Nov. 28, 1933. D. H. REED 1,936,643

OUTSIDE PIPE CUTTER

Filed Dec. 10, 1929 3 Sheets-Sheet 1

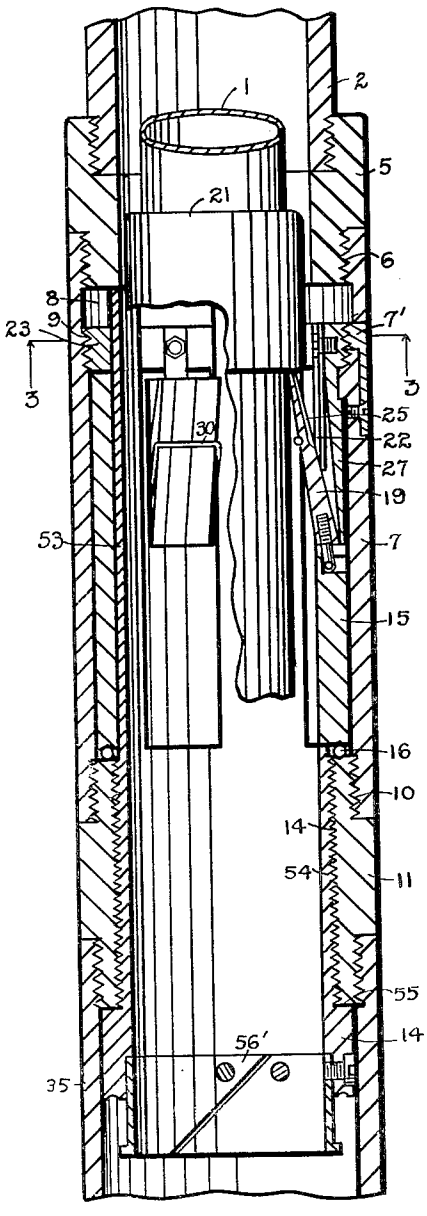

Fig. 1.

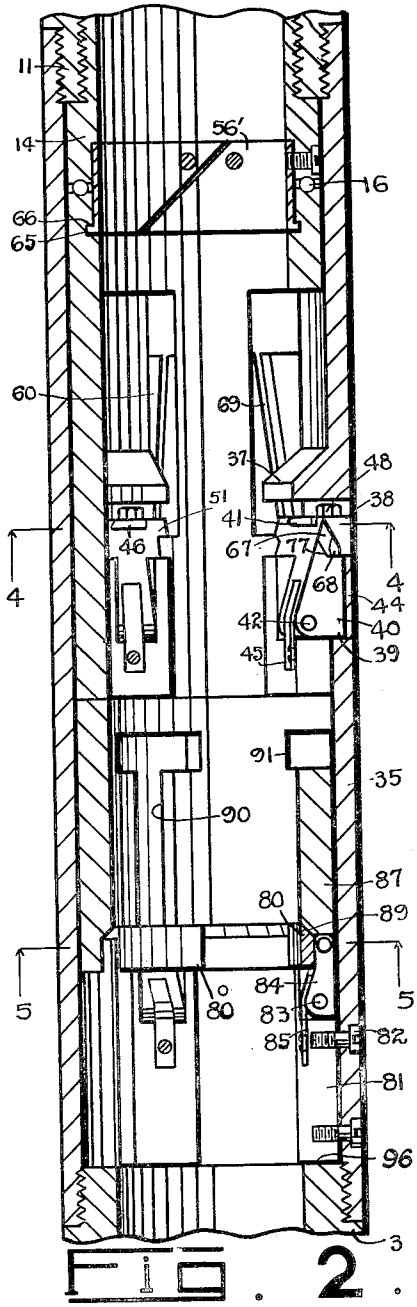

Fig. 2.

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OUTSIDE PIPE CUTTER

Filed Dec. 10, 1929 3 Sheets-Sheet 2

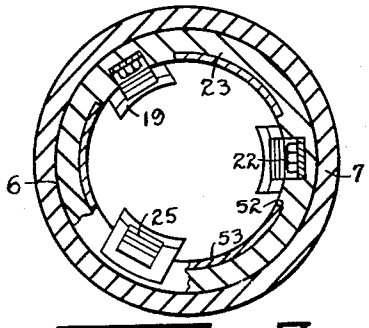

Fig. 3

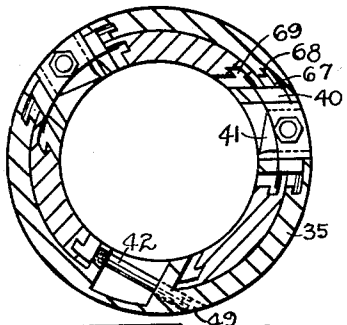

Fig. 4

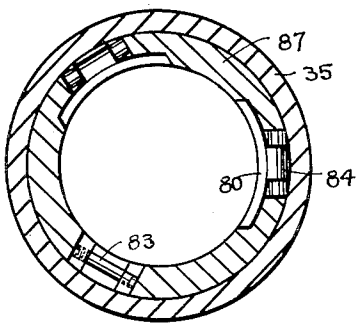

Fig. 5

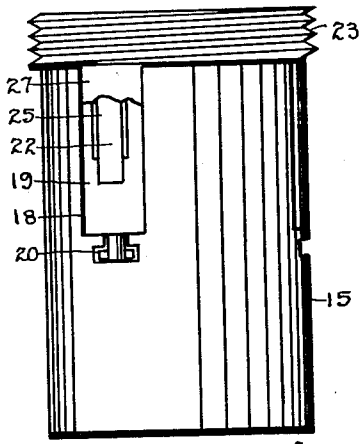

Fig 6

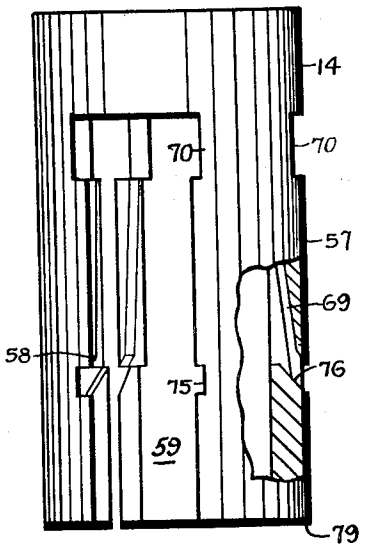

Fig. 7

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OUTSIDE PIPE CUTTER

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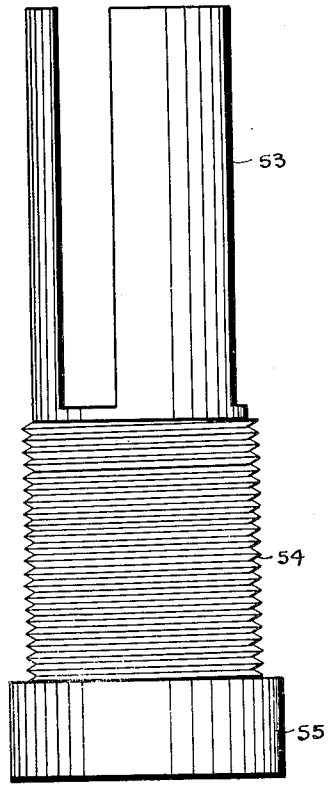

Fig. 8

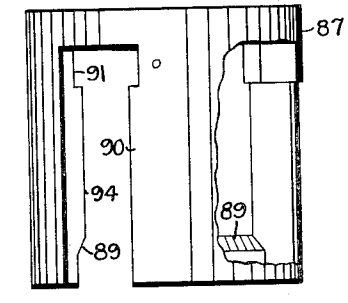

Fig. 9

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Patented Nov. 28, 1933

1,936,643

UNITED STATES PATENT OFFICE

1,936,643

OUTSIDE PIPE CUTTER

Dempson H. Reed, Houston, Tex., assignor of one-half to James S. Abercrombie, Houston, Tex.

Application December 10, 1929
Serial No. 412,984

15 Claims. (Cl. 81—189)

The invention relates to pipe cutters for cutting pipe in wells and is more specifically a cutter of this character adapted to cut the pipe from the outside.

In well drilling operations it often occurs that the drill stem or a casing of small diameter will become broken or twisted off so that a portion thereof remains in the well. When this occurs the flushing fluid, which is present in the well during the drilling operation, may congeal, or the walls of the well bore may cave in in such a manner that the removal of the casing remaining in the well cannot be accomplished. The present tool is of the type which has been devised to remove these pieces of drill stem or casing from the well by telescoping the tool over the outside of the junked pipe and severing the uppermost section therefrom. This operation may be repeated until all of the pipe or casing has been removed and the well drilling operation may then proceed or the well be abandoned.

Devices of this character have been previously devised but in most of them it is difficult if not impossible to release the pipe engaged by the cutter where it is found that it can not be removed after the pipe has been severed or it is impossible to complete the cut.

It is an object of the invention to provide an outside pipe cutter which is capable of engaging over the pipe in the well and to release such engagement if the cut cannot be completed.

Another object of the invention is to devise a pipe cutter wherein engagement is had with the pipe to be cut by means of dogs beneath a collar upon the pipe in such manner that subsequent rotation of the cutter body will sever the pipe below the collar which is being engaged.

Another object of the invention is to devise a pipe cutter which will have a positive cutting action, depending upon the amount of rotation of the cutter body.

A still further object of the invention is to devise a pipe cutter wherein the cutting action of the blades is caused by an advancing wedge which is driven by a screw thread from the cutter body.

A still further object of the invention is to devise the cutting blades in such a manner that the amount of cutting action can be determined by the number of rotations of the cutter body.

Another object of the invention is to devise a mechanism which will permit the cutting blades to rotate but will cause a wedge to be passed behind the cutter blades in order to extend them against the pipe being cut.

It is also an object to so construct the wedge members which advance the cutters that the cutters will drop back into the retracted position immediately after they reach the extended position.

It is also contemplated to provide a positive lock for the cutters to retain them in retracted position while the tool is being lowered into the well.

A still further object is to arrange a groove in the side edge of each of the advancing wedges so that the cutter is positively controlled and cannot gouge into the pipe and be broken.

Another object is to construct a set of releasable centering pawls at a point below the cut so that the cutting blades will contact the work uniformly; the pawls being arranged to be advanced by the same means as the cutting blades and to be released in somewhat the same manner.

Other and further objects of the invention will be readily apparent such as the simplicity of the device and the practical embodiments which are illustrated.

The invention will be readily understood when the following description is considered in connection with the accompanying drawings wherein

Fig. 1 is a central vertical section showing the pipe cutter body and parts thereof in section and with the junked pipe in elevation but having certain parts thereof broken away for purposes of illustration.

Fig. 2 is a view similar to Fig. 1 but showing the lower end of the tool illustrated in Fig. 1, Figs. 1 and 2 being a complete showing of the tool.

Fig. 3 is a central transverse section taken on the line 3—3 of Fig. 1.

Fig. 4 is a section taken on the line 4—4 of Fig. 2.

Fig. 5 is a sectional view taken on the line 5—5 of Fig. 2.

Fig. 6 is a side elevation of the dog supporting collar.

Fig. 7 is a side elevation of the cutter advancing mandrel or wedges with certain portions broken away to illustrate the construction.

Fig. 8 is a side elevation of the control stem or chuck and

Fig. 9 is a side elevation of the control sleeve for the centering pawls.

The piece of pipe or drill stem which has been junked in the well is indicated generally at 1. This is in most instances a piece of drill stem which has been twisted off due to excessive torque during the drilling operation or it may be a piece of casing which has become lodged in the well

bore. With tools of the type here disclosed the tool is connected to a string of pipe or drill stem such as 2, which is of greater internal diameter than the outside diameter of the piece of pipe which is to be recovered. The tool is then lowered into the well bore in such a manner that it will be telescoped over the piece of junked pipe. To accomplish this, various types of shoes have been devised and such shoes are connected upon the pipe 3, which is shown in the lower end of Fig. 2.

The pipe cutter comprises a body portion which includes a coupling 5 connected to the pipe 2 and having its lower end externally threaded at 6 to receive the housing 7. This housing is shown as having an annular cut-out portion 8 and as being threaded at 9. The lower end of this housing is threaded at 10 to a second coupling or fitting 11. The fitting 11 is threaded on its inner face to receive the driving wedge or chuck 14. Inside of the housing 7 is a sleeve 15 arranged for rotation on anti-friction bearings 16 upon the flat upper surface of the fitting 11. This sleeve 15 is seen in side elevation in Fig. 6 and has a plurality of cut-out portions 18, each of which is adapted to receive one of the dogs 19. These dogs are shown as pivoted at 20 for swinging movement in order that they may engage under the collar 21 of the junked pipe. Fig. 1 shows these dogs in collar-engaging position.

Above the upper end of the sleeve 15 is arranged a ring 23 which carries a small leaf spring 22 which projects downwardly and behind the dog 19. In this manner the spring 22 will constantly urge the dogs inwardly so that they will click under the collar as soon as the dog has been lowered beyond the underside thereof. The upper portion of each of the dogs, however, is shown as cut away at 25 in order that the spring 22 may be received in this opening when the dog is thrown rearwardly in a manner which will be later described. The ring 23 is threaded to the housing 7 at 9 and is of such a width that it may screw upwardly and be received within the cavity 8. This occurs when the tool has been lowered into the well and raised upwardly so that the dogs 19 engage beneath the collar of the junked pipe. Subsequent rotation of the cutter tool will cause the ring 23 to unscrew from the threads 9 and move upwardly, due to the fact that the dogs 19 are held stationary, as is the sleeve 15. A small segment 7' is shown in Fig. 1 as having been cut from the housing 7 and mounted so that it will spring inwardly after the ring 23 moved upward and thus prevent its return as will be later described.

Fig. 5 shows the sleeve 15 having the slots or openings 18 cut downwardly from the top. As previously described, these openings are adapted to contain the dogs 19 but also receive a thin finger 27, which is a part of the ring 23. This finger tends to fill the back portion of the opening 18 and prevent the dogs from falling outwardly or being displaced.

A rat-trap spring 30 is arranged upon the sleeve 15 in a manner to normally urge the dogs from beneath the collar of the junked pipe. This spring 30, however, is of less strength than the leaf spring 22 so that as the tool is being lowered into the well the spring 22 will force the dogs into extended position so that they will immediately click beneath a collar on the junked pipe. However, after the tool has been rotated and the ring 23 raised into the groove 8, the leaf springs 22 will also have been raised to a point where they will fit into the cavity 25, which will materially reduce the spring tension upon the dogs 19. It is intended, however, that during this time the dogs will be retained in extended position by their engagement with the collar of the junked pipe so that it may be raised from the well when the cut has been completed. When it is desired to release the dogs 19 from beneath the collar after the tool has been rotated it is only necessary to slack off on the hoisting cable so as to lower the tool. This will free the dogs from engagement with the collar and the rat-trap spring 30 will then swing the dogs back to a substantially vertical position so that the tool may be withdrawn from the well. When the tool is again to be used it is only necessary to reset the ring 23 in proper position so that the leaf springs 22 will cause the dogs 19 to be extended.

The arrangement of the cutters is best seen in Fig. 2 and they are arranged within a cutter housing 35, which is connected to the fitting 11. This housing is cylindrical in formation and is arranged to receive the pipe or shoe 3. This cutter housing is provided with a plurality of projecting lugs 37, each of which surmounts a cavity 38 in which the cutter 39 is adapted to be pivoted. It will be noted that the housing 35 is directly connected to the pipe 2 so that it may be positively rotated as desired. In order to provide a simple and economical cutter which may be readily replaced when it becomes worn or broken I have divided the cutter into two portions which include the cutter body 40 and the cutter blade 41. The body 40 is shown as pivoted at 42 to the cutter housing 35 and is arranged for inward swinging movement but is limited in its outward movement by the rim 44, which is upstanding on the cutter housing. A spring 45 fastened on the inner face of the housing 35 below the opening 38 retains the cutter body in retracted position. In order that the cutters may be economically produced I have provided the upper face of the cutter body 40 with a dovetailed groove 46, into which the blade 41 may be moved longitudinally. A cap plate 47 is arranged to overlie the cutter plate and retain it in position, a cap screw 48 being provided to securely fasten both the cap 47 and the cutter blade 41 to the body 40.

The structure just described is best illustrated in top plan view in Fig. 4. The pivot pin 42 is so arranged that it may be removed through the passage 49 by means of a small screw driver or other instrument so that the body may be readily removed in order to replace the cutter.

It will also be noted that while the cutter is in the position shown in Fig. 2 it is impossible for the cap screw 48 to become dislodged and the cutter displaced, due to the fact that the cap screw when it becomes loosened would engage against the lug 37. The lugs 37 prevent injury to the cutting blade and body while the tool is being lowered into and removed from the well bore. The rear face of each of the cutter bodies is arranged to abut against the rim 44 so that they will not be forced outwardly beyond the periphery of the housing 35 by the spring 45. The body 40 is also provided on each side with outstanding ears 51, the rear faces of which are beveled downwardly for a purpose which will be later described.

The mechanism for extending the cutters into operating position comprises the mandrel or chuck 14. This chuck is best seen in side elevation in Fig. 8 and comprises a plurality of upstanding arms 53, which are adapted to interfit about the dogs 19 with-

in the sleeve 15 and ring 23. These arms are arranged to slide in grooves 52 which are cut radially and are therefore dovetailed in section so that the arms cannot be removed except by sliding longitudinally. Thus when the dogs 19 engage beneath the collar 21 of the junked pipe they are prevented from rotation. The arms 53 will also be prevented from rotation. Below the arms 53 the mandrel 14 is threaded at 54. The length of this threaded portion may be varied, depending upon the amount which the cutting blades are to be extended and the threads may also vary as to pitch, depending upon the speed of travel of the mandrel 14, which it is desired to obtain.

The threads 54, as will be noted in Fig. 1, are arranged to engage with the threads on the inner face of the coupling or fitting 11. Below the threads 54 the mandrel 14 is enlarged at 55 to be received beneath the lower shoulder of coupling 11. An anti-friction bearing race 56 is provided between the enlarged portion 55 of the mandrel and the wedge collar 57. A split ring 56' is fitted within the mandrel 14 and held in position so that it will prevent entrance of dirt or obstructions above the collar 57 and into the anti-friction bearing 56. This ring 56' serves to prevent longitudinal movement between the portion 55 and the collar 57 but permits the rotation of the collar. The collar 57 is best seen in Fig. 2 and is arranged within the cutter housing 35 directly above the cutting blades. The wedge collar, however, is forked or tined at 58 so that a plurality of slots 59 are formed. These slots are of sufficient width to receive the lugs 37 and also the body portion 40 of the cutter body. The ears 51 of the cutter body, however, are of greater width than the openings or slots 59 so that as the mandrel is lowered the tapered or wedge-shaped face 60 of each of the tines are engaged behind the tapered face 67 of the ears 51. It will be readily apparent that as the mandrel 14 is lowered the tapered face 60 will gradually move the cutter body and the cutter blade 41 inwardly toward the pipe to be severed. Each of the cutters will be driven on opposite sides by a separate tine or wedge of the mandrel, so that there will be no failure in any of the cutting blades.

In order to insure that the cutter will be advanced and retracted an amount only in proportion to the movement of the wedges I have provided a guide finger 63 also projecting laterally from the cutter body 40. This finger is constructed to fit in a slot 69 formed in the edge face 60 of the wedges. Such an arrangement insures that the cutter will not gouge into the pipe and become broken and also that it will be withdrawn in event the rotation is reversed to back off the tool.

The cutting blade may be made of any desired material but I have shown them in plan view in Fig. 4 as being similar to the usual cutting blade in lathe tools and I find that such construction is very economical as a supply of these blades may be carried on hand, and inasmuch as they are very small the cost is therefore proportionate.

The tool is also provided with a construction best seen in Fig. 7 whereby the cutters may move to retracted position when the wedges have completed their stroke. To accomplish this the wedges are cut away at 70 to provide an opening of sufficient size to allow the ears 51 to be moved thereinto by the spring 45. The fingers 63 will also pass out of the slots 69 so that the cutter may assume its full retracted position automatically when the wedges are extended. Fig. 7 also shows the wedges as provided with a notch 75 which has an outwardly sloping face 76. This face is intended to engage the face 77 on the underside of the ears 51, when the cutters are retracted and the wedges in their initial position, that is as the tool is lowered into the well. Such construction provides a positive lock for the cutters and no obstacle or jar of the tool can displace them. It is understood that as the tool is operated the wedges move downwardly and the faces 76 and 77 move apart, fingers 68 pass into the grooves 69 and the cutter gradually moved inwardly.

Figs. 2 and 9 show a structure for centering the cutter with respect to the junk in the well. It often occurs that the junk has fallen a considerable distance and the pipe is bent or twisted. Where this is encountered it has been found that the cutters may cut into one side of the pipe but due to its angularity they may not even touch it on the opposite side. Thus the cut cannot be completed and I have, therefore, devised a set of centering pawls indicated at 80. These pawls are carried by the lower end of the cutter housing 35 and are illustrated as mounted upon blocks 81 secured by screws 82 to the housing. A pivot 83 is provided and an arm 84 directly supports each of the pawls 80. A spring 85 normally retains the pawl in position adjacent the housing. In order that these pawls may be advanced a sleeve 87 is inserted in the housing 35 above the pawls. This sleeve has a steep taper 89 which is spaced to engage the beveled upper side of the pawls at each side thereof. Slots 90 in the sleeve allow it to pass downwardly by the blocks 81 in a manner similar to the movement of the wedges which operate the cutters. These slots have an enlarged upper end 91 so that the pawls may spring back to retracted position at the same time as the cutters when the advancing movement has been completed. The sleeve 87 is moved downwardly by engagement with the lower end 79 of the collar 57 where it extends beyond the tapered area 58. It will be seen that the steep taper 89 causes the pawls to move inwardly immediately when the wedges and sleeve 87 start downward. The straight face 94 then retains them in position against the pipe being cut until the cut is completed or the cutters fully extended, whereupon the pawls drop back into the enlarged space 91.

When the pawls are extended they serve to center the cutting tool with respect to the pipe being cut and also prevent wabbling of the cutter. The sleeve 87 has been illustrated as being free to move within the housing but it seems obvious that a split ring similar to 56' may be employer to connect it to the lower end of the wedge collar 57. The sleeve 87 also serves as a means of indicating to the operator that the rotation of the cutter has reached its maximum as the downward movement of the wedges will move the sleeve 87 down to engage the shoulder 96 on the member 3 and in this manner further rotation will be prevented and the engine will stall or be overloaded in an attempt to rotate the dogs 19 under the collar 21 if the cut is not complete. When the cut is completed regardless of the amount of rotation the operator is advised as the tension on the hoisting cable is relieved when pipe separates at the cut.

The operation of the device is as follows: The tool is lowered into the well until the junked pipe is encountered. It may then be rotated so that

the shoe on the lower end of the pipe 3 will remove any accumulation of debris of material about the pipe. In this manner the tool is lowered about the junked pipe a sufficient distance until it is desired to make a cut. During this lowering operation the dogs 19 have clicked past each of the collars on the junked pipe so that it is only necessary that the tool be raised until the dogs engage beneath the collar which has just been passed. When this occurs a tension is maintained upon the pipe 2 so that the dogs will be firmly engaged beneath the collar 21.

The tool is then rotated, preferably in a right-hand direction. This rotation unscrews the ring 23 so that the wings 27 and the springs 22 are withdrawn from in the rear of the dogs 19. This relative movement due to the unscrewing of the threads 9 is accomplished due to the fact that the sleeve 15 is mounted upon the anti-friction bearings 16 and may therefore remain stationary while the housing 7 is rotated. During this same rotation the mandrel 14 will be held stationary due to the fact that the arms 53 are engaged within the slots 52. As the housings 7 and 35 are rotated by the pipe 2 the mandrel 14 will remain stationary and the threads 54 will unscrew from the coupling 11. This unscrewing action will move the mandrel or chuck 14 downwardly with respect to the cutters 39. This downward movement will cause the faces 76 and 77 to part and the wedge collar 57 to force the points of the prongs behind the ears 51 of the cutting bodies.

The collar 57, however, is prevented from rotation with the cutter housing 35 and the cutters by means of the anti-friction bearings 56. In this manner the cutting blades 41 will be positively driven into engagement with the pipe to be cut. The centering pawls will be moved inwardly to contact the pipe being cut in the manner heretofore described.

If the cut is completed before all the threads 54 have been unscrewed the cut off piece of pipe and the tool may readily be withdrawn from the well as it rests on the the dogs 19 and the pawls 80 will be pulled upwardly along the short length of pipe remaining in the well above them and the point of cutting. However, if the cut is not completed by the time the threads 54 have been unscrewed and the sleeve 87 moved to its lowermost position the cutters and the pawls will both reach the enlarged heads in their respective slots and automatically withdraw from the pipe. The operator may then slack off slightly on the hoisting cable to ease off the tension on the dogs 19. The rat trap springs will retract the dogs and the tool may be removed from the well and reset.

The amount of inward movement of the cutters, however, can be positively controlled by the number of rotations of the pipe 2 and it seems apparent that by varying the pitch of the threads 54 the speed of inward movement of the cutters may be varied to accommodate any existing conditions and to obtain a cut in any desired number of revolutions. The length of the threads 54 may be increased so that a sufficient number of revolutions may be obtained in order to accomplish a cut where an extraordinary thick pipe is encountered. The advantages of the driving mechanism for the cutting blades will be readily apparent as the amount of inward movement is directly proportionate to the number of rotations of the pipe. The cutting action is positive at all times and is not dependent upon fluid pressure or other uncertain factors. The cutting blades may be readily removed and in view of the fact that three cutting blades are provided which are of the same type which are usually employed in lathes it is possible to obtain a cut on a pipe in a well bore in practically the same time that a similar cut could be made under ideal conditions in a machine shop lathe.

In event the pipe cannot be severed or removed, or the cut cannot be completed or for some reason it is desired to retract the cutters so that the tool may be removed it is only necessary to reverse the direction of rotation of the tool. When this occurs the dogs 19 will remain in engagement with the collar 21 and the threads 54 will move upwardly with respect to the coupling 11 which will raise the wedge members 57 and allow the springs 45 to retract the cutters. The wedge members are raised by the rings 56', which has an enlarged flange or ring 66 upon its lower end. This rim fits into the groove 65 in the wedge collar 57 so that it may exert an upward pull upon the wedge members.

During this reverse rotation the segment 7' has prevented the ring 23 from threading back into the housing 7 and when the cutters are retracted and the tension on the tool relieved, then the springs 30 will move the dogs 19 from beneath the collar 21. This reversing operation, however, will seldom, if ever, be necessary as the operator may continue the rotation until the dogs and pawls automatically retract as above described.

Various alterations and modifications may be made in the device without departing from the spirit of the invention as set forth in the appended claims.

Having thus described my invention, what I claim as new and desire to protect by Letters Patent is:

1. An outside pipe cutter including in combination cutters to engage the pipe, a vertically movable mandrel to actuate said cutters in proportion to the amount of rotation thereof, and means on said mandrel to lock said cutters in retracted position but releasable upon movement of said mandrel.

2. An outside pipe cutter including in combination cutters to engage the pipe, a vertically movable mandrel to actuate said cutters, means on said mandrel to lock said cutters in retracted position, and additional means on said mandrel whereby said cutters may move to retracted position when said mandrel is fully extended.

3. An outside pipe cutter including in combination cutters to engage the pipe, a vertically movable mandrel to actuate said cutters, and means whereby said cutters may move to retracted position when said mandrel is fully extended.

4. An outside pipe cutter including in combination cutters to engage the pipe, a vertically movable mandrel to actuate said cutters, and means whereby said cutters may move to retracted position when said mandrel is fully extended, said means comprising a spring normally urging said cutters to retracted position and an enlarged recess in said mandrel to receive said cutters after said mandrel has exerted its maximum wedging action.

5. An outside pipe cutter including in combination cutters to engage the pipe, a vertically movable mandrel to actuate said cutters, and means on said mandrel to lock said cutters in retracted position when said mandrel is retracted, said means including co-operating beveled faces

on said cutters and said mandrel adapted for separation upon operation of the cutter.

6. A pipe cutter including in combination cutters to engage the pipe, a vertically movable mandrel to actuate said cutters, and means on said mandrel to lock said cutters in retracted position when said mandrel is retracted, said means including co-operating beveled faces on said cutters and said mandrel disposed below the cutting edge on said cutter and the wedging face on said mandrel so that said cutter will be released when said mandrel moves to actuate the cutter.

7. A device of the character described including a slotted hollow circular mandrel, cutting members disposed in said slots, co-operating faces on the edges of the slotted portions of said mandrel and said members whereby said members are advanced toward the hollow portion of said mandrel, and a tongue and groove construction between said mandrel and the edges of the slots in said members to limit the rate of travel thereof to a direct proportion of the movement of said mandrel.

8. A device of the character described including a hollow circular mandrel, cutting members, co-operating faces on said mandrel and said members whereby said members are advanced toward the hollow portion of said mandrel, and a tongue and groove construction between the edges of said cutters and said mandrel and said members to limit the rate of travel thereof to a direct proportion of the movement of said mandrel, and means arranged to extend said mandrel directly in proportion to the amount of rotation of the device.

9. An outside pipe cutter including in combination cutters to engage the pipe, a vertically movable mandrel to actuate said cutters, means on said mandrel to lock said cutters in retracted position, and extensible and contractible centering means actuated by movement of said mandrel.

10. An outside pipe cutter including in combination cutters to engage the pipe, ears on said cutters, a vertically movable mandrel to actuate said cutters by engaging said ears, means to move said cutters to retracted position when said mandrel is fully extended, and centering means for said cutters, actuated by movement of said mandrel.

11. In an outside pipe cutting tool, a set of cutters, a centering device for the pipe to be cut, a mandrel to actuate both said cutters and said centering device, said device including a set of pawls, and a sleeve arranged to move said pawls inwardly to center said tool about the pipe to be cut when said sleeve is moved by said mandrel.

12. In an outside pipe cutting tool, a set of cutters, a centering device for the pipe to be cut, a mandrel to actuate both said cutters and said centering device, said device including a set of pawls, a sleeve arranged to move said pawls inwardly to center said tool about the pipe to be cut, and means formed in said sleeve whereby said pawls will be retained in centering position until the cutters of said tool have been extended.

13. In an outside pipe cutting tool, a set of cutters, a centering device for the pipe to be cut, a mandrel to actuate both said cutters and said centering device, a set of pawls, a sleeve arranged to move said pawls inwardly to center said tool about the pipe to be cut and enlarged recesses in said sleeve to receive said pawls in a protracted position when said sleeve has been moved to extended position.

14. An outside pipe cutting tool including cutter blades, pawls to center said tool with respect to the pipe to be cut, and means actuated by rotation of the tool to move both said blades and said pawls to operative position.

15. An outside pipe cutting tool including cutter blades, pawls to center said tool with respect to the pipe to be cut, means actuated by rotation of the tool to move both said blades and said pawls to operative position, and additional means whereby both said cutters and said pawls will automatically move to retracted position after a predetermined amount of rotation of said tool.

DEMPSON H. REED.

DISCLAIMER

1,936,643.—*Dempson H. Reed,* Houston, Tex. OUTSIDE PIPE CUTTER. Patent dated November 28, 1933. Disclaimer filed April 8, 1939, by the patentee, and the assignee of one-half interest, *James S. Abercrombie.*

Hereby disclaim any interpretation of claim 5 that would include a mandrel which is not moved downwardly relative to the cutters while said mandrel is rotated in cutting the pipe.

Further disclaim any interpretation of claim 7 of the patent which does not include a structure acting to cause a cutting of the pipe by the cutting members as said members are advanced toward the hollow portion of the mandrel and to their inner positions.

[*Official Gazette May 2, 1939.*]

CERTIFICATE OF CORRECTION.

Patent No. 1,936,643. November 28, 1933.

DEMPSON H. REED.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 5, lines 20 and 21, claim 7, strike out the words "the edges of the slots in" and insert the same before the words "said mandrel" in line 20, of said claim; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 16th day of July, A. D. 1935.

(Seal)

Leslie Frazer
Acting Commissioner of Patents.