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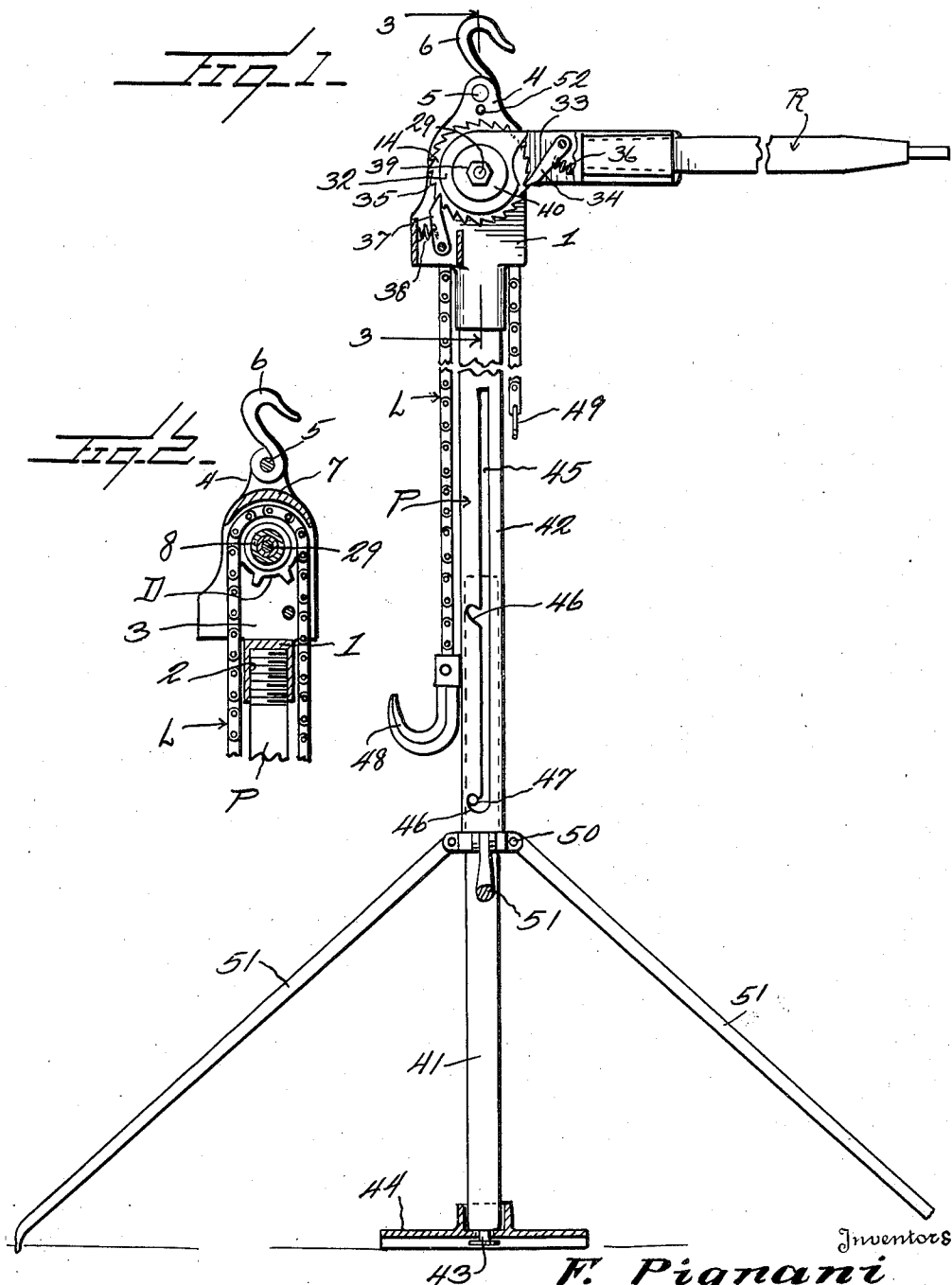
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LIFTING APPARATUS

Filed July 5, 1940

2 Sheets-Sheet 1



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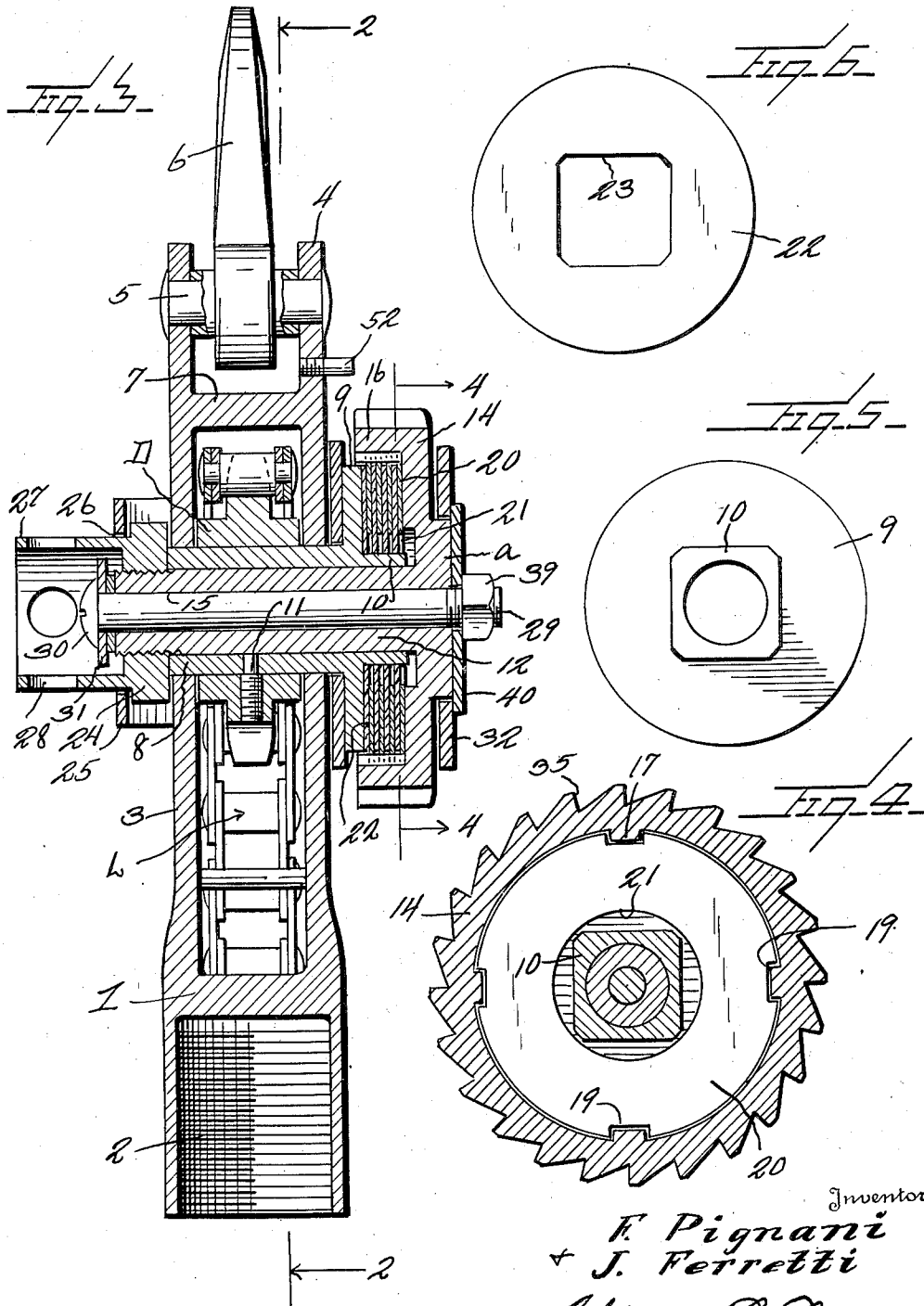
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UNITED STATES PATENT OFFICE

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LIFTING APPARATUS

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7 Claims. (Cl. 254-167)

This invention relates to a lifting apparatus, and it is an object of the invention to provide a device of this kind including a flexible load member together with means for causing said load member to travel in one direction to provide a lift or pull with further means to permit said flexible load member to be readily moved in the opposite direction independently of the first named means.

It is also an object of the invention to provide a device of this kind including a driven member with which a flexible load member is operatively engaged with means for driving said driven member in a direction to allow the flexible load member to impose a pull or lift, said operating means including a clutch mechanism whereby the operation of the driven member may be readily and conveniently regulated and controlled.

Another object of the invention is to provide a device of this kind which is especially adapted for use as a jack for use in connection with motor driven vehicles and wherein means are provided, when the device is so used, for conveniently and effectively maintaining the same in effective working position.

The invention consists in the details of construction and in the combination and arrangement of the several parts of our improved lifting apparatus whereby certain important advantages are attained and the device rendered simpler, less expensive and otherwise more convenient and advantageous for use, as will be hereinafter more fully set forth.

The novel features of our invention will hereinafter be definitely claimed.

In order that our invention may be the better understood, I will now proceed to describe the same with reference to the accompanying drawings, wherein:

Figure 1 is a view in elevation with portions broken away of a lifting apparatus constructed in accordance with an embodiment of our invention and in assembly for use as an automobile jack;

Figure 2 is a fragmentary sectional view on a reduced scale on substantially the line 2-2 of Figure 3;

Figure 3 is an enlarged sectional view with portions in elevation taken substantially on the line 3-3 of Figure 1 with the jack prop omitted;

Figure 4 is a detailed sectional view taken substantially on the line 4-4 of Figure 3;

Figure 5 is a view in end elevation of the tubular axle herein embodied and particularly illus-

trating the clutch flange carried thereby and the mounting for certain of the clutch discs;

Figure 6 is an elevational view of one of the clutch discs herein employed.

As disclosed in the accompanying drawings, our improved lifting apparatus comprises a body 1 formed to provide a socket 2 which may be threaded upon or otherwise detachably secured to the upper end portion of a supporting prop P when it is desired to use the apparatus as a jack and more particularly as an automobile jack.

The body 1 is provided with a pair of upstanding spaced plates 3 arranged side by side and each of said plates 3 being substantially flat. The plates 3 are also substantially duplicate and of such configuration and dimensions to enable the same to be effectively employed in the assembly of the various parts. The top portions 4 of the plates 3 are restricted and bridging said restricted portions and securely attached thereto is a rod 5 with which is freely engaged a hook 6. The hook 6 provides means whereby the apparatus may be suitably supported when it is desired to use the same independently of the prop. The plates 3 immediately below the portions 4 are secured by the interposed plate 7 herein disclosed as integral with the plates 3. This plate 7, as illustrated in Figure 2 of the drawings, is relatively long and is disposed on a predetermined curvature and more particularly provides a means for maintaining the flexible load member L in effective engagement with the driven member D. The driven member D is mounted upon a tubular sleeve 8 which bridges the space between the plates 3 and rotatably extends therethrough. The curvature of the plate 7 hereinbefore referred to is substantially concentric to this sleeve 8.

The sleeve 8 is of a length to extend a material distance outwardly beyond one of the plates 3 and said extended portion is provided with a surrounding and outstanding flange 9. The sleeve 8 has a portion 10 extending outwardly beyond the flange 9 and such portion 10 is angular in cross section as particularly illustrated in Figure 5 of the drawings.

The driven member D, as herein disclosed, comprises a sprocket wheel fixed by the locking screw 11 or otherwise as may be preferred to the tubular sleeve 8 for rotation therewith.

The load member L comprises a chain which interlocks in the usual manner with the driven member D.

Snugly engaging within and disposed through

the sleeve 8 is a shaft 12. This shaft 12 is of a length to extend beyond the opposite ends of the sleeve 8 and carried by the extended end portion of the shaft 12 adjacent to the flange 9 of the sleeve 8 is a ratchet wheel 14 of desired radius. The shaft 12 is at the axial center of the ratchet wheel 14 and said shaft 12 is provided therethrough with an axial bore 15 which is continued through the axial center of the wheel 14. The wheel 14 is provided with an inwardly disposed peripheral flange 16. The inner surface of the flange 16 is provided thereacross at circumferentially spaced points with the outstanding ribs 17 which are received within the properly positioned recesses 19 in the peripheral portions of the friction discs 20. Each of these discs 20 is provided with a central opening 21 of a diameter to permit the disc 20 to freely surround the extended portion 10 of the sleeve 8.

Alternating with the discs 20 are the discs 22. Each of these discs 22 is provided with a central opening 23 conforming to the cross sectional configuration of the portion 10 of the sleeve 8 and through which said portion 10 is snugly engaged. It is, therefore, believed to be apparent that the discs 22 are locked to the sleeve 8 for rotation therewith and it is to be particularly noted in Figure 3 of the drawings that the diameter of the discs 22 is such as to have their peripheries terminate inwardly of the ribs 17.

The shaft 12 is also of a length to allow the same to have endwise movement so that the alternating discs 20 and 22 may be caused to have frictional contact under varying tensions or to be so sufficiently free of each other to permit rotation of the sleeve 8 upon the shaft 12 independently of the shaft 12. It is believed to be obvious that by drawing the ratchet wheel 14 toward the clutch flange 9 the discs 20 and 22 will be brought into such frictional engagement to assure the rotation of the shaft 12 and the sleeve 8 as a unit, or that said frictional contact between the discs 20 and 22 can be so regulated and modified to allow control rotation of the sleeve 8 around the shaft 12.

The end portion of the shaft 12 remote from the ratchet wheel 14 threads through a nut 24 which has close contact with the adjacent end of the sleeve 8. The nut 24 is maintained against outward movement on the shaft 12 upon rotation of the nut 24 by a loop bracket 25 suitably anchored to the outer face of the adjacent plate 3. By having the nut 24 held against movement lengthwise of the shaft 12, rotation of such nut 24 will result in endwise movement of the shaft 12 with corresponding movement of the ratchet wheel 14 whereby the action of the discs 20 and 22 is regulated and controlled.

The loop bracket 25 is provided with an opening 26 through which is freely directed a cylindrical sleeve 27. This sleeve 27 is provided in the outer portion of its wall with the openings 28 through which a suitable implement may be inserted to facilitate the desired rotation of the nut 24. It is to be stated, however, that in many instances this sleeve 27 may be grasped by the fingers of a hand.

Extending through the bore of the shaft 12 is a bolt 29, the head 30 of which is within the sleeve 27. Interposed between this head 30 and the adjacent end of the shaft 12 is a washer 31. This washer 31 is of a diameter in excess of the adjacent threaded end portion of the shaft 12 so that the peripheral portion of said washer 31 will contact with the outer face of the nut 24

and thus limit the extent of movement of the ratchet wheel 14 away from the flange 9.

The bolt 29 has its free end extending beyond the ratchet wheel 14. The outer face of the ratchet wheel 14 in its central part is formed to provide a circular post *a* which affords a mounting for one of the arms 32 of the ratchet lever R. A second arm 33 of this lever R is freely engaged with the sleeve 8 between the flange 9 and the adjacent plate 3. The arms 32 and 33 rotatably support therebetween a pawl 34 which is constantly urged in a well known manner toward the teeth 35 of the ratchet wheel 14 by a suitably mounted spring 36. The teeth 35 of the wheel 14 and the pawl 34 are so arranged that upon downward swinging movement of the lever R the wheel 14 may be caused to intermittently rotate. It is believed to be obvious that upon upward swinging movement of the lever R the pawl 34 will readily ride over the teeth 35. Also coacting with the teeth 35 of the wheel 14 is a holding pawl 37 constantly urged toward the wheel 14 by the suitably mounted spring 38. As is believed to be obvious, this pawl 37 provides means to lock the wheel 14 against reverse or anti-clockwise rotation.

The bolt 29 is held in applied position by a conventional nut 39 which threads upon the bolt 29 outwardly of the ratchet wheel 14. Interposed between this nut 39 and the wheel 14 is a washer 40. This washer is of such diameter as to overlie the portion of the lever arm 32 which is operatively engaged with the ratchet wheel 14 whereby said arm 32 is maintained in desired working position.

The prop P, as herein disclosed, comprises two elongated sections 41 and 42 telescoping one within the other. The lower section 41 of the prop P has its outer end freely connected, as at 43, with a base plate 44. The upper section 42 is provided therealong with a slot 45 having therealong spaced recesses 46 in which is selectively engaged an outstanding pin 47 carried by the section 41. This pin 47 may readily travel along the slot 45. By means of these recesses 46 and pin 47 the prop P may be varied as to length within certain limitations. It is also to be noted that by having the lower section 41 loosely connected, as at 43, with the base 44 the prop P may be angularly disposed to facilitate the proper and effective placing of the apparatus when used as a jack.

One end portion of the flexible load member or chain 11 carries a hook 48 to be engaged with the work while the opposite end portion of the member or chain 11 carries an enlargement 49 to provide means to prevent the complete withdrawal of the member or chain 11 from the driving member or sprocket.

Pivotaly connected, as at 50, with the lower extremity of the upper section 42 of the prop P are the elongated brace rods 51. These rods are preferably four in number and equidistantly spaced around the prop. These brace rods 51 provide means whereby the prop P may be effectively held in desired working position and in a manner to facilitate the operation of the apparatus as a whole.

It is believed to be obvious that with the hook 48 engaged with the work drawing of the ratchet wheel 14 toward the flange 9 will result in such frictional engagement between the discs 20 and 22 to cause the shaft 12 and sleeve 8 to rotate in unison upon manipulation of the ratchet lever R. This rotation of the shaft 12 will cause the

member or chain 11 to impose desired lift or pull upon the work. However, when it is desired to return the hook or to draw out the same for effective engagement with the work, it is only necessary to turn the nut 24 in a direction to move the ratchet wheel 14 away from the flange 9 a distance sufficient to release the discs 20 and 22 from frictional contact. After this has been accomplished the member or chain 11 may be readily and freely drawn. After the apparatus has been used to lift a load, said load can be caused to lower at desired speed as determined by the braking action afforded by the contact of the discs 20 and 22 and which contact, of course, is determined by the proper manipulation of the nut 24.

One of the plates 3 in its upper portion is provided with an outstanding pin 52 which provides a stop to be engaged by the plate 32 of the ratchet lever R to limit the extent of upward swinging movement of said lever.

From the foregoing description it is thought to be obvious that a lifting apparatus constructed in accordance with our invention is particularly well adapted for use by reason of the convenience and facility with which it may be assembled and operated, and it will also be obvious that our invention is susceptible of some change and modification without departing from the principles and spirit thereof and for this reason we do not wish to be understood as limiting ourselves to the precise arrangement and formation of the several parts herein shown in carrying out our invention in practice except as hereinafter claimed.

We claim:

1. An apparatus of the class described comprising a body having spaced walls, a sleeve rotatably supported by said walls and bridging the space therebetween, a flexible load member operatively engaged with said sleeve to impose pull upon the flexible member when the sleeve is rotated in one direction, said sleeve being of a length to extend outwardly beyond one of the spaced walls, a clutch flange carried by the extended portion of the sleeve but spaced inwardly from the adjacent end of the sleeve, a shaft freely insertible through the sleeve and extending beyond opposite ends thereof, a second clutch flange carried by the shaft at a point outwardly of the extended end of the sleeve, friction discs interposed between the flange of the sleeve and the second clutch member carried by the shaft, said discs being alternately keyed to the sleeve and second clutch member, means associated with the end portion of the shaft remote from the second clutch member for moving the shaft endwise to shift the second clutch member of the shaft toward or from the flange on the sleeve, and means for rotating the shaft.

2. An apparatus of the class described comprising a body having spaced walls, a sleeve rotatably supported by said walls and bridging the space therebetween, a flexible load member operatively engaged with said sleeve to impose pull upon the flexible member when the sleeve is rotated in one direction, said sleeve being of a length to extend outwardly beyond one of the spaced walls, a clutch flange carried by the extended portion of the sleeve but spaced inwardly from the adjacent end of the sleeve, a shaft freely insertible through the sleeve and extending beyond opposite ends thereof, a second clutch member carried by the shaft at a point outwardly of the extended end of the sleeve, friction

discs interposed between the flange of the sleeve and the second clutch member carried by the shaft, said discs being alternately keyed to the sleeve and second clutch member, means associated with the end portion of the shaft remote from the second clutch member for moving the shaft endwise to shift the second clutch member of the shaft toward or from the flange on the sleeve, means for rotating the shaft, and means carried by the said second end portion of the shaft for limiting the movement of the clutch member on the shaft away from the flange on the sleeve.

3. An apparatus of the class described comprising a body having spaced walls, a sleeve rotatably supported by said walls and bridging the space therebetween, a flexible load member operatively engaged with said sleeve to impose pull upon the flexible member when the sleeve is rotated in one direction, said sleeve being of a length to extend outwardly beyond one of the spaced walls, a clutch flange carried by the extended portion of the sleeve but spaced inwardly from the adjacent end of the sleeve, a shaft freely insertible through the sleeve and extending beyond opposite ends thereof, a second clutch member carried by the shaft at a point outwardly of the extended end of the sleeve, friction discs interposed between the flange of the sleeve and the second clutch member carried by the shaft, said discs being alternately keyed to the sleeve and second clutch member, means associated with the end portion of the shaft remote from the second clutch member for moving the shaft endwise to shift the second clutch member of the shaft toward or from the flange on the sleeve, means for rotating the shaft, and means carried by the second end portion of the shaft for contact with the adjacent end of the sleeve for limiting the extent of movement of the clutch member carried by the shaft in a direction away from the flange on the sleeve.

4. An apparatus of the class described comprising a body having spaced walls, a sleeve rotatably supported by said walls and bridging the space therebetween, a flexible load member operatively engaged with said sleeve to impose pull upon the flexible member when the sleeve is rotated in one direction, said sleeve being of a length to extend outwardly beyond one of the spaced walls, a clutch flange carried by the extended portion of the sleeve but spaced inwardly from the adjacent end of the sleeve, a shaft freely insertible through the sleeve and extending beyond opposite ends thereof, a second clutch member carried by the shaft at a point outwardly of the extended end of the sleeve, friction discs interposed between the flange of the sleeve and the second clutch member carried by the shaft, said discs being alternately keyed to the sleeve and second clutch member, means associated with the end portion of the shaft remote from the second clutch member for moving the shaft endwise to shift the second clutch member of the shaft toward or from the flange on the sleeve, the clutch member on the shaft constituting a ratchet wheel, a lever mounted for swinging movement upon the extended portion of the sleeve, and a pawl carried by the lever coacting with the ratchet wheel for intermittently rotating the shaft upon swinging movement of the lever.

5. An apparatus of the class described comprising a body having spaced walls, a sleeve rotatably supported by said walls and bridging the

space therebetween, a flexible load member operatively engaged with said sleeve to impose pull upon the flexible member when the sleeve is rotated in one direction, said sleeve being of a length to extend outwardly beyond one of the spaced walls, a clutch flange carried by the extended portion of the sleeve but spaced inwardly from the adjacent end of the sleeve, a shaft freely insertible through the sleeve and extending beyond opposite ends thereof, a second clutch member carried by the shaft at a point outwardly of the extended end of the sleeve, friction discs interposed between the flange of the sleeve and the second clutch member carried by the shaft, said discs being alternately keyed to the sleeve and second clutch member, a nut threading upon the second end portion of the shaft, a member coacting with the nut providing means in connection with the adjacent plate of the body for holding the nut substantially against movement in a direction lengthwise of the shaft, rotation of the nut imposing endwise movement on the shaft.

6. An apparatus of the class described comprising a body having spaced walls, a sleeve rotatably supported by said walls and bridging the space therebetween, a flexible load member operatively engaged with said sleeve to impose pull upon the flexible member when the sleeve is rotated in one direction, said sleeve being of a length to extend outwardly beyond one of the spaced walls, a clutch flange carried by the extended portion of the sleeve but spaced inwardly from the adjacent end of the sleeve, a shaft freely insertible through the sleeve and extending beyond opposite ends thereof, a second clutch member carried by the shaft at a point outwardly of the extended end of the sleeve, friction discs interposed between the flange of the sleeve and the second clutch member carried by the shaft, said discs being alternately keyed to

the sleeve and second clutch member, a nut threading upon the second end portion of the shaft, a member coacting with the nut providing means in connection with the adjacent plate of the body for holding the nut substantially against movement in a direction lengthwise of the shaft, rotation of the nut imposing endwise movement on the shaft, and means carried by the nut for rotating the same.

7. An apparatus of the class described comprising a body having spaced walls, a sleeve rotatably supported by said walls and bridging the space therebetween, a flexible load member operatively engaged with said sleeve to impose pull upon the flexible member when the sleeve is rotated in one direction, said sleeve being of a length to extend outwardly beyond one of the spaced walls, a clutch flange carried by the extended portion of the sleeve but spaced inwardly from the adjacent end of the sleeve, a shaft freely insertible through the sleeve and extending beyond opposite ends thereof, a second clutch member carried by the shaft at a point outwardly of the extended end of the sleeve, friction discs interposed between the flange of the sleeve and the second clutch member carried by the shaft, said discs being alternately keyed to the sleeve and second clutch member, a nut threading upon the second end portion of the shaft, a member coacting with the nut providing means in connection with the adjacent plate of the body for holding the nut substantially against movement in a direction lengthwise of the shaft, rotation of the nut imposing endwise movement on the shaft, the member coacting with the nut comprising a loop bracket, and a sleeve carried by the nut and extending out freely through said bracket to provide means for rotating the nut.

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