

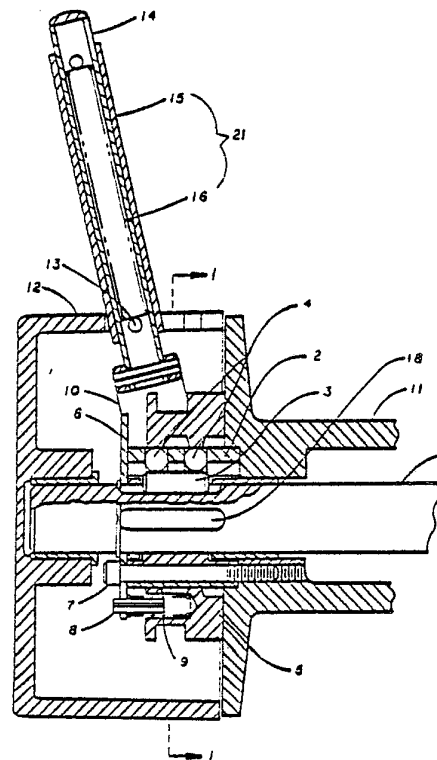


## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<b>(21) International Application Number:</b> PCT/US81/01616 <b>(22) International Filing Date:</b> 4 December 1981 (04.12.81)  <b>(31) Priority Application Number:</b> 218,349 <b>(32) Priority Date:</b> 22 December 1980 (22.12.80) <b>(33) Priority Country:</b> US  <b>(71) Applicant:</b> RAMSEY WINCH COMPANY, INC. [US/US]; 1600 North Garnett, Tulsa, OK 74116 (US). <b>(72) Inventors:</b> BALL, Harold M. ; 2705 East Jackson Place, Broken Arrow, OK 74012 (US). BEACH, Robert G. ; 1606 South 117 East Ave., Tulsa, OK 74128 (US).		<b>(74) Agent:</b> ZIMMERMAN, Ralph E.; 6216 South Lewis, Tulsa, OK 74136 (US).  <b>(81) Designated States:</b> AT, AU, BR, CH, DE, DK, FR (European patent), GB, JP, NO, SE, SU.  <b>Published</b> <i>With international search report.</i>

**(54) Title:** A WINCH CLUTCH**(57) Abstract**

A winch clutch which comprises a cable drum (11), a power shaft (1) with at least four slots (18) spaced equidistant apart on the surface of the said power shaft (1); a cylindrical clutch (2) having a bore, the said cylindrical clutch (2) fitting around the said power shaft (1); four dowel pins (3) spaced equidistantly and being located in the inner surface of the said cylindrical clutch (2); a clutch locking ring (5) in assembly with steel balls (4), the said clutch locking ring (5) being actuated by movement of a shifting yoke (10) acting against a set springs (9) and moving said clutch locking ring (5) causing the said steel balls (4) to move the said dowel pins (3) into the said slots (18) in the said power shaft (1).



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Description  
A Winch Clutch

Background Art

This invention relates to an improvement in the structure  
5 of a winch clutch and provides locking means which operates  
with assurance of safety in winch operation.

The patent to White 1,163,386, issued December 7, 1915,  
shows a clutch which operation is powered through a worm gear  
10 attached to a shaft 2 with friction disks 22 as driving  
disks, and disks 20 as the driven disks. . Contact between  
22 and disks 20 is accomplished by shifting a movable control  
device which through rolling members forces the disks 20 and  
22 into contact with each other. Applicant does not use disks  
as a means of clutching. The means of clutching used by  
15 applicant are not suggested or disclosed by White.

The patent to Dodge, 2,735,528, issued February 21, 1956  
shows tooth clutch structure which enables the transmission  
of power in shiftable gear transmission for engaging and dis-  
engaging under variable driving conditions producing different  
20 driving ratios. Balls 24, Fig. 1 and Fig. 4, are useful in  
the movement of shaft collar 28 when shifting the transmission  
in and out of gear. This structure is entirely different  
from the structure disclosed by the applicant.

The patent to Wolf, 2,639,015, issued May 19, 1953, shows  
25 a cam operated clutch which is spring loaded. The high  
clamping force is created by forcing steel balls radically  
inward into tapered slots forcing the movement of clamping  
plate 16, Fig. 4 against sheave 14 which engages plate 12.

This functions entirely different from the invention  
30 concept shown herein as will be disclosed in the following  
paragraphs.

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### Summary of the Invention

The present invention presents a new and novel clutch operation in a winch assembly. This clutch assembly includes locked features which heretofore have not been used in a 5 winch clutch assembly. The features incorporated in this clutch locks the cable drum shaft directly in the power shaft.

The shifting spring loaded clutch handle travel is controlled by a two position locking device which locks the clutch 10 in either a disengaged or engaged position so that the mode of operation can only be changed by lifting the locking pin on the shifting clutch handle from an engaged position to a disengaged position or visa versa. However, the operation of this winch clutch is not confined to the handle herein described. Novelty 15 is noted in the engaging means between the power shaft and the cable drum wherein the shifting and movement of the steel dowel pins locks the power shaft with the cable drum to make a positive secure connection between the power shaft and the cable drum. This is accomplished when the steel dowel pins 20 fall into slots in the power shaft by movement of the clutch handle from position second to position first. The clutch handle movement causes steel balls to place the steel dowel pins to rest in the slots in the power shaft. The clutch handle is locked in an engaged position (first) and held in 25 that first position by a locking pin. To disengage the clutch, the clutch handle is unlocked, by raising the locking pin located on the clutch handle and moving it to position second which locks the clutch handle securely in this position.

### Brief Description of the Drawings

30 Figure 1 is a partial cross-sectional view of the winch clutch assembly.

Figure 2 is a cross-sectional side view of the winch clutch assembly in engaged position.

Figure 3 is a cross-sectional side view of the winch 35 clutch assembly in a disengaged position.

Figure 4 is a top view of the clutch assembly which shows the locking pin in a disengaged position.

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### Description of the Preferred Embodiment

Figure 1 shows a partial cross-sectional view of the clutch winch in engaged position. The clutch 2 holds four steel dowel pins 3 and eight steel balls 4 in assembly 5 comprising four groups containing one steel dowel pin 3 and two steel balls 4 each. The clutch locking ring 5 with two grooves on the inner surface moves over the surface of the clutch 2. The retainer plate 6 is used to mount eight screws 7 which attach the clutch 2 to the cable drum 11, Fig. 2. 10 A guide post 8 is also assembled on the retainer plate 6 and is useful for aligning springs 9, Fig. 2. Yoke 10 is mounted at pivot point 17 and 17' and moves in a groove at positions 22 and 22' in clutch locking ring 5. The yoke 10 is pivotly attached to body 12 and 17 and 17'. Locking pin 13 is shown 15 in place attached to movable outer tube 15 which is part of the shifting handle made up of inner tube 14, Fig. 2 and the movable outer tube 15. Outer tube 15 which is spring loaded moves in an up and down direction.

Figure 2 which is a cross-sectional view of the clutch 20 assembly in an engaged position. The clutch enclosure case 12 which holds the complete clutch assembly supports one end of the power shaft 1. Clutch 2 which holds eight steel balls is shown as 4 and four steel dowel pins is shown as 3 in the assembly. As stated in the preceding paragraph, retainer 25 plate 6 with eight cap screws 7 hold clutch 2 attached to cable drum 11. See Figures 1, 2 and 3. Guide post 8 supports a spring 9 which is located in a hold in the clutch locking ring 5. Shifting handle 21 is shown in the engaged position in Figure 2. Sliding clutch locking ring 5 has moved into 30 position moving steel balls 4 and steel dowel pins 3 from an upper position as shown in Figure 3 to a lower position as shown in Figure 2. The steel dowel pins 3 are shown resting in slot 18 which locks power shaft 1 tightly to clutch 2 which is attached to cable drum 11; locking pin 13 shown in Figure 35 4 is shown on shifting handle 21, Fig. 2. The outer tube of shifting handle 21 is shown as 15, spring 16 is located

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within the inner tube of shifting handle 21.

Figure 3 is a cross-sectional view of the clutch winch in a disengaged position. The component parts are identical to the parts shown in Figure 2. The shifting handle 21 is shown in a disengaged position in Figure 3. In this view the steel balls 4 have moved into the grooves in the clutch locking ring 5 and the steel dowel pins 4 have moved out of the slots 18 in the power shaft 1. The cable drum 11 is shown disconnected in Figure 3 and is free to rotate.

Figure 4 is a partial top view of the housing 12 showing the engaged and the disengaged slots 19 and 20 in the top structure of housing 12. The slots are numbered 19 (engaged) and 20 (disengaged). The position locking pin is shown in engaged position.

#### 15 Operation of the Winch Clutch

The winch clutch should be in position as shown in Figure 3. The power shaft 1 is set into rotation, the spring loaded outer tube 15 in the shifting handle 21 is raised to get the locking pin 13 unseated from position 20, Fig. 4.

The shifting handle 21 is manually moved to position 19, Fig. 4. At the same time yoke 10, Fig. 1 which fits into a slot in the clutch locking ring 5 moves the clutch locking ring 5 into position shown in Figure 2. As the handle is moving from position 19, Fig. 4, power shaft 1 is rotating. To place the dowel pins 3, Fig. 2 into the slots in power shaft 1 requires manual pressure on the yoke 10, Fig. 1 which moves the clutch locking ring 5, Fig. 2 over the shifting surface of clutch 2, Fig. 2. The clutch locking ring 5, Fig. 2 exerts pressure on the steel balls which in turn force the dowel pins 3 into a locked position as shown in Figure 2. The clutch is now in engaged position. To disengage the winch clutch assembly, raise outer tube 15 in shifting handle 21 to release locking pin 13, shift to position shown in Figure 3. In the position cable drum 11 is disconnected from power shaft 1.

Although I have described only a typical preferred form and application of my invention, the invention should not be limited or restricted to specific details herein set forth, but I wish to reserve to myself any variations that may fall  
5 into the scope of the following claims:



## Claims

1. In a winch, a clutch assembly comprising a housing, a power shaft having four slots spaced equidistantly on the surface of the said power shaft, a cylindrical clutch having  
5 a retainer plate mounted on one end of the said cylindrical clutch with at least one dowel pin and at least two steel balls located in said cylindrical clutch, the said cylindrical clutch being attached to a cable drum; a cylindrical clutch locking ring having a pair of grooves therein, being slidably  
10 mounted around the said cylindrical clutch, the said cylindrical clutch locking ring being actuated by a yoke pivotally mounted on the clutch housing; the said yoke being attached to a clutch handle.

2. The clutch assembly as claimed in claim 1 wherein  
15 the clutch handle comprises an inner tube, an outer tube, with a spring mounted within the inner tube against a clutch position pin, the said spring acting to maintain the said clutch position pin in a slot in the said casing of the said clutch assembly.

20 3. The clutch assembly as claimed in claim 1 wherein the said sliding movement of cylindrical clutch locking ring is motivated by at least two springs mounted in the said retainer plate.

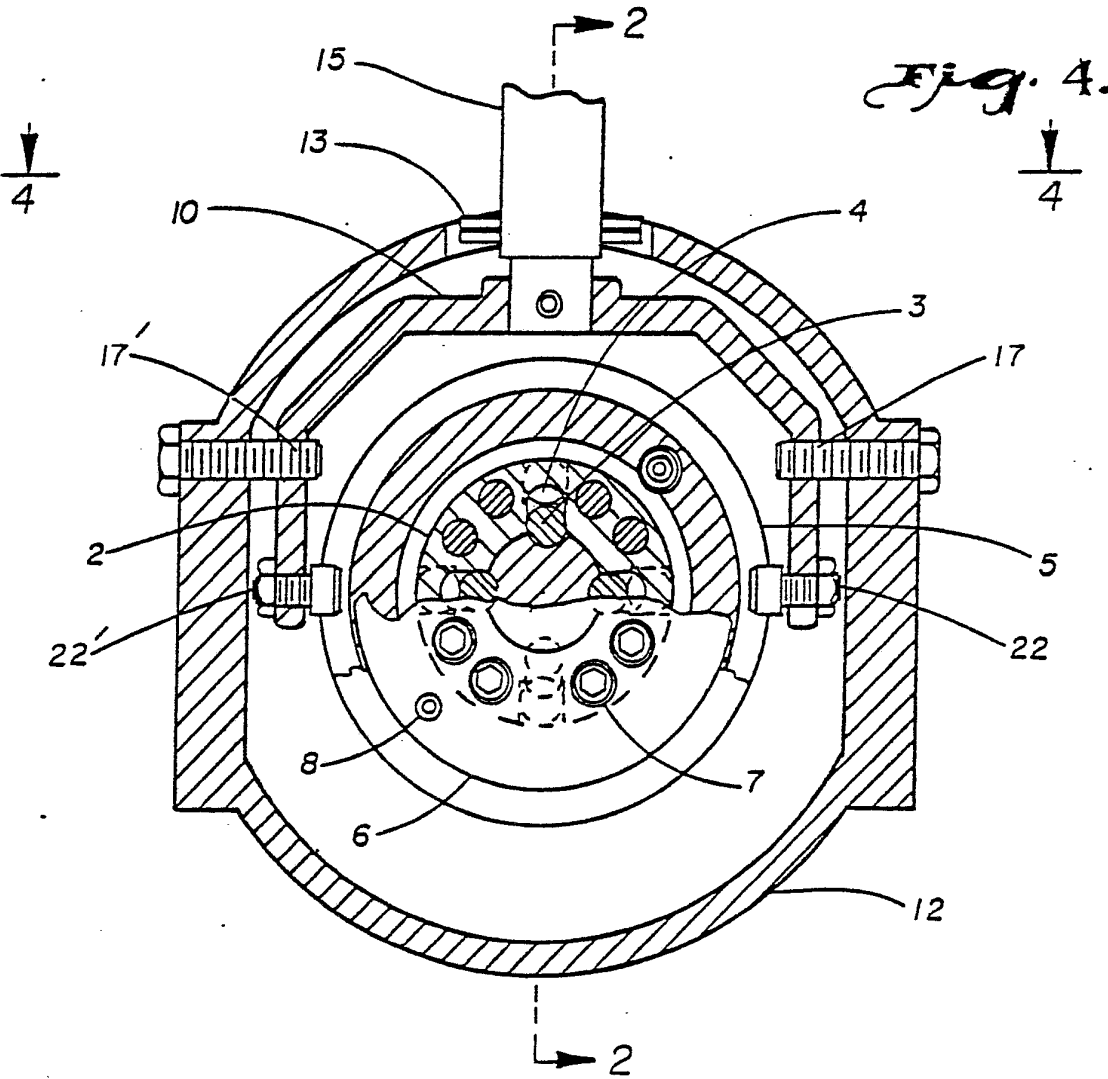
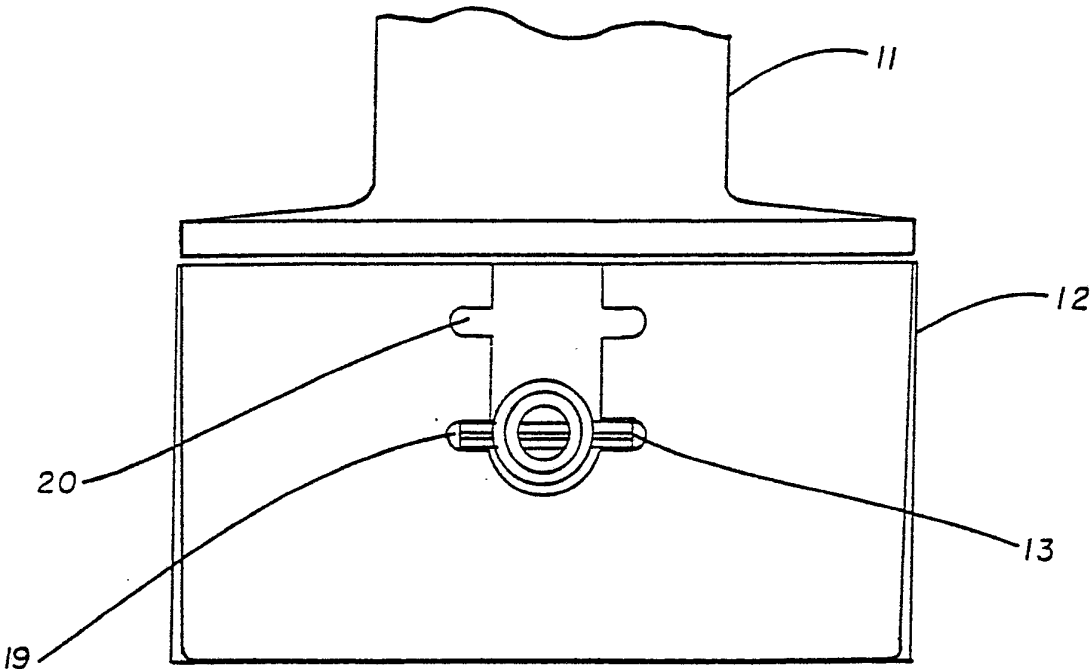
4. The clutch assembly as claimed in claim 1 wherein  
25 the said cylindrical clutch is held attached to the said cable drum by the said retainer plate supported by at least two screw caps.

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1 / 3



2 / 3

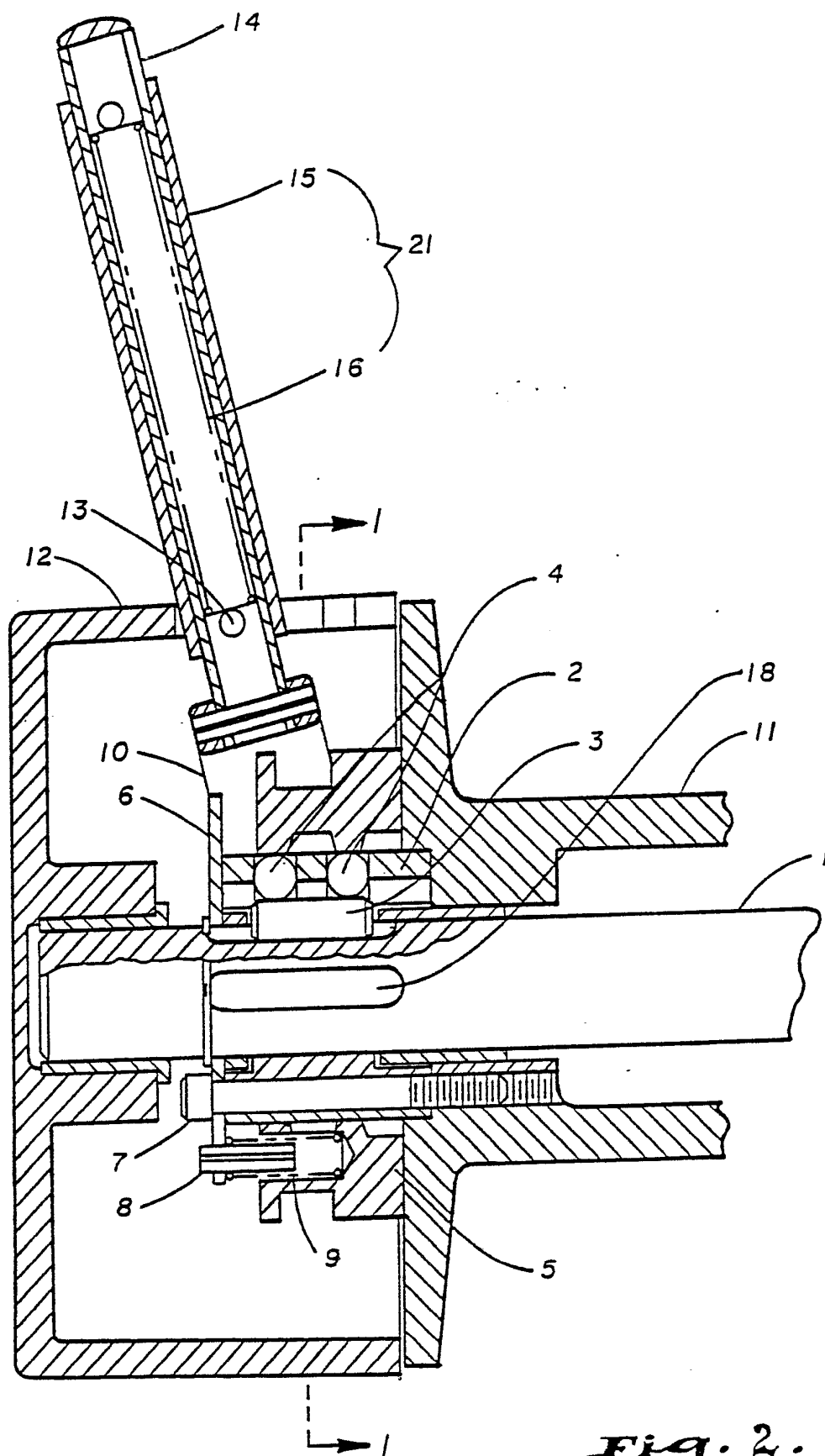


Fig. 2.

3 / 3

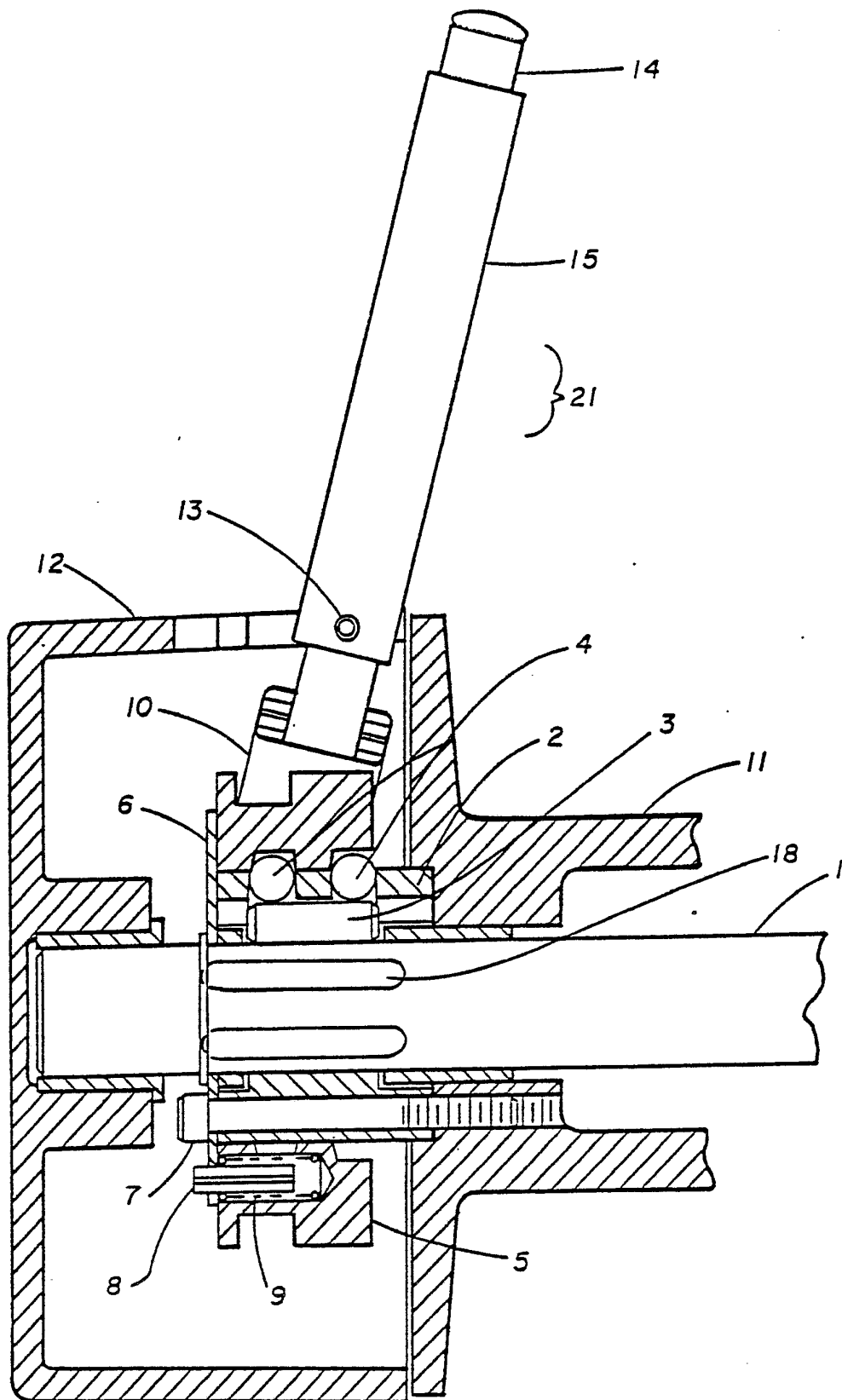
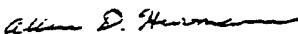


Fig. 3.

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 81/01616

<b>I. CLASSIFICATION OF SUBJECT MATTER</b> (If several classification symbols apply, indicate all) <sup>1</sup>		
According to International Patent Classification (IPC) or to both National Classification and IPC Int. Cl. <sup>3</sup> F16D 11/12, B66D 1/00 U.S. Cl. 192/71, 93C 254/370		
<b>II. FIELDS SEARCHED</b>		
Minimum Documentation Searched <sup>4</sup>		
Classification System	Classification Symbols	
U.S.	192/71, 93C 254/309, 355, 370	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched <sup>5</sup>		
<b>III. DOCUMENTS CONSIDERED TO BE RELEVANT</b> <sup>14</sup>		
Category <sup>6</sup>	Citation of Document, <sup>15</sup> with indication, where appropriate, of the relevant passages <sup>17</sup>	Relevant to Claim No. <sup>18</sup>
A	US, A, 1,380,917, Published 07 June 1921, McCarrell	
A	US, A, 1,590,304, Published 29 June 1926, McCarrell	
A	US, A, 2,498,399, Published 21 February 1950, Dodge	
A	US, A, 1,808,770, Published 09 June 1931, Edwards	
A	US, A, 2,379,320, Published 26 June 1945, Sprake	
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p><sup>16</sup> Special categories of cited documents:</p> <p>"A" document defining the general state of the art</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document cited for special reason other than those referred to in the other categories</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> </div> <div style="width: 45%;"> <p>"P" document published prior to the international filing date but on or after the priority date claimed</p> <p>"T" later document published on or after the international filing date or priority date and not in conflict with the application, but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance</p> </div> </div>		
<b>IV. CERTIFICATION</b>		
Date of the Actual Completion of the International Search <sup>2</sup>		Date of Mailing of this International Search Report <sup>3</sup>
05 February 1982		04 MAR 1982
International Searching Authority <sup>1</sup>		Signature of Authorized Officer <sup>10</sup>
ISA/US		 A. D. Herrmann