Jan. 5, 1926. 1,568,175

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WINDING DRUM MECHANISM

Filed May 20, 1920 4 Sheets-Sheet 1

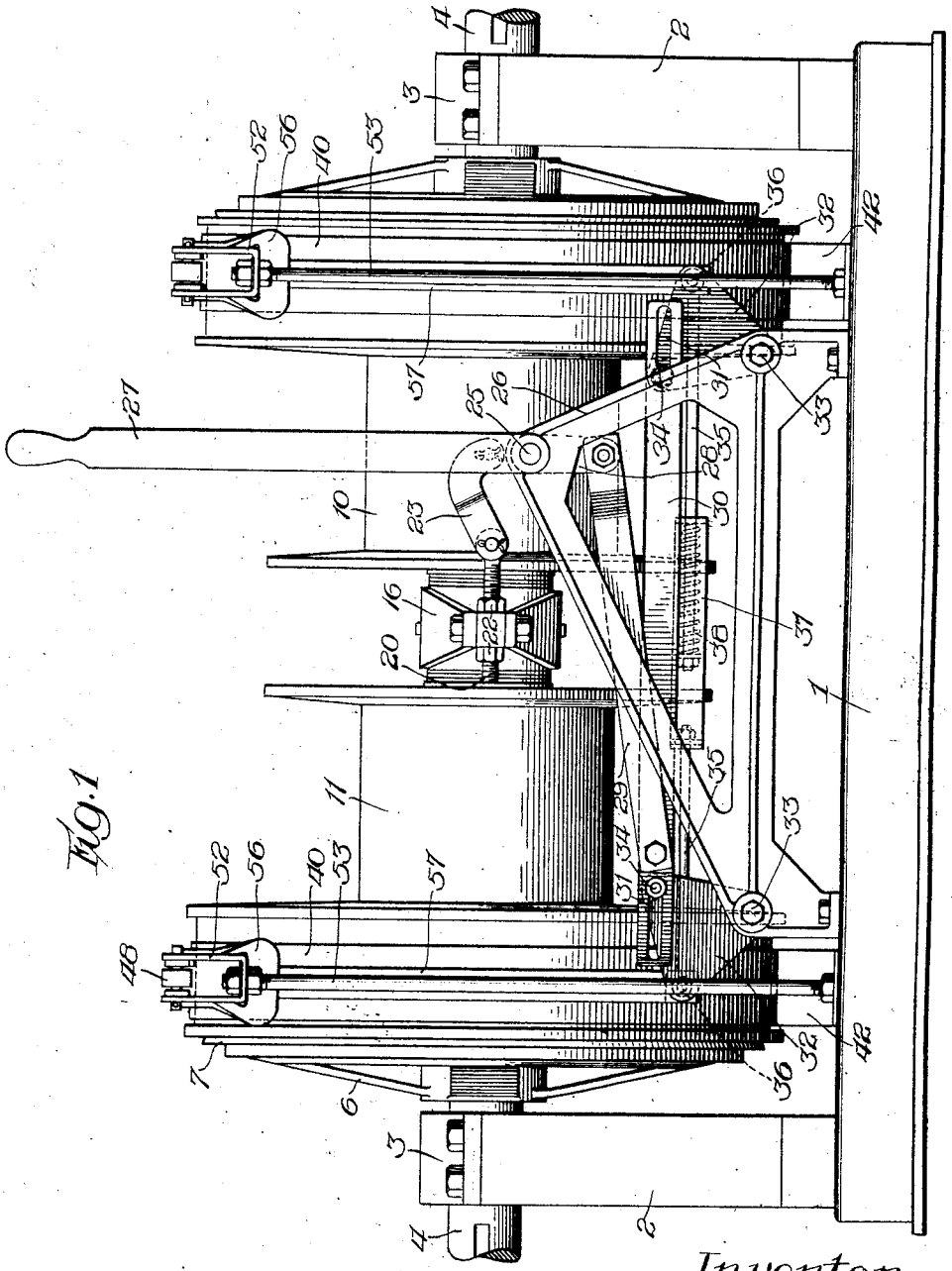


Fig. 1

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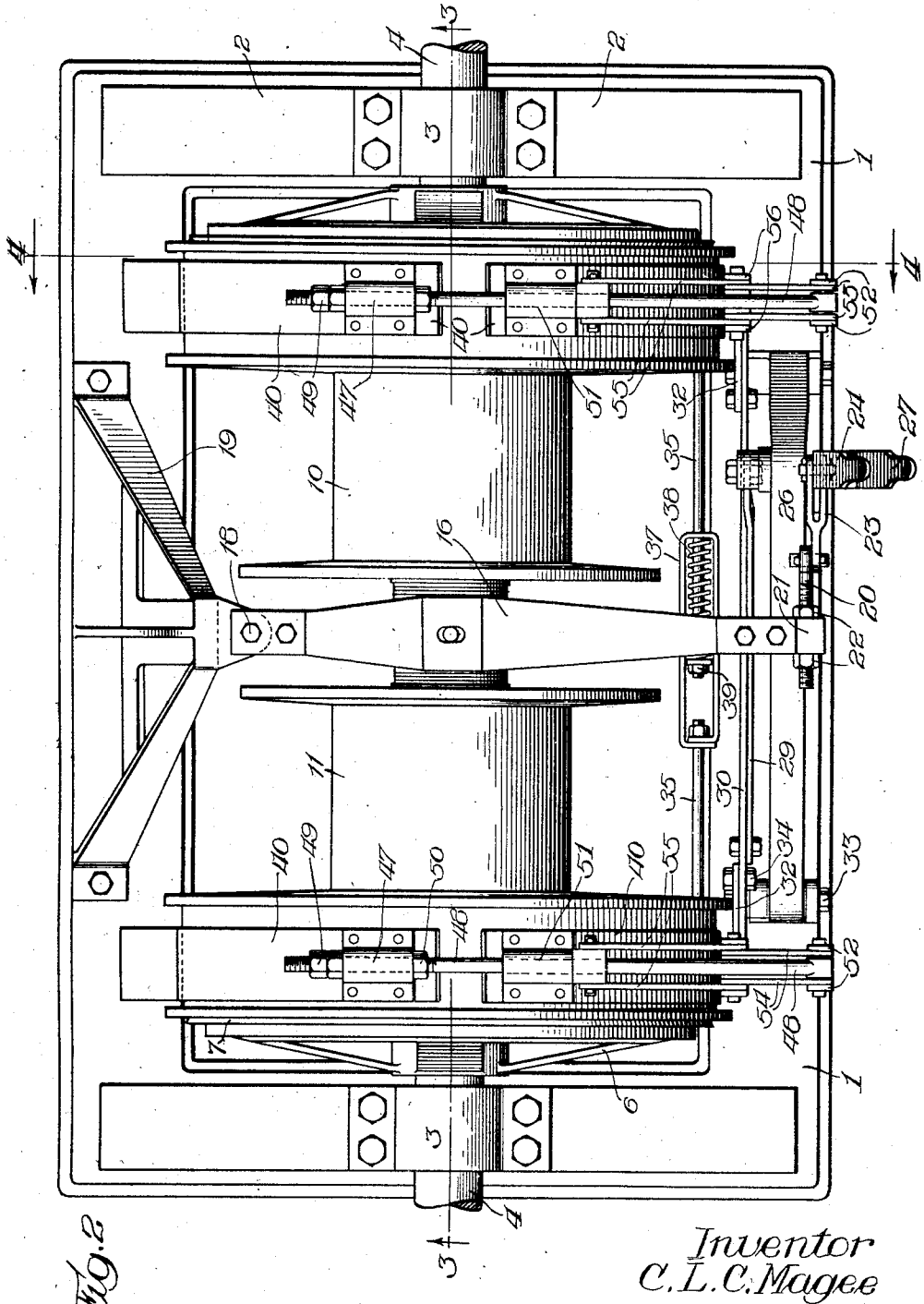


Fig. 2

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WINDING DRUM MECHANISM

Filed May 20, 1920 4 Sheets-Sheet 3

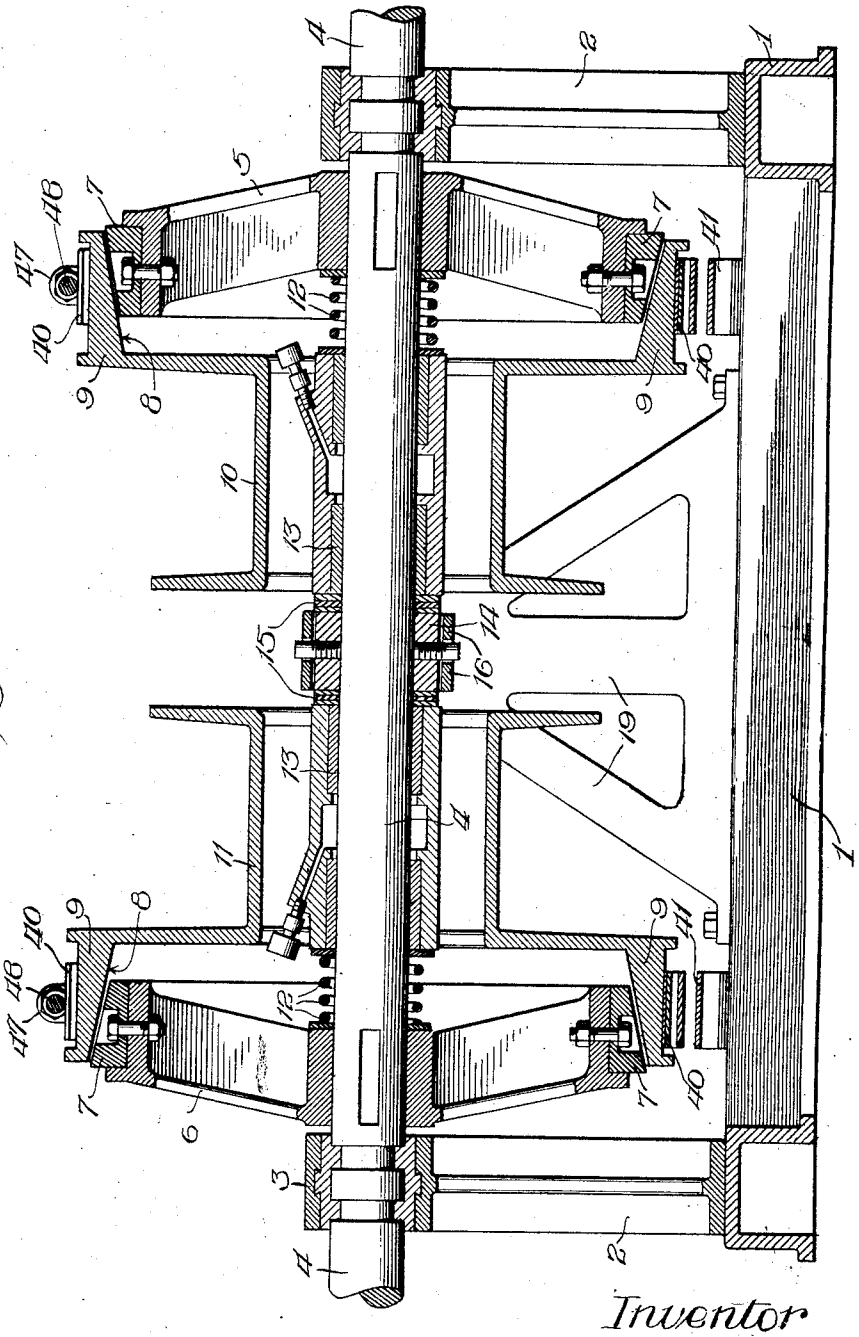


FIG. 3

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WINDING DRUM MECHANISM

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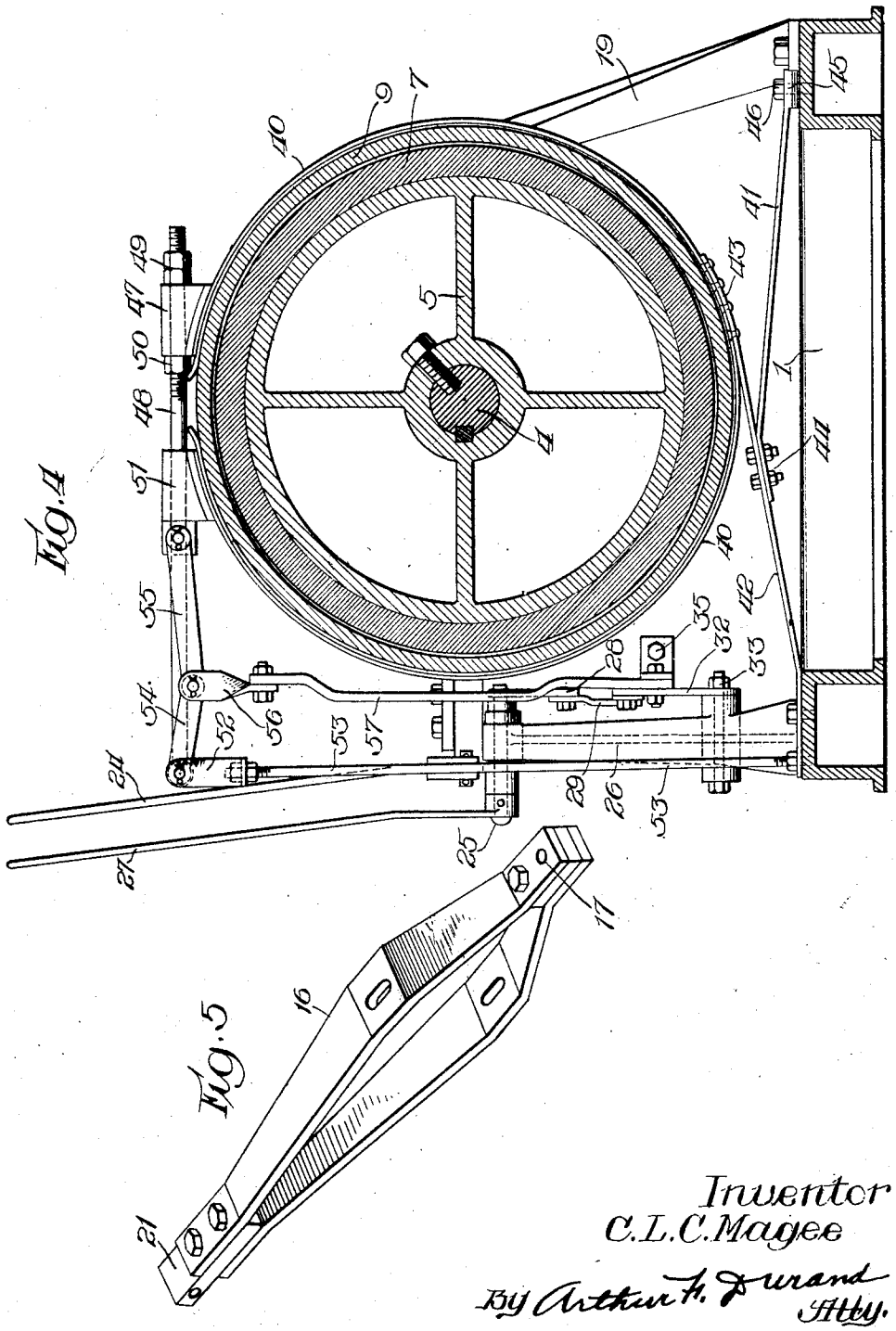


Fig. 4

Fig. 5

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UNITED STATES PATENT OFFICE.

CHAUNCEY L. C. MAGEE, OF CHICAGO, ILLINOIS.

WINDING-DRUM MECHANISM.

Application filed May 20, 1920. Serial No. 382,882.

To all whom it may concern:

Be it known that I, CHAUNCEY L. C. MAGEE, a citizen of the United States of America, and a resident of Chicago, Illinois, have invented a certain new and useful Improvement in Winding-Drum Mechanism, of which the following is a specification.

This invention relates to winding drum mechanism for hoisting purposes, or for operating any instrumentalities which are adapted to be controlled by winding drums. More specifically considered, the invention relates to hoisting apparatus, or winding drum mechanism, of this particular character, in which two drums are arranged side by side, and provided with controlling means whereby either drum can be controlled at will.

Generally stated, therefore, the object of the invention is to provide a novel and improved construction whereby winding drums arranged side by side are controllable by two hand levers, one lever controlling the transmission of power to the winding drums, and the other lever controlling the brakes by which the drums are held in stationary position, or against rotation, or whereby the rotation of the drums is frictionally retarded when such is necessary or desirable.

It is also an object to provide certain details and features of construction and combinations tending to increase the general efficiency and the desirability of a winding drum mechanism or hoisting apparatus of this particular construction.

To these and other useful ends the invention consists in matters hereinafter set forth and claimed, and shown in the accompanying drawings, in which—

Fig. 1 is a front elevation of a winding drum mechanism embodying the principles of the invention.

Fig. 2 is a plan of said mechanism.

Fig. 3 is a longitudinal vertical section on line 3—3 in Fig. 2.

Fig. 4 is a transverse section on line 4—4 in Fig. 2.

Fig. 5 is a perspective of the transverse lever through the medium of which the drums are shifted to control the friction clutches by which they are driven.

As thus illustrated, the invention comprises a suitable base 1 provided at opposite ends thereof with upright castings 2 providing bearings 3 for the horizontally disposed shaft 4 upon which the winding drum mechanism is mounted. The two friction disks 5 and 6 are keyed to said shaft and provided with peripheral means 7, such as fiber or leather or metal or any other suitable means, for engaging the beveled inner surfaces 8 provided in the heads 9 of the two winding drums 10 and 11, the latter being loosely mounted on said shaft. Springs 12 are interposed between the disks 5 and 6 and the hubs 13 of the two winding drums, so that the latter are forced toward each other by said springs. A ring 14 encircles the shaft between the two drums, and washers or friction means 15 are interposed between this ring and the ends of the hubs 13 of the drums, so that by shifting this ring laterally either drum can be forced sidewise on the shaft to cause its bevel 8 to engage the beveled friction means 7 of its allotted disk, the latter being keyed or otherwise secured to the shaft, as previously explained. For the purpose of shifting the ring 14, any suitable means can be employed, but this is preferably accomplished by means of a lever 16 which is formed of two straps bent apart to extend over and under said ring and which are secured together at their ends by any suitable means. The short end 17 of said lever is fulcrumed at 18 upon the bracket or fulcrum member 19 which is suitably mounted on the base. An eye-bolt 20 is inserted through the end portion 21 of said lever, and adjustably held therein by the nuts 22, and this eye-bolt is connected by a link 23 with the hand lever 24, which latter is pivoted at 25 on the upright casting or bracket 26, the latter being suitably secured on the base of the machine. The pivot 25 is rigid with the hand lever 27, the two hand levers being disposed side by side, in the manner shown, and both extending vertically when the two friction clutches are open, and when the brakes are set, as will hereinafter more fully appear. The other end of the pivot 25 has a downwardly extending crank arm 28 which is connected by a link 29 with the horizontally extending bar 30, the latter having longitudinal slots 31 at opposite ends thereof. Triangular shaped levers or crank arms 32 are pivoted at 33 on the casting or bracket 26, and are provided with pivot bolts 34 which extend through the slots 31 and slide back and forth therein, whereby lost-motion connections are provided between these triangular crank plates 32 and said bar 30, endwise motion

of the latter in one direction operating one crank plate 32 without operating the other one, and vice versa, so that either crank plate can be tilted or operated about its axis 33 without disturbing the other. The rods 35 are connected to the crank plates or triangular levers 32 by pivots 36, and the two rods are connected together by a yoke 37, one rod having a compression spring 38 thereon, this spring being interposed between one end of the yoke and the nut and washer 39 on the end of the rod. The said spring keeps the pivot bolts 34 at the inner ends of the slots 31, and permits either plate 32 to tilt or operate independently of the other, in the manner stated, when the hand lever 27 is swung in one direction or the other about its axis 25 previously mentioned.

The said triangular levers or crank plates 32 are connected to control the friction band brakes in the following manner: Said brakes comprise the steel bands 40 which encircle the heads 9 of the two drums, and which are supported at their bottoms by steel strips 41 and 42, the strip 42 being riveted to the band at 43 and the two strips being riveted or bolted together at 44, while both strips have their outer ends bolted to the base of the machine. Washers 45 are preferably interposed between the base and the end of the strip 41 on the bolt 46, so that by taking out or adding washers the tension of the spring 41 can be varied or regulated, thereby to support the steel band 40 in such a position that it will not drag on or engage the drum when the band is open or relaxed—that is to say, when the brake is not set. One end of the band has a terminal casting 47 through which a rod 48 extends, being adjustably held therein by nuts 49 and 50, and said rod also extends through a similar terminal piece or casting 51 on the other end of the band. The construction, it will be understood, is duplicated at each end of the machine, so that the two friction brakes are of similar construction. The rods 48 extend outwardly and have their ends pivoted upon the brackets 52 supported upon the vertical rods 53, the lower ends of the latter being mounted on the base of the machine. A pair of toggle links 54 and 55 connect each bracket 52 with the adjacent terminal piece or casting 51, so that both ends of the brake band are connected to the upper end of the rod 53, in the manner shown. The toggle links 54 and 55 have their toggle joints provided with depending links 56, and these links are connected to the upper ends of longer links 57, the lower ends of which latter are connected to the pivots 36 previously mentioned, whereby the rocking motion of the triangular shaped crank plates or levers 32 will operate the vertically disposed links 57, and will thus control the toggle links 54 and 55 to in turn control the two friction brakes. With this arrangement, the shifting of the hand lever in one direction will operate one crank plate 32, and thereby release the band 40 connected to this crank plate, while the other band 40 will remain set or tight and in contact with its allotted drum; while, on the other hand, a shifting of the lever 27 in the opposite direction will release the other brake only. When one of the links 57 is pushed upward, the rod 48 exerts a pull on the terminal piece 47, and the toggle links 54 and 55 push on the other terminal piece 51, so that the tendency is to bring the two terminal pieces together, and in this way either brake is set, depending upon which of the links 57 is pushed upward. The rod 48 can pull endwise, it is obvious, because the long slim rod 53 will yield or flex enough to permit this.

With this construction, therefore, the two drums are controlled by the two hand levers. In normal condition, when the two hand levers extend vertically, as shown in the drawings, the two friction clutches through which power is transmitted to the drums are open, but upon the shifting of the lever 24 in either direction, so as to shift either drum in a direction to close its friction clutch, one drum will be rotated while the other is allowed to remain stationary. Of course, neither drum can be rotated until after its allotted band brake is released, and normally both band brakes are set, as the spring 38 yieldingly maintains the connection in normal position, so that the two drums are normally held against rotation. By shifting the hand lever 27 in one direction or the other, one link 57 is pulled downward, thereby causing the two terminal pieces 47 and 51 to move away from each other, thus releasing the brake band 40 from the drum to which the link 57 is allotted. When the lever 27 is in normal position, then both of the links 57 are in raised position and both brakes are set; but when the lever 27 is swung in one direction or the other, one link 57 is pulled downward, while the other link remains stationary, because of lost-motion connections 31 and 34 previously mentioned, and in this way eithe brake band is released at will, depending upon which drum is to be rotated. Obviously, therefore, the operation of both hand levers is necessary when it is desired to start the rotation of either drum. Normally, of course, both drums are stationary, and they cannot both be rotated at the same time, inasmuch as it is impossible to close both friction clutches simultaneously, and impossible to release both brakes at the same time. When either brake is released, its drum can shift axially, as stated, on the shaft 4, which latter is held by the

bearings 3 against endwise movement. Hence, as explained, either drum can be rotated at will, and the two drums are under the complete control of the two hand levers.

Any suitable means can be employed, it will be understood, for driving the shaft upon which the winding drums are mounted, so that said drums will rotate about a horizontal axis common to both drums. The clutch-controlling hand lever and the brake-controlling hand lever are mounted to swing about a transverse horizontal axis, as explained, and to swing in vertical planes parallel with the axis of the drums. In this way, the two hand levers are arranged for convenient operation by the operator or attendant, one lever having suitable connection with the collar between the two drums, so that either but not both drums can be rotated at will, while the other hand lever has lost-motion connection with the two brake bands, so that either but not both of said bands can be released from the drums, the two brakes being normally set and the two clutches being normally open, as previously explained.

What I claim as my invention is:—

1. In winding drum mechanism, the combination of a driving shaft, drums slidable on said shaft, friction clutch members fixed on said shaft, the structure and arrangement being such that movement of either drum away from the other closes the clutch of the shifted drum only, friction brake bands to engage the drums, within which bands the drums are slidable axially, devices to shift said drums into engagement with said members, and instrumentalities to control said brake bands, having structural provisions whereby either drum is friction driven or friction held at will, together with shaft bearings between which all of said shaft supported elements are disposed in operative relation, said devices comprising a collar loosely mounted on said shaft between said drums, a transverse lever engaging said collar, a fulcrum for one end of said lever, a clutch-controlling hand lever common to both drums, and means to connect said hand lever to the other end of said transverse lever.

2. In winding drum mechanism, the combination of a driving shaft, drums slidable on said shaft, friction clutch members fixed on said shaft, the structure and arrangement being such that movement of either drum away from the other closes the clutch of the shifted drum only, friction brake bands to engage the drums, within which bands the drums are slidable axially, devices to shift said drums into engagement with said members, and instrumentalities to control said brake bands, having structural provisions whereby either drum is friction driven or friction held at will, together with shaft bearings between which all of said shaft supported elements are disposed in operative relation, said instrumentalities comprising rods and toggles connected to the ends of said bands, supports for said rods and toggles, pivoted elements connected to said toggles, a link having lost-motion connection with said pivoted elements, a spring connection between said elements, a brake-controlling hand lever, and means to connect said hand lever with said link.

3. In winding drum mechanism, the combination of a driving shaft, drums slidable on said shaft, friction clutch members fixed on said shaft, the structure and arrangement being such that movement of either drum away from the other closes the clutch of the shifted drum only, friction brake bands to engage the drums, within which bands the drums are slidable axially, devices to shift said drums into engagement with said members, and instrumentalities to control said brake bands, having structure provisions whereby either drum is friction driven or friction held at will, together with shaft bearings between which all of said shaft supported elements are disposed in operative relation, said instrumentalities comprising rods and toggles connected to the ends of said bands, supports for said rods and toggles, pivoted elements connected to said toggles, a link having lost-motion connection with said pivoted elements, a spring connected between said elements, a brake-controlling hand lever, and means to connect said hand lever with said link, substantially as described.

4. In winding drum mechanism, the combination of a driving shaft, drums slidable on said shaft, friction clutch members fixed on said shaft, the structure and arrangement being such that movement of either drum away from the other closes the clutch of the shifted drum only, friction brake bands to engage the drums, within which bands the drums are slidable axially, devices to shift said drums into engagement with said members, and instrumentalities to control said brake bands, having structural provisions whereby either drum is friction driven or friction held at will, together with shaft bearings between which all of said shaft supported elements are disposed in operative relation, said devices comprising a single clutch-controlling hand lever, and said instrumentalities including a single brake-controlling hand lever, the two brakes being normally set to hold the drums against rotation, and the two clutches being normally open, so that operation of both hand levers is necessary for the rotation of either drum, and means whereby both drums can not be rotated at the same time.

5. In winding drum mechanism, the combination of a pair of drums, normally open

friction clutches therefor, friction brake bands to normally hold the drums against rotation, within which bands the drums are slidable axially, a single clutch-controlling hand lever to control said clutches, means whereby said hand lever is operative to close either clutch without closing the other, and a single brake-controlling hand lever mounted to swing in a plane at one side of said drums and connected to control said brakes, said drums beings slidable under the control of their said hand lever to close either friction clutch.

6. In a winding drum mechanism, the combination of a pair of drums, normally open friction clutches therefor, friction brake bands to normally hold the drums against rotation, within which bands the drums are slidable axially, a single clutch-controlling hand lever to control said clutches, means whereby said hand lever is operative to close either clutch without closing the other, and a single brake-controlling hand lever mounted to swing in a plane at one side of said drums and connected to control said brakes, said brake-controlling hand lever having lost-motion connection with the friction brakes, so that either brake can be released, leaving the other set, and having means whereby both brakes are normally set to hold the drums against rotation.

7. In apparatus of the class described, a pair of drums, means including a rotary shaft to rotate either drum, forming the axis of both drums, and including a friction drive for each drum, whereby either drum may rotate alone, a friction brake for each drum, a single hand lever common to both drums, and instrumentalities whereby said lever is operative to control either brake without controlling the other.

8. A structure as specified in claim 7, said instrumentalities including a spring connection to yieldingly hold both brakes normally set on the drums.

9. A structure as specified in claim 7, said instrumentalities including lost motion connections to permit control of either brake without disturbing the normal condition of the other.

10. In winding drum mechanism, the combination of a driving shaft, drums slidable on said shaft, friction clutch members fixed on said shaft, friction brake bands to engage the drums, devices to shift said drums into engagement with said members, and instrumentalities to control said brake bands, said instrumentalities comprising rods and toggles connected to the ends of said bands, supports for said rods and toggles, pivoted elements connected to said toggles, a link having lost-motion connection with said pivoted elements, a spring connection between said elements, a brake-controlling hand lever, and means to connect said hand lever with said link.

11. In winding drum mechanism, the combination of a driving shaft, drums slidable on said shaft, friction clutch members fixed on said shaft, friction brake bands to engage the drums, devices to shift said drums into engagement with said members, and instrumentalities to control said brake bands, said devices comprising a single clutch-controlling hand lever for both drums, and said instrumentalities including a single brake-controlling hand lever for both brakes, the two brakes being normally set to hold the drums against rotation, and the two clutches being normally open, so that operation of both hand levers is necessary for the rotation of either drum, and said devices operable in a manner whereby both drums cannot be rotated at the same time.

12. In winding drum mechanism, the combination of a pair of drums, friction clutches therefor, friction brakes to normally hold the drums against rotation, devices including a single clutch-controlling hand lever connected to control both of said clutches, and a single brake-controlling hand lever connected to control both of said brakes, said brake-controlling hand lever having lost-motion connection with the friction brakes, so that either brake can be released, leaving the other brake set, and said devices operable in a manner whereby both brakes are normally set to hold the drums against rotation.

13. In apparatus of the class described, a pair of drums, a friction brake for each drum, a single hand lever common to both drums, a rotary shaft on which said drums are mounted, means whereby rotation of the shaft rotates either drum, and instrumentalities whereby said lever is operative to control either brake without controlling the other, said instrumentalities including lost-motion connections to permit control of either brake without disturbing the normal condition of the other.

14. In winding drum mechanism, the combination of a driving shaft, drums slidable on said shaft, friction clutch members fixed on said shaft, friction brake bands to engage the drums, devices to shift said drums into engagement with said members, and instrumentalities to control said brake bands, said devices comprising a collar loosely mounted on said shaft between said drums, a transverse lever engaging said collar, a fulcrum for one end of said lever, a clutch-controlling hand lever, means to connect said hand lever to the other end of said transverse lever, said instrumentalities comprising rods and toggles connected to the ends of said bands, supports for said rods and toggles, pivoted elements connected to

said toggles, a link having lost-motion connection with said pivoted elements, a spring connection between said elements, a brake-controlling hand lever, and means to connect said hand lever with said link, substantially as described.

15. In winding drum mechanism, the combination of a pair of drums, friction clutches therefor, friction brakes to normally hold the drums against rotation, a single clutch-controlling hand lever connected to control said clutches, and a single brake-controlling hand lever connected to control said brakes, said brake-controlling hand lever having lost-motion connection with the friction brakes, so that either brake can be released, leaving the other set, and having means whereby both brakes are normally set to hold the drums against rotation.

16. In apparatus of the class described, a pair of drums, a friction brake for each drum, a friction drive for each drum, whereby either drum may rotate alone, a single hand lever common to both drums, and instrumentalities whereby said lever is operative to control either brake without controlling the other, said instrumentalities including a spring connection to yieldingly hold both brakes normally set on the drums.

17. In winding drum mechanism, the combination of a driving shaft, drums slidable on said shaft, friction clutch members fixed on said shaft, and means operative to prevent rotation of both drums at the same time, the structure and arrangement being such that movement of either drum away from the other closes the clutch of the shifted drum only, friction brake bands to engage the drums, within which bands the drums are slidable axially, devices to shift said drums into engagement with said members, operable to shift either drum independently of the other, and instrumentalities to control said brake bands, whereby either drum is friction driven or friction held at will, together with shaft bearings between which all of said shaft supported elements are disposed in operative relation.

18. A structure as specified in claim 17, said devices comprising a collar loosely mounted on said shaft between said drums, a transverse lever engaging said collar, a fulcrum for one end of said lever, a clutch-controlling hand lever, and means to connect said hand lever to the other end of said transverse lever.

19. A structure as specified in claim 17, said instrumentalities comprising rods and toggles connected to the ends of said bands, supports for said rods and toggles, pivoted elements connected to said toggles, a link having lost-motion connection with said pivoted elements, a spring connection between said elements, a brake-controlling hand lever, and means to connect said hand lever with said link.

20. A structure as specified in claim 17, said devices comprising a collar loosely mounted on said shaft between said drums, a transverse lever engaging said collar, a fulcrum for one end of said lever, a clutch-controlling hand lever, and means to connect said hand lever to the other end of said transverse lever, said instrumentalities comprising rods and toggles connected to the ends of said bands, supports for said rods and toggles, pivoted elements connected to said toggles, a link having lost-motion connection with said pivoted elements, a spring connection between said elements, a brake-controlling hand lever, and means to connect said hand lever with said link, substantially as described.

21. A structure as specified in claim 17, said devices comprising a single clutch-controlling hand lever, and said instrumentalities including a single brake-controlling hand lever, the two brakes being normally set to hold the drums against rotation, and the two clutches being normally open, so that operation of both hand levers is necessary for the rotation of either drum, and means whereby both drums cannot be rotated at the same time.

22. A structure as specified in claim 10, the support for each rod being a flexible member to permit endwise movement of each rod by its allotted toggle.

23. A structure as specified in claim 10, each said rod extending directly across between the ends of the brake band and beyond one end, and each rod being movable endwise, the support for each rod being resilient to yieldingly hold the rod in normal position.

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