with a rotary shaft, a drum rotatable thereon, a driving wheel secured to and rotatable with the shaft, and clutch mechanism arranged to connect the drum and driving wheel and including a bar axially longitudinally reciprocative in said shaft, of a rack connected to and reciprocative with said bar, a rotary worm meshing with said rack, a cylinder, a piston reciprocative in said cylinder, means connecting the piston and worm by which the latter is rotated alternately in opposite directions when the piston is reciprocated, and fluid operated means for reciprocating said piston, substantially as set forth.

7. In an apparatus of the kind described, the combination with a rotatable shaft, a drum rotatable thereon, a driving wheel secured to and rotatable with the shaft, and clutch mechanism arranged to connect the drum and driving wheel and including a bar axially longitudinally reciprocative in said shaft, of a rack connected to and reciproca-

tive with said bar, a rotary worm meshing with said rack, a cylinder, a piston reciprocative in said cylinder, a second rack connected to and reciprocative with said piston, a pinion meshing with said second rack and connected to and rotative with said worm, and fluid operated means for reciprocating said piston, substantially as set forth.

8. In an apparatus of the kind described, the combination with a rotary member, a friction band embracing and adapted to clamp the periphery of said rotary member, and means including a reciprocative operating bar for tightening and loosening said band on said rotary member, when the reciprocative bar is reciprocated, of a rack connected to said reciprocative bar and reciprocative therewith, a rotary worm meshing with said rack, a cylinder, a piston reciprocative in said cylinder, means connecting the piston and worm by which the latter is rotated alternately in opposite directions when the piston is reciprocated, and fluid operated means for reciprocating said piston, substantially as set forth.

9. In an apparatus of the kind described, the combination with a rotary member, a friction band arranged to releasably clampingly engage said member, and means including a reciprocative operating bar for tightening and loosening said band on said member, when the bar is reciprocated, of a rack connected to and reciprocating with said bar, a rotary worm meshing with said rack, a cylinder, a piston reciprocative in said cylinder, a pinion connected to and rotative with said worm, a second rack meshing with said pinion and connected to and reciprocative with said piston, and fluid operated means for reciprocating said piston, substantially as set forth.

10. In an apparatus of the kind described, the combination with a clutch which includes a reciprocative operating member, of a rack connected to and reciprocative with said member, a rotary worm meshing with said rack, a cylinder, a piston reciprocative in said cylinder, means connecting the piston with said worm by which the latter is alternately rotated in opposite directions when the piston is reciprocated, and fluid operated means for reciprocating the piston, substantially as set forth.

11. In an apparatus of the kind described, the combination with a clutch, of an oscillatory toothed member, means actuated by the toothed member for operating said clutch, a worm meshing with said toothed member, a cylinder, a piston reciprocative in said cylinder, means actuated by the piston for rotating the worm alternately in opposite directions when the piston is reciprocated, and fluid actuated means for reciprocating the piston, substantially as set forth.

12. In an apparatus of the kind described, the combination with a clutch of an oscillatory toothed member, means actuated by said member for operating said clutch, a worm meshing with said toothed member, a cylinder, a piston reciprocative in said cylinder, a pinion connected with and rotatable with said worm, a second oscillatory toothed member meshing with said pinion, and fluid actuated means for reciprocating said piston, substantially as set forth.

13. In an apparatus of the kind described, the combination with a clutch, of an oscillatory toothed member, means connecting the toothed member with the clutch by which the latter is moved to and from the clamping position when said member is oscillated, a worm meshing with said toothed member, two cylinders each having an open inner end and a closed outer end, two pistons respectively reciprocative in said cylinders, a rack connecting said pistons, a pinion meshing with said rack and connected to and rotative with said worm, and means by which fluid under pressure may be admitted alternately in said cylinders through the closed ends thereof and exhausted therefrom, substantially as set forth.

In testimony whereof I have signed my name to this specification.

SWENEY MUNSON.