

May 16, 1950

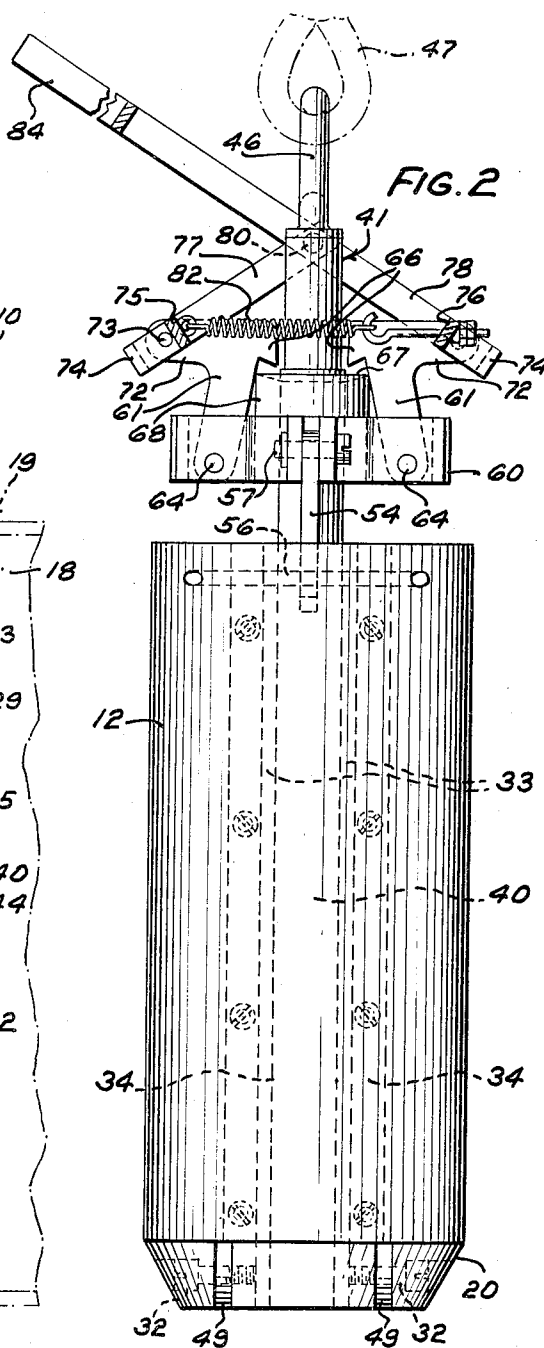
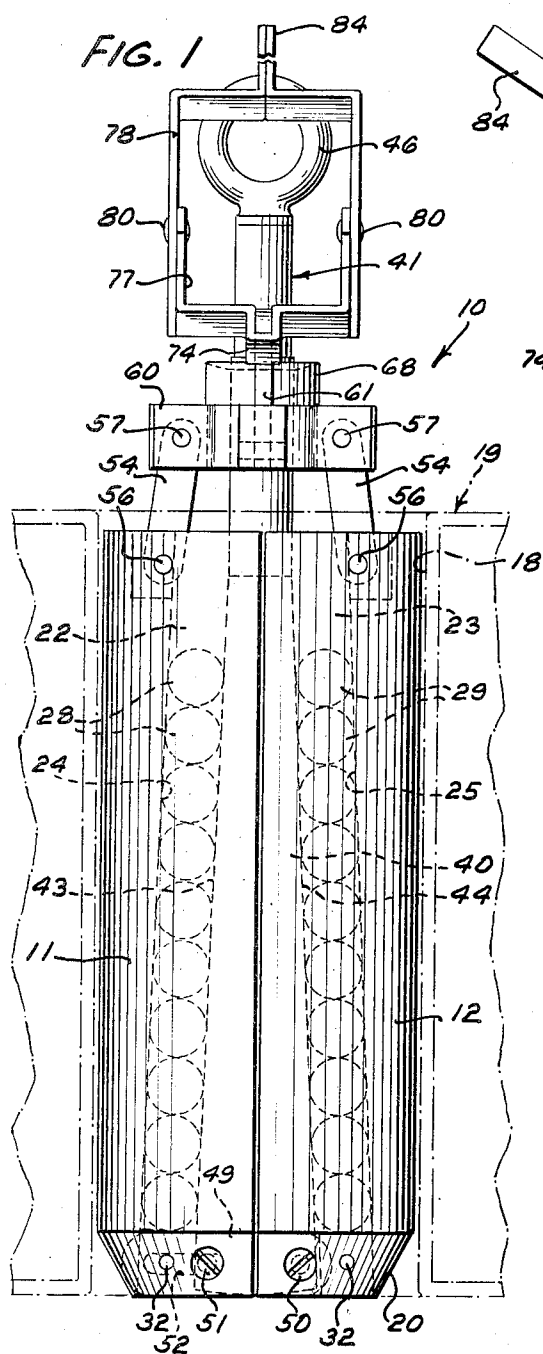
G. K. REYNOLDS

2,507,577

EXPANDING ARBOR TYPE REEL GRAB

Filed Aug. 29, 1947

3 Sheets-Sheet 1



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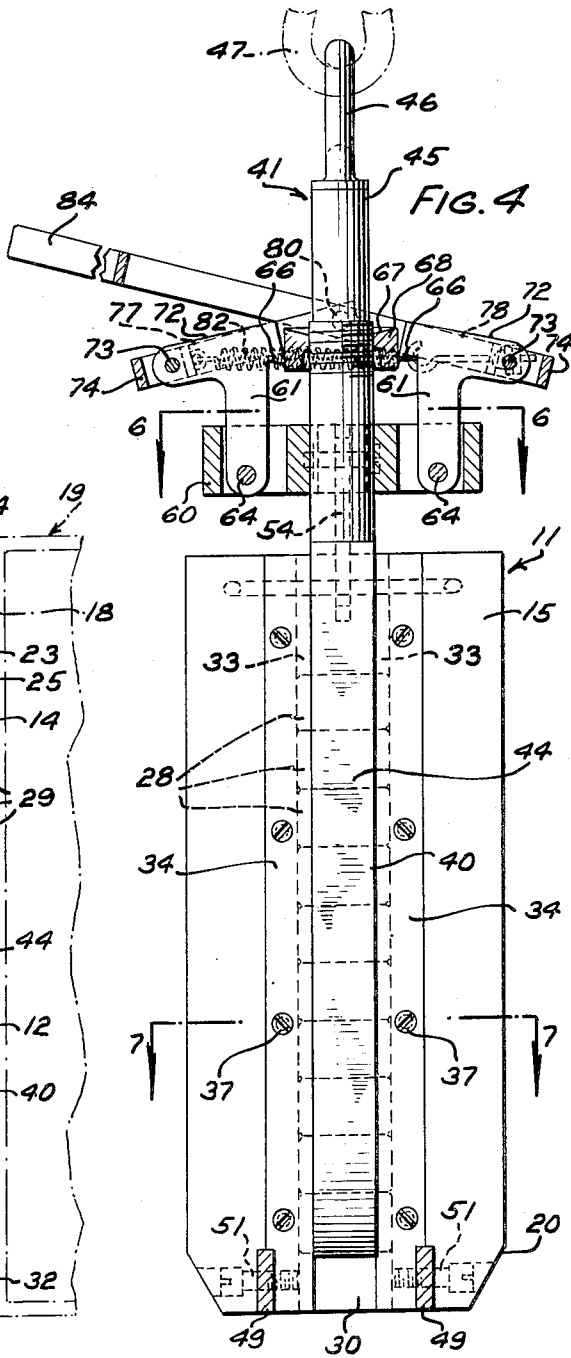
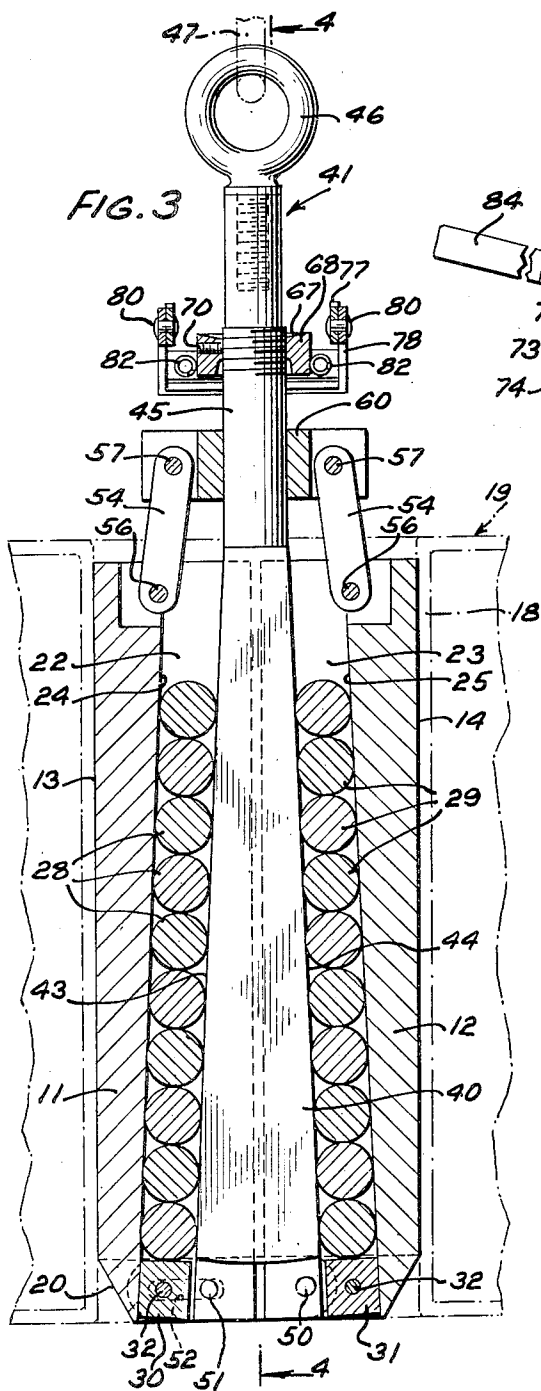
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Filed Aug. 29, 1947

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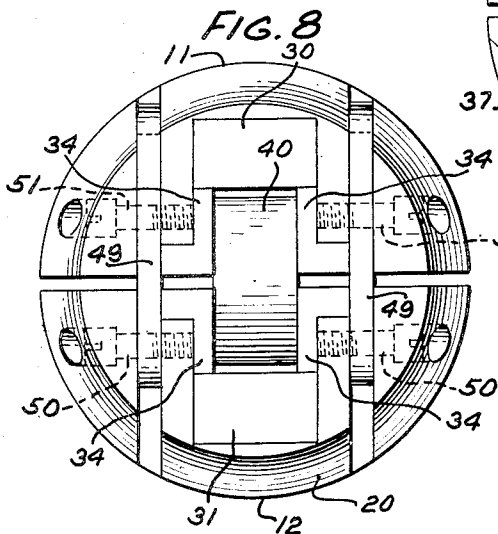
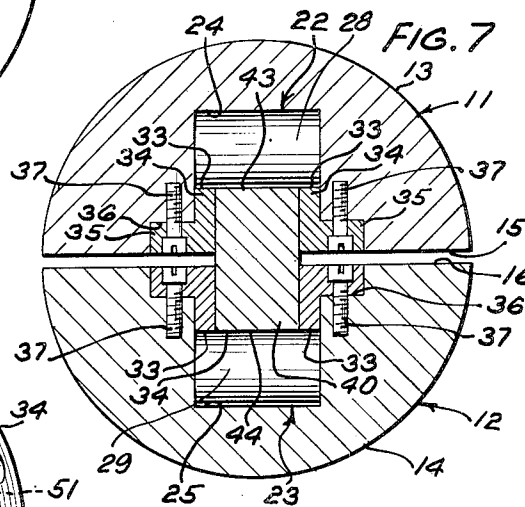
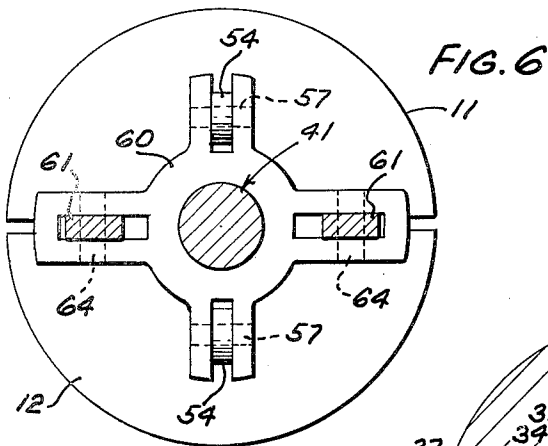
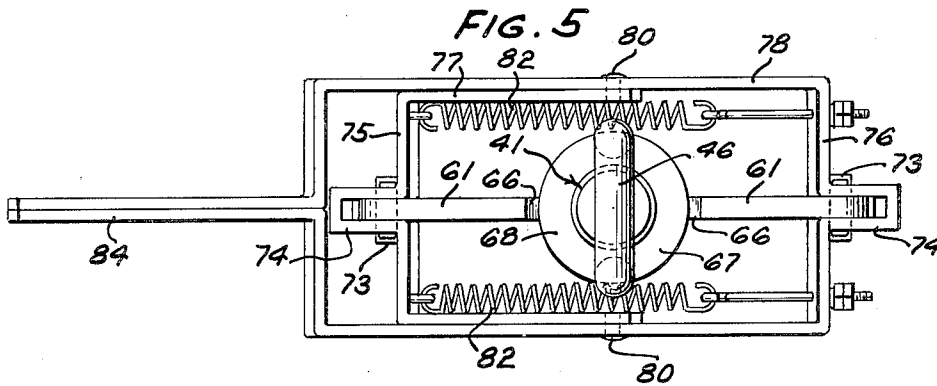
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Filed Aug. 29, 1947

3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

2,507,577

EXPANDING ARBOR TYPE REEL GRAB

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Application August 29, 1947, Serial No. 771,191

10 Claims. (Cl. 242-72)

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This invention relates to a reel grab and more particularly to an expanding arbor type reel grab to be expanded into gripping engagement with the inner surfaces of the drum of a reel.

It is an object of the present invention to provide an improved expanding type of reel grab which is readily applicable to and releasable from a reel.

In one embodiment of the reel grab to grip-
ingly engage the inner surface of the arbor aper-
ture or drum of a reel, there is provided a pair of
opposed semi-cylindrical shoes or gripping mem-
bers forming a split cylindrical bushing and hav-
ing opposed inclined recesses therein forming a
tapered aperture for receiving a tapered shank
of an arbor and a set of rollers positioned be-
tween the tapered surfaces of the arbor and the
shoes. The arbor has an eyelet at the upper end
thereof for connection to a hoist and is movable
axially relative to the shoes to cause the tapered
shank of the arbor to cam the shoes outwardly
into gripping engagement with the drum of the
reel. The arbor, when a reel it has been support-
ing is held against downward movement may be
moved downwardly relative to the shoes to re-
lease the gripping engagement between the shoes
and the drum of the reel and a latch mechanism
connected to the shoes is provided to latch onto
a collar on the arbor when the arbor has been
lowered sufficiently and thereby retain the shoes
in released or contracted position on the arbor
and permit the removal of the grab from the
drum of the reel. A latch release mechanism is
provided to release the latch mechanism from the
collar on the arbor and permit the arbor to move
upwardly relative to the shoes so that the shoes
may be expanded into gripping engagement with
the drum of a reel.

The invention will be more fully understood by
reference to the following detailed description
thereof and the accompanying drawings illus-
trating a preferred embodiment thereof in which

Fig. 1 is a side elevational view of the grab
shown in inoperative position within a reel drum
indicated in dot and dash lines;

Fig. 2 is a front elevational view of the grab in
inoperative position with a portion of the latch
release mechanism shown in section;

Fig. 3 is a vertical central sectional view
through the grab showing the grab in operative
position with the gripping members expanded
into gripping engagement with the inner surface
of the drum of the reel, which is indicated in dot
and dash lines;

Fig. 4 is a vertical central sectional view of the

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grab shown in operative position and taken on
the line 4-4 of Fig. 3;

Fig. 5 is a plan view of the upper portion of the
grab showing the mechanism in the position illus-
trated in Fig. 4;

Figs. 6 and 7 are horizontal sectional views
taken on the lines 6-6 and 7-7, respectively, of
Fig. 4; and

Fig. 8 is a bottom plan view of the grab.

Referring to the drawings, the grab 10 com-
prises a pair of semi-cylindrical gripping mem-
bers or shoes 11 and 12 having outer cylindrical
surfaces 13 and 14 (Fig. 7) and flat surfaces 15
and 16 arranged opposite each other. The shoes
11 and 12 form a split cylindrical bushing which,
as shown in Fig. 1 in unexpanded condition, is of
a diameter to fit freely within an aperture of
the drum 18 of the reel 19, to which the grab 10
is to be attached for purposes of conveying the
reel. The lower end of the split bushing is tapered,
as indicated at 20, to facilitate the entrance
of the split bushing into a reel drum aper-
ture.

Longitudinal angularly disposed recesses 22
and 23 of rectangular cross section are formed in
the shoes 11 and 12, respectively, and together
form an axially disposed tapering aperture hav-
ing oppositely inclined flat surfaces 24 and 25.
Antifriction members in the form of rollers 28
and 29 are arranged in a row in each of the re-
cesses 22 and 23 against the surfaces 24 and 25
and are retained therein against downward dis-
placement by rectangular blocks 30 and 31 se-
cured in the lower end of the recesses by pins 32.
The rollers 28 and 29 are freely rotatable and are
held against transverse displacement by the in-
clined surfaces 33 (Fig. 7) formed on retaining
members 34-34. The retaining members 34
have flanges 35 seated in laterally extending re-
cesses 36 in the shoes 11 and 12 and are secured to
the shoes by screws 37. Spaced apart from each
other on each shoe, the retaining members 34-34
serve as a guide member for laterally positioning
the lower end 40 of an arbor 41 mounted in the
tapered recess.

The lower tapered portion 40 of the arbor is
rectangular in cross section and is provided with
oppositely inclined surfaces 43 and 44 having the
same inclination as the surfaces 24 and 25 of the
recesses in the shoes 11 and 12. The upper por-
tion of the arbor forms a cylindrical post, as indi-
cated at 45, and, at its upper end, is provided with
an eyelet 46, to which may be attached a hook or
other connection 47 of a hoist or other suitable
conveying mechanism, by means of which the

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grab 10 and the reel may be raised and moved about. The arbor 41 and the shoes 11 and 12 are designed so that when the grab is lowered onto a horizontal surface, the arbor, of its own weight, moves down into engagement with the surface, as indicated in Fig. 1, and the shoes are free to move towards each other to their unexpanded or inoperative position. Upward movement of the arbor 41 relative to the shoes causes the shoes to be cammed apart by the wedge action of the arbor into operative position.

To tie the lower end of the shoes together and prevent excess separation thereof, a pair of links 49—49 are provided. The links 49—49 are disposed in slots in the shoes and are pivotally attached to the shoe 12 by pins 50 and to the shoe 11 by pins 51, which fit within the slots 52 of the links. The length of the slots 52 determines the limit movement of separation of the shoes 11 and 12.

Mechanism is provided for latching the shoes to the arbor in their unexpanded or inoperative position for movement with the arbor and comprises a pair of links 54—54 pivotally connected at one end thereof to the shoes 11 and 12 by pins 56—56 and at their other end by pins 57 to a guide member or collar 60 mounted for longitudinal movement on the arbor. Disposed at right angles to the links 54—55 on opposite sides of the arbor are a pair of latches 61—61 extending upwardly from and pivoted by pins 64—64 to the guide member 60. The latches 61—61 have inwardly directed hook portions 66 adapted, in one position of the latches 61, to be positioned in the path of longitudinal movement of and engage the upper surface 67 of a shoulder or collar 68 on the arbor 41. The shoulder 68 may be formed integrally with the arbor but preferably, as here illustrated, is formed as a collar threaded by engaging the arbor and securely anchored thereto by a set screw 70 (Fig. 3). Transverse portions 72 of the latches 61 are pivotally connected at 73 to the clevis portion 74 of the cross arms 75 and 76, respectively, of a pair of bail-shaped toggle members 77 and 78, the spaced parallel legs of which are pivotally connected to each other at 80. A pair of coiled contractile springs 82—82, connected to the cross arms 75 and 76 of the toggle members 77 and 78, stress them and the latches 61 for movement towards each other. The parallel legs of the toggle member 78 are continued to the left beyond the pivot 80, as viewed in Figs. 2, 4 and 5, to form a closed loop and terminate in an operating handle 84. When the handle 84 is moved downwardly, the toggle members 77 and 78 are operated to rock the latches 61 about their lower pivots 64 and move the hooks 66 outwardly whereby the latches 61 are moved from a latched position in engagement with or in the path of the shoulder 68, as shown in Fig. 2, to an unlatched or disengaged position, as shown in Fig. 4.

Thus, with this construction, when the grab 10 is lowered onto a horizontal surface, the shoes 11 and 12 and the arbor 41 come to rest on the surface and assume the position shown in Figs. 1 and 2 with the hooks 66 of the latches 61 moved inwardly by the springs 86 and the toggle members 77 and 78 to the latched position directly above the shoulder 68, as shown in Fig. 2. It will be seen that when the arbor 41 is raised, the hook portions 66 of the latches will engage the shoulder 68 and, in cooperation with the guide member 60 and the links 54 and 55, will connect the shoes 11 and 12 to the arbor for vertical movement therewith. The links 54 are angularly inclined relative to the axis of the grab with their lower ends,

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pivotally connected to the shoes 11 and 12, spaced apart a greater distance than their upper ends so that when the shoes 11 and 12 are freely suspended therefrom, the links cause the shoes to move inwardly toward each other to their inoperative or unexpanded position, as shown in Fig. 1.

The grab 10, in this unexpanded condition, may then be inserted in the reel drum aperture and the operating handle 84 moved downwardly to cause the toggle links 77 and 78 to move the latches 61 outwardly and disengage the hook portions 66 thereof from the shoulder 68. With the hook portions 66 and the latches 61 disengaged from the shoulder 68 of the arbor, the arbor may be raised, causing a longitudinal movement of the wedge portion 40 thereof relative to the shoes 11 and 12 and a consequent radial separating movement of the shoes into gripping engagement with the drum 18 of the reel. After the arbor 41 and the shoulder 68 thereon have moved upwardly relative to the shoes 11 and 12 and the hooked portions 66 of the latches 61, the handle 84 may be released and the latches 61 will be retained in their disengaged or unlatched position, as shown in Fig. 4, thus permitting free axial movement of the arbor relative to the shoes. With the shoes 11 and 12 in gripping engagement with the drum of the reel, a continued upward movement of the arbor will result in the upward movement of the reel, which may then be conveyed to the desired location. After the reel has been conveyed to its destination and placed on a horizontal surface and it is desired to release the grab therefrom, it is only necessary to lower the hoist to allow the arbor 41 to move downward relative to the shoes 11 and 12 to the point where the hooks 66 of the latches 61 may ride over the shoulder 68 to their latched position, shown in Fig. 2. The downward movement of the arbor relative to the shoes will release the wedging action of the arbor on the shoes and permit them to become disengaged from the surface of the reel drum 18. As the arbor 41 is again raised, the latches 61, in their latched position, act to connect the shoes 11 and 12 in their unexpanded condition to the arbor and the grab 10 may then be removed from the reel drum.

What is claimed is:

1. An expanding reel grab comprising a plurality of shoes arranged for radial movement about an axis and having outer gripping surfaces and inner axial recesses with surfaces inclined relative to said axis to form an axially tapered aperture, an arbor connectible to a conveying mechanism and having a tapered portion disposed within said tapered aperture and with inclined surfaces parallel to the inclined surfaces in said aperture formed by said shoes, anti-friction members between said inclined surfaces on said arbor and said shoes, said arbor being axially movable relative to said shoes to impart radial outward movement to said shoes, a shoulder on said arbor, latches operatively connected to said shoes and movable into engagement with said shoulder to connect said shoes to said arbor for axial movement therewith, and means for disengaging said latches from said shoulder to permit axial movement of said arbor relative to said shoes.

2. An expanding reel grab comprising a plurality of shoes arranged about a vertical axis for transverse movement relative to said axis and having outer gripping surfaces and inner inclined faces forming a tapered axially disposed aperture, an arbor connectible to a conveying mechanism and having a tapered portion axially disposed in

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said tapered aperture for axial movement relative to said shoes and having flat inclined faces parallel to the inclined faces of said shoes, anti-friction members between said inclined faces of said arbor and said shoes, latching means operable to connect said shoes to said arbor for axial movement therewith when the arbor is moved to a predetermined position relative to said shoes, and means for actuating said latching mechanism to disconnect the shoes from said arbor.

3. A reel grab comprising a pair of opposed shoes having outer gripping surfaces and inner opposed recesses with oppositely directed inclined surfaces and forming a longitudinally extending tapered aperture therein, an arbor connectible to a hoist and having a tapered portion disposed for longitudinal movement within the tapered aperture of said shoes, rollers interposed between the tapered surfaces of said recess and said arbor, a shoulder on said arbor, latch means connected to said shoes and movable into operative position in engagement with said shoulder on said arbor to connect said shoes to said arbor for movement therewith, and means for actuating said latch means to disconnect the shoes from movement with said arbor.

4. An expandable reel grab comprising a pair of shoes arranged about a vertical axis for transverse movement relative to said axis and having outer cylindrical gripping surfaces and having inner longitudinal recesses with opposed inclined flat surfaces forming an axially disposed tapered aperture, an arbor connectible to a conveying mechanism and having a tapered portion axially disposed in said tapered aperture for axial movement relative to said shoes and having flat inclined surfaces parallel to the flat inclined surfaces of said shoes, anti-friction roller members mounted between the inclined surfaces of said arbor and said shoes, a guide member mounted for axial movement on said arbor above said shoes, links pivotally connecting said shoes to said guide member, said links being angularly disposed whereby when said shoes are freely suspended by said links, they are moved toward said axis, a shoulder on said arbor above said guide member, latches pivotally connected to said guide member operable to engage said shoulder on said arbor to connect said shoes to said arbor for longitudinal movement therewith in response to a downward axial movement of said arbor to a predetermined position relative to said shoes, and actuating means for disengaging said latches from said shoes.

5. An expandable reel grab comprising a plurality of shoes arranged about a vertical axis for transverse movement relative to said axis and having outer gripping surfaces and inner axially disposed recesses with flat inclined surfaces forming a tapered axially disposed aperture, an arbor connectible to a conveying mechanism and having a tapered portion axially disposed in said tapered aperture for axial movement relative to said shoes and having flat inclined surfaces parallel to the inclined surfaces of said shoes, a plurality of rollers mounted between the inclined surfaces of said arbor and said shoes, a guide member mounted for axial movement on said arbor above said shoes, links pivotally connecting said shoes to said guide member, a shoulder on said arbor, latches pivotally connected to said guide member and operable to engage said shoulder on said arbor to connect said shoes to said arbor for longitudinal movement therewith in response to a downward axial movement of said

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arbor to a predetermined position relative to said shoes, and actuating means to disengage said latches from said shoulder.

6. An expandable reel grab comprising a pair of shoes disposed on opposite sides of a vertical axis for transverse movement relative to said axis and having semi-cylindrical outer gripping surfaces concentric with said axis and inner longitudinal recesses with opposed inclined flat surfaces forming a tapered axially disposed aperture between said shoes, an arbor connectible to a conveying mechanism and having a tapered portion axially disposed in said tapered recess for axial movement relative to said shoes and having flat inclined surfaces parallel to the flat inclined surfaces of said shoes, anti-friction roller members mounted on said shoes between the inclined surfaces of said arbor and said shoes, a guide member mounted for axial movement on said arbor above said shoes, a pair of links on opposite sides of said arbor pivotally connected at their upper ends to said guide member and pivotally connected at their lower ends to said shoes at a greater distance from said axis than said upper ends thereof whereby said shoes, when freely suspended by said links, are moved toward said axis, a shoulder on said arbor above said guide member, a pair of latches on opposite sides of said arbor pivotally connected to said guide member and operable to engage said shoulder on said arbor to connect said shoes to said arbor for longitudinal movement therewith in response to a downward movement of said arbor to a predetermined position relative to said shoes, a pair of toggle members pivotally connected to said latches and to each other to form a toggle operable for actuating said latches, spring means normally stressing said toggle members in one direction to urge said latches into engagement with said shoulder, and an operating member connected to said toggle for moving said toggle members to disengage said latches from said shoulder.

7. An expandable reel grab comprising a plurality of shoes arranged about a vertical axis for transverse movement relative to said axis and having outer gripping surfaces and inwardly directed longitudinal recesses forming an axially disposed aperture, an arbor connectible to a conveying mechanism and having inclined surfaces thereon forming a tapered portion axially disposed in said axial aperture formed by the recesses of said shoes and movable axially relative to said shoes, angularly disposed bearing means on said shoes engageable with the inclined surfaces of said arbor, a member mounted for axial movement about said arbor above said shoes and interconnected with said shoes, a shoulder on said arbor, latches pivotally connected to said member and operable to engage said shoulder on said arbor to connect said shoes to said arbor for longitudinal movement therewith when said arbor is in a predetermined position axially relative to said shoes, and means to disengage said latches from said shoulder.

8. In a reel grab, a central post for connection to a conveying mechanism, a tapered arbor connected to said central post, a pair of bushing members substantially encircling the tapered arbor and having recesses extending longitudinally thereof, rollers mounted on said bushing members in position to bear against the tapered portion of said arbor, a collar fixed to the post, a second collar slidable with respect to the post and interconnected with the bushing members,

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latching mechanism on said second collar engageable with the fixed collar for connecting the bushing members to said arbor for longitudinal movement therewith, and means for disengaging the latching mechanism from said fixed collar.

9. An expandable reel grab comprising an arbor connectible to a conveying mechanism and having the lower portion of rectangular cross section with one pair of opposite surfaces parallel and the other pair of opposite surfaces inclined to form an upwardly tapering wedge portion, a pair of opposed shoes having outer cylindrical gripping surfaces and inner longitudinal extending recesses forming an axially disposed aperture with opposed tapering surfaces for receiving the tapered portion of said arbor therein for relative movement axially and transversely thereof, rollers mounted on said shoes and engageable with the inclined surfaces of said arbor and said shoes, spaced surfaces on said shoes slidably engaging the parallel surfaces of said arbor for guiding said shoes and said arbor for relative movement parallel to said parallel surfaces, latching mechanism operable to connect said shoes to said arbor for axial movement therewith, and means for actuating said latching

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mechanism to release said shoes from axial movement with said arbor.

10. In a reel grab, a central arbor connectible to a conveying mechanism and having a tapered portion, a pair of opposed bushing members substantially encircling said arbor and having opposed recesses extending longitudinally thereof for receiving the tapered portion of said arbor, rollers mounted on said bushing members in position to bear against the tapered portion of said arbor, latching means operable to connect said bushing members to said arbor for longitudinal movement therewith, and means for actuating said latching mechanism to release said bushings from movement with said arbor.

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