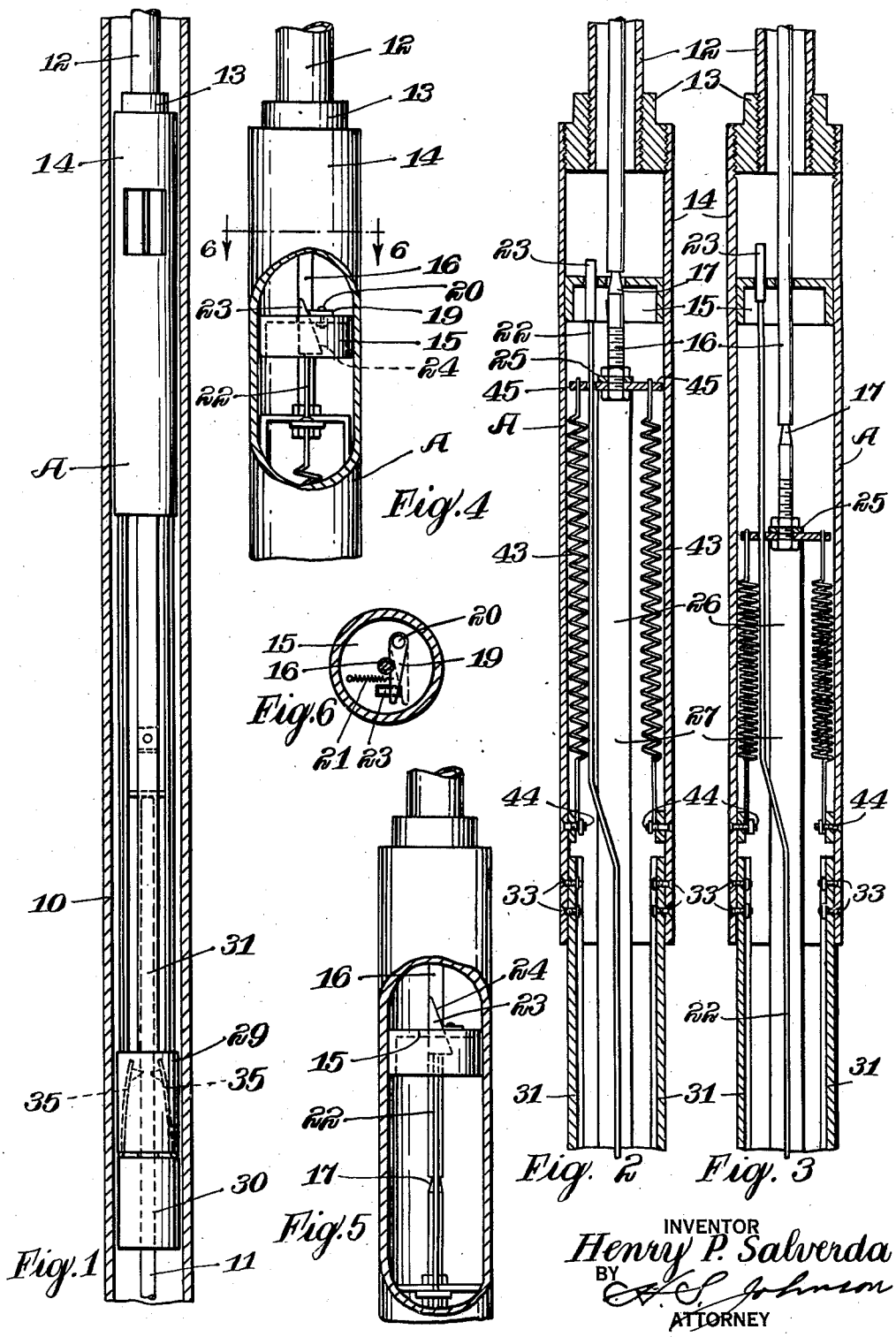
April 3, 1945. H. P. SALVERDA 2,373,081

PUMP ROD EXTRACTING DEVICE

Filed Nov. 26, 1941 2 Sheets-Sheet 1



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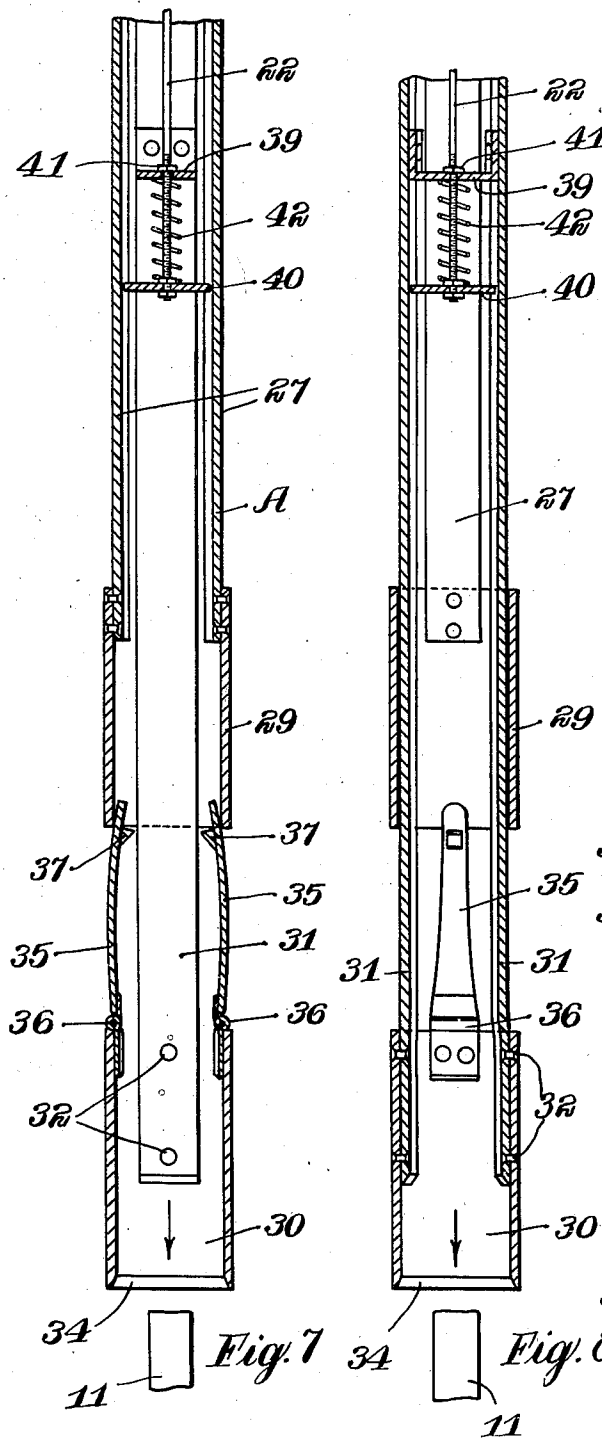


Fig. 7

Fig. 8

Fig. 9

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PUMP ROD EXTRACTING DEVICE

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5 Claims. (Cl. 294—100)

My invention relates to an improvement in pump rod extracting device, wherein it is desired to provide an apparatus capable of removing broken plungers of pumps and the like.

I have found that when they are in constant use, the pump rods or plunger rods of pumps occassionally become broken. It is extremely difficult to extract the lower end of the broken rod together with the plunger. Often the rod becomes broken many feet below the surface of the ground and without pulling out the entire pipe casing, it is difficult to grasp the plunger rod to extract the same.

It is the object of my invention to provide a device which may be inserted into the plunger casing and which may extend thereinto to any desired depth. This device will embrace the upper end of the broken portion of the pump rod and will engage the same so that the plunger and broken pump rod end may be extracted.

A feature of the present invention lies in the provision of a device which is designed to fit within the well casing and which slides downwardly therein until it comes in contact with the upper end of the broken-off pump or plunger rod. The device will guide the broken end of the plunger into my extracting device and into position where the plunger rod is firmly gripped.

It is an object of the present invention to provide a substantially hollow cylindrical shell or sleeve at the lower end of the extracting device so as to guide the broken end of the pump rod between a series of gripping means. When the broken end of the pump rod is between the gripping means, these means act to grip the rod so that the plunger and broken end of the pump rod may be extracted from the well casing together with the extracting device.

A feature of the present invention resides in the provision of a trigger device which acts to operate the gripping means when the pump rod is in proper position. This trigger means is so arranged as to be actuated by the broken end of the pump rod itself, and the construction is such that the pump rod must be in position between the gripping means before the trigger is actuated. Thus the pump rod must be in position to be gripped before the gripping means may take effect and proper operation of the device is insured.

A feature of my invention resides in the fact that the device may be very easily accommodated for a pump casing of any desired size. It is desirable to have the sleeve at the lower end of the gripping device of proper size to fit within the pump casing and my construction is such that the lower end of the device may be changed so that sleeves of different diameters may be used in combination with the device. As a result my mechanism will operate successfully on well casings of any size within reasonable limits.

It is a feature of the present invention that my extracting device will operate successfully irrespective of the shape of the pump rod being extracted. My device will operate whether the pump rod is round or square and will effectively grip the same for extraction purposes.

These and other objects and novel features of my invention will be more clearly and fully set forth in the following specification and claims.

In the drawings forming a part of my specification:

Figure 1 is a longitudinal section through a pipe well casing showing my extracting device positioned therein.

Figure 2 is a longitudinal section through the upper portion of the extracting device in the position that the parts would assume as the extractor was inserted into the well casing.

Figure 3 is a view similar to Figure 2 showing the parts of the extractor in the position they would assume when the pump rod was being gripped for extraction purposes.

Figure 4 is a side elevation view of a portion of the upper part of the extractor, a portion of the casing thereof being broken away.

Figure 5 is a view similar to Figure 4 showing the elements in a different relative position.

Figure 6 is a cross-sectional view through the extractor casing, the position of the section being indicated by the line 6—6 of Figure 4.

Figure 7 is a longitudinal section through the lower portion of the extractor.

Figure 8 is another longitudinal section through the lower portion of the extractor, the section of Figure 8 being taken on a plane at right angles to that of Figure 7.

Figure 9 is a vertical section similar to Figure 7 showing the relationship of the parts when the pump rod is being gripped for extraction purposes.

The well may be of any desired type and is usually provided with an outer cylindrical casing 10 which may be of pipe or other suitable material. A pump rod 11 is reciprocable within the pipe 10 and usually supports a plunger or piston at the bottom end thereof. From time to time these pump rods or plungers become broken in use and it becomes necessary to extract the portion remaining in the pipe casing, after the at-

tached part at the top of the casing has been removed. It is for this purpose that the extracting device A has been designed.

The extracting device indicated in general by the numeral A is supported by means of a pipe or rod 12 which may be formed in sections so that any desired number of sections may be added to lower the extractor A to the proper depth. The rod or tube 12 is secured through a reducer or reducing coupling 13 to the upper hollow cylindrical body 14 as best shown in Figures 1, 2, and 3 of the drawings. This upper hollow body 14 may be of any desired diameter but is preferably of a diameter which will readily fit within the pump casing 10.

Within the body 14, I provide a partition 15 which forms a bearing for a slidable rod 16. This rod 16 is provided with a notch 17 therein so shaped that it may be retained in elevated position by a trigger arm 19. The trigger arm 19 is pivoted at 20 to the partition 15 and is biased toward the rod 16 by a spring 21. The spring 21 draws the trigger arm 19 into the notch 17, and as long as the trigger is in engagement therewith, the rod 16 is held in the elevated position illustrated in Figure 2 of the drawings. As soon as the trigger 19 is released from the notch 17, however, the rod 16 will slide downwardly as will be later described.

A trigger rod 22 is provided to release the trigger 19. This trigger rod 22 is provided with a wedge-shaped end 23 thereupon which engages the trigger 19 and pivots the same out of the notch 17. With special reference to Figures 4 and 6, it will be noted that as the trigger rod 22 is elevated so that the cam 23 moves upwardly from the position shown in Figure 4, the cam surface 24 will engage against the trigger 19 and swing it in a counter-clockwise position into the position shown in dotted outline in Figure 6 of the drawings.

The lower end of the slidable rod 16 is bolted to the closed end 25 of an inverted U-shaped bracket 26. This bracket 26 is provided with downwardly extending bracket arms 27 which extend within a sleeve 29 and are secured thereto. Thus as the rod 16 slides downwardly through the partition 15, the sleeve 29 slides downwardly with respect to the body portion 14.

A sleeve 30 is secured by arms 31 to the body 14. These arms 31 are secured by bolts or rivets 32 to the sleeve 30 and are secured by bolts 33, or other suitable means, to the body 14. Thus the sleeve 30 is held in definite fixed relation to the body 14, while the sleeve 29 is slidable toward or away from the sleeve 30. The lower end of the sleeve 30 is usually beveled as illustrated at 34, so that a pump rod within the casing 10 can be readily guided into the sleeve 30.

A pair of gripping arms 35 are pivotally secured by hinges 36 to the upper extremity of the sleeve 30. These gripping arms 35 are preferably provided with teeth 37 so as to present a gripping surface to the pump rod 11. In case the pump rod is formed of wood or similar material, these teeth may bite into the body of the pump rod so as to grip the same with a hold which can not be broken without splitting the material forming the rod.

The outer surfaces of the gripping arms 35 are so shaped as to be forced inwardly when the sleeve 29 is moved toward the sleeve 30. From an examination of Figures 7 and 9, it will be apparent that as the sleeve 29 moves downwardly the inner surface of this sleeve engages the outer surface of the gripping arms 35, urging them inwardly into contact with the pump rod 11. Thus as the sleeves 29 and 30 are moved together the pump rod within the sleeves is firmly grasped by the arms 35.

Extending between the opposed arms 31, I provide a connecting member or partition 39. The lower end of the trigger rod 22 extends through this partition 39 and an enlarged disc or pressure plate 40 is secured to the lower end of the trigger arm 22. A shoulder 41, such as a nut threaded upon the trigger arm provides a stop to limit downward movement of the trigger arm 22. A spring 42 is positioned between the plate 40 and the partition 39 so as to urge the trigger arm 22 in its lower extreme position. A pair of springs 43 are provided within the upper body member 14 so as to urge the rod 16 into its lower extreme position. The lower ends of the springs 43 are secured at 44 to the casing or body 14, and the upper ends of these springs are secured to a cross member 45 which is secured to the lower end of the rod 16. In actual practice the cross member 45 may, if desired, be eliminated and the springs 43 may be connected directly to the closed end 25 of the U-shaped bracket 26. In any event the springs 43 however positioned are designed to move the bracket 26 downwardly, thereby sliding the sleeve 29 toward the sleeve 30.

In operation the sleeve 29 is manually pulled upwardly away from the sleeve 30, thus sliding the rod 16 upwardly through the partition 15. When the notch 17 comes into registry with the trigger 19 this trigger engages into the notch, being drawn into engaging position by its spring 21.

The extractor may then be inserted into the well casing 10 and sections of rod or pipe 12 may be added to form a sufficient length to lower the extractor into engagement with the broken portion of the pump rod. When the extractor comes into contact with the pump rod this rod extends into the casing, extending through the sleeves 29 and 30 until the upper extreme end thereof contacts the plate 40. Further downward movement of the extractor A will cause the pump rod 11 to compress the spring 42 and raise the trigger rod 22. In raising the trigger rod 22 the wedge-shaped cam 23 is raised, the cam edge 24 thereof engaging against the trigger 19 to pivot the same out of engagement with the notch 17. When the trigger 19 has been entirely released from the notch 17, the rod 16 will drop, as it is a part of the bracket 26 which is urged downwardly by the springs 43.

Downward movement of the bracket 26 causes relative downward movement of the sleeve 29, thus moving the sleeves 29 and 30 relatively together. As the sleeve 29 moves toward the sleeve 30 the arms 35 are pressed inwardly against the pump rod 11 and thus the pump rod is firmly gripped and locked from outward movement.

I have found in actual tests that my pump rod extracting device will engage the broken end of a pump rod with sufficient firmness to permit extraction of the same from an extreme depth. It is obvious that nothing may readily trip the trigger of my device with the exception of a member entering through sleeves 29 and 30, as the major portion of the sides of the extractor are closed by the side members 27 of the bracket 26 and by the arms 31 which support the sleeve 30.

In order that my extractor may operate suc-

cessfully on different wells and the like, it is possible to either change the size of the entire device or to change the size of the lower end of the device. By unscrewing the reducing coupling 13 the entire extractor A may be removed from the pipe 12 and this extractor may be replaced by another of larger diameter having a suitable reducing coupling to fit the threads of the pipe 12. On the other hand if it is so desired the bolts 33 may be removed and the lower end of the extractor comprising the shells 29 and 30 and the bracket arms 31 may be replaced. In such an instance it is well to have the arms 31 of the larger size of extractor bent outwardly below the position of the plate 40.

In accordance with the patent statutes I have described the principles of construction and operation of my pump rod extracting device, and while I have endeavored to set forth the best embodiments thereof, I desire to have it understood that obvious changes may be made within the scope of the following claims without departing from the spirit of my invention.

I claim:

1. An extracting device for pump rods in combination with an elongated tubular pump housing, comprising a sleeve designed to fit within said elongated housing, a hollow body member secured to said sleeve and held in spaced relation thereto, a series of gripping means secured to said sleeve, a second sleeve slidable with respect to said first sleeve and operable in one position to engage said gripping means and to force the same into contact with said pump rod, spring means urging said second sleeve into engagement with said gripping means, a trigger means holding said spring means from moving said second sleeve, and means actuated by the pump rod and engageable with said trigger means to release said second sleeve to engage said gripping means.

2. An extracting device for a pump rod in combination with an elongated tubular casing enclosing the pump rod, said device comprising an elongated body, a hollow sleeve supported by said body and designed to embrace the pump rod, gripping means secured to said sleeve, a second sleeve movable toward and away from said first named sleeve and operable in one position to move said gripping means into contact with said pump rod, resilient means urging said second sleeve into engagement with said gripping means, trigger means holding said sleeve in non-engaging position, cam means for actuating said trigger means, and means operated by said pump rod to actuate said cam means to release said trigger.

3. An extracting device for pump rods enclosed within an elongated casing, said device comprising a sleeve into which the pump rod may extend, rod gripping means secured to said sleeve, a second sleeve engaging said gripping means to move the same into contact with said pump rod, resilient means for sliding said second sleeve, a trigger for holding said resilient means from movement, cam means for releasing said trigger means, pump rod actuated means secured to said cam means for actuating the same, and supporting means for said device whereby said device may be dropped into an elongated casing into contact with said pump rod.

4. An extracting device for pumping rods enclosed within an elongated casing, said device comprising a sleeve into which the pump rod may extend, rod gripping means pivotally secured at the lower extremity thereof to said sleeve, a second sleeve slidably supported for movement toward or away from said first mentioned sleeve, said second sleeve engaging externally of said rod gripping means for pivoting said rod gripping means inwardly upon slidable movement toward said first named sleeve, spring means urging said second sleeve toward said first named sleeve, and trigger means normally holding said sleeve from movement toward said first sleeve.

5. An extracting device for pump rods enclosed within an elongated casing, said device comprising a sleeve into which the pump rod may extend, rod gripping means pivotally secured at the lower extremity to said sleeve, a second sleeve engaging said gripping means to move the same into contact with said pump rod upon movement toward said first sleeve, resilient means for sliding said second sleeve, a trigger for holding said resilient means from movement, and means engageable with the pump rod when the pump rod is positioned within said sleeves to operate said trigger.

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