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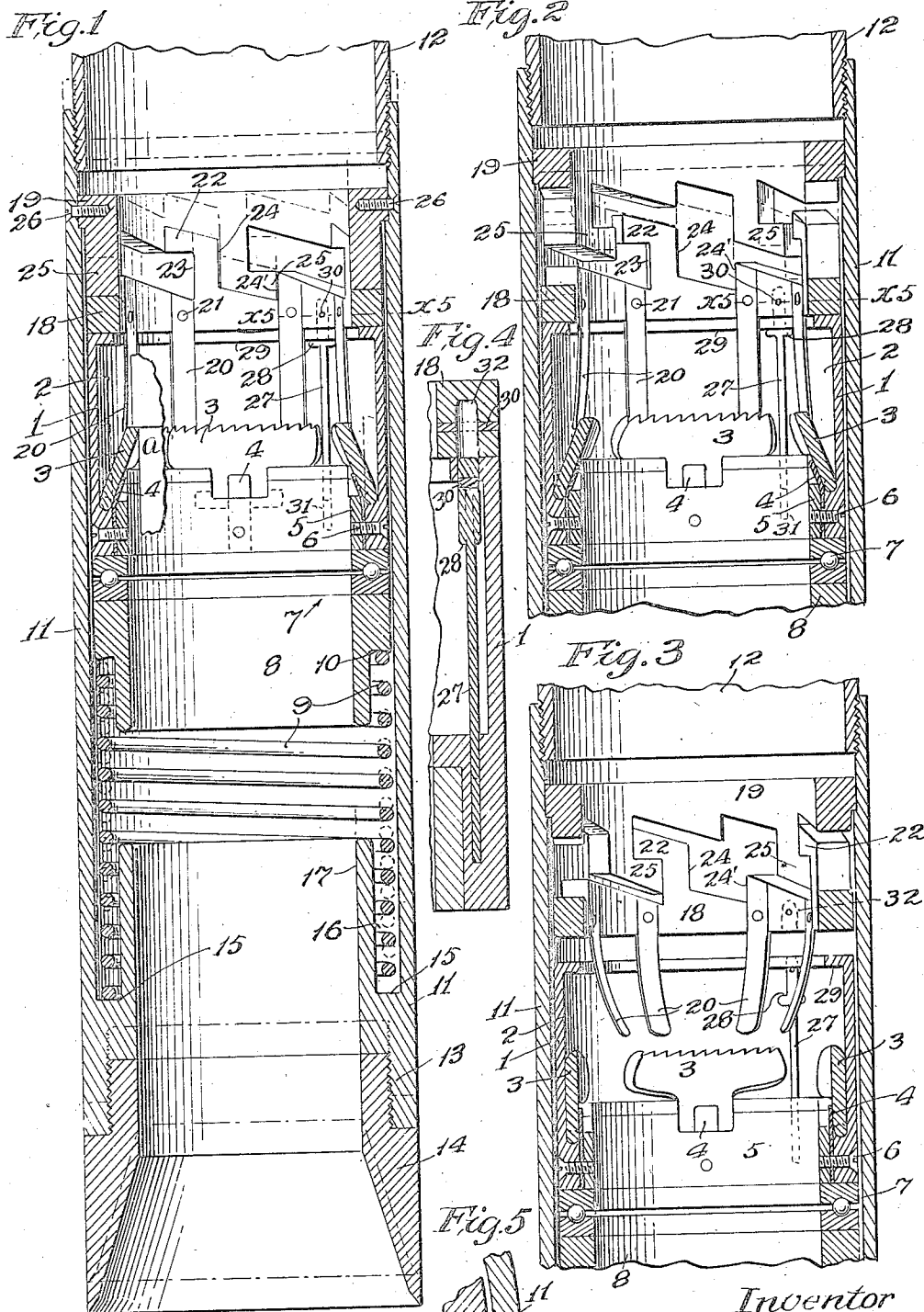
1,471,775

C. E. BROWN

RELEASING DEVICE FOR WELL TOOLS

Filed June 8, 1922

3 Sheets-Sheet 1



Witness
C. C. Holly

Inventor
Claude E. Brown
James R. Townsend
his atty

Oct. 23, 1923.

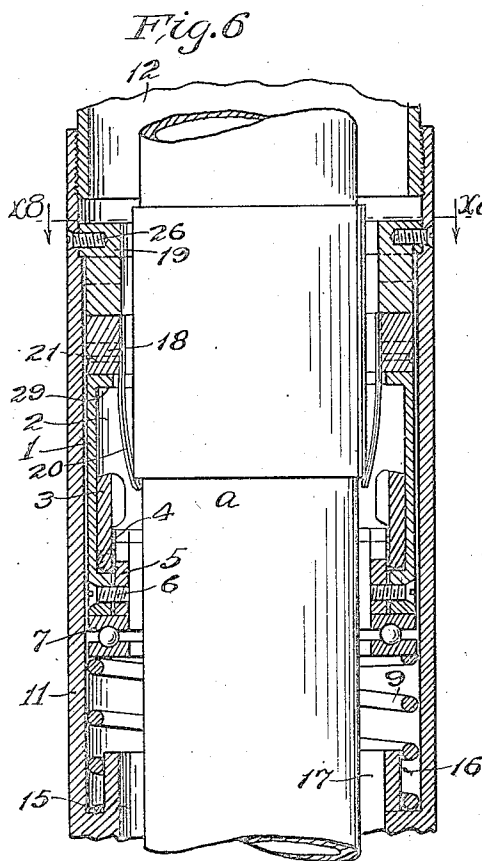
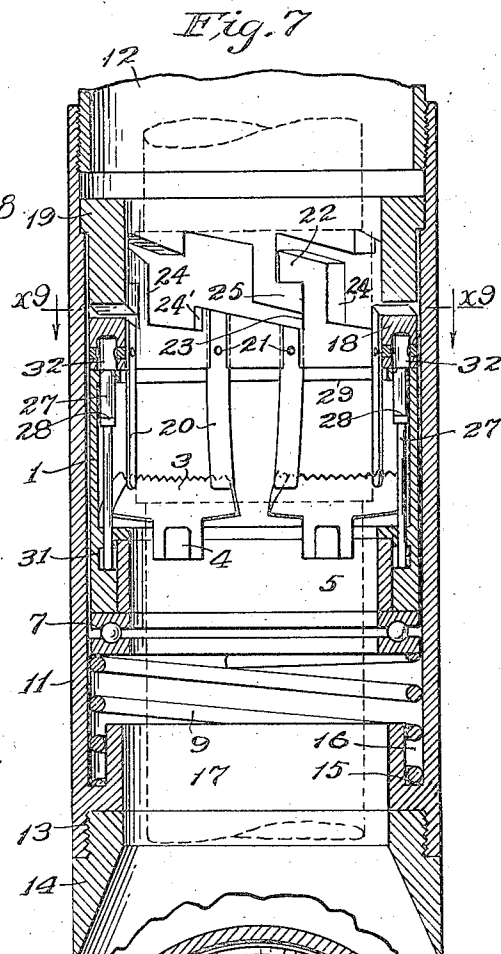
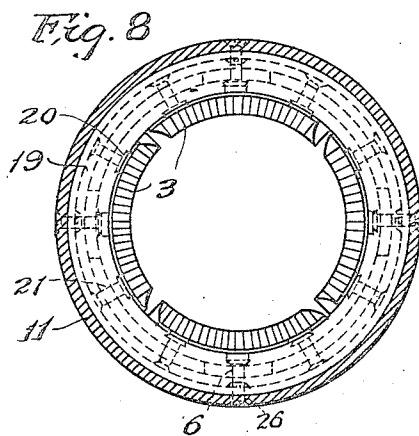
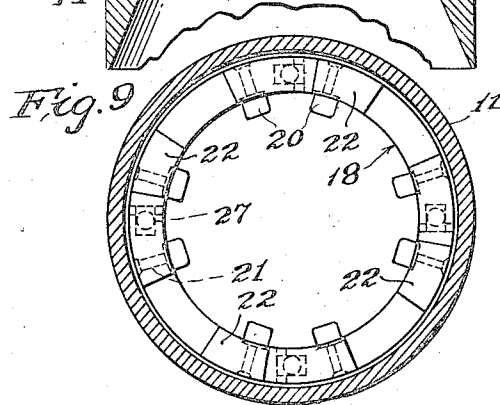
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C. E. BROWN

RELEASING DEVICE FOR WELL TOOLS

Filed June 8, 1922

3 Sheets-Sheet 2



WITNESS:
J. A. McDowell

INVENTOR.
CLAUDE E. BROWN
BY *James R. Townsend*
his ATTORNEY

Oct. 23, 1923.

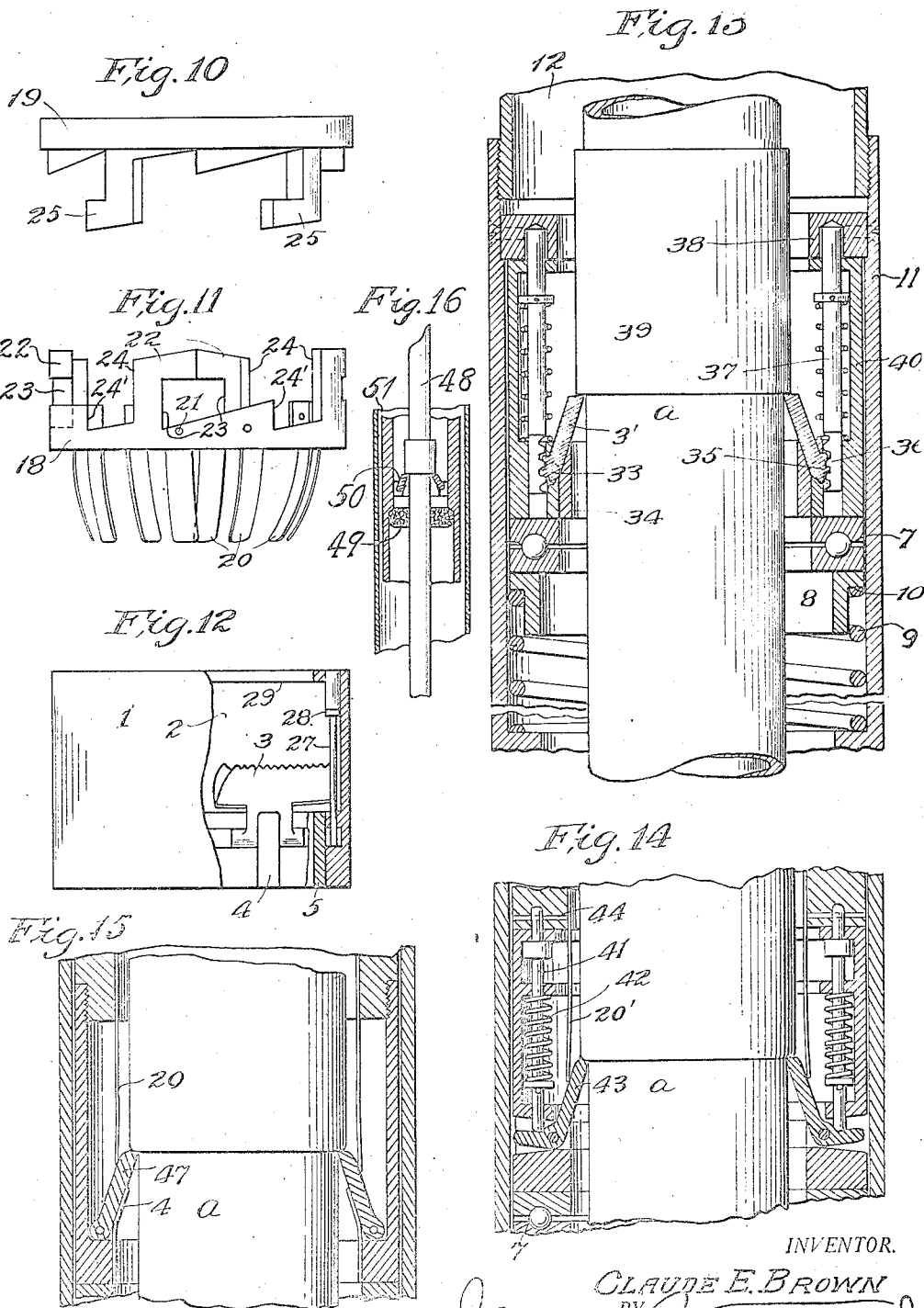
1,471,775

C. E. BROWN

RELEASING DEVICE FOR WELL TOOLS

Filed June 3, 1922

3 Sheets-Sheet 3



WITNESS:

J. H. McDowell

INVENTOR.

CLAUDE E. BROWN

BY

J. H. McDowell

his ATTORNEY.

Patented Oct. 23, 1923.

1,471,775

UNITED STATES PATENT OFFICE.

CLAUDE E. BROWN, OF SANTA ANA, CALIFORNIA.

RELEASING DEVICE FOR WELL TOOLS.

Application filed June 8, 1922. Serial No. 586,785.

To all whom it may concern:

Be it known that I, CLAUDE E. BROWN, a citizen of the United States, residing at Santa Ana, in the county of Orange and State of California, have invented a new and useful Releasing Device for Well Tools, of which the following is a specification.

In the art of drilling oil wells, gas wells, and water wells it sometimes becomes necessary to pull the drill pipe or outlet pipe from inside the casing or hole, and various means for this purpose have been provided among which are devices called "mouse-traps" and "overshots." In these devices, dogs or slips are provided which catch upon the pipe or underneath a joint thereof when the contrivance is drawn up for that purpose, thus enabling the workman to pull the pipe.

It sometimes occurs that the tool or pipe taken hold of by the dogs or slips is so firmly held in the ground that it cannot be withdrawn by the power that is available.

Sometimes it is necessary where the pipe is stuck in the hole, to cut it and take it out in sections and in such cases a "mouse-trap" is used to pull the portion of the pipe that is cut from the portion that is stuck. It sometimes occurs that the cutters become broken without severing the pipe and it becomes impossible to pull either the pipe or the cutters; thus causing the loss of the hole and the pipe and devices in the hole.

Various means have heretofore been proposed to release the "mouse-trap" or the "overshot" from its hold on the pipe so as to allow the device to be withdrawn when it is found the pipe cannot be cut or pulled. I do not know of any such means which is satisfactory; and it is yet common practice in the oil fields to attempt the cutting or the pulling of stuck pipes without providing means for releasing the cutting or pulling apparatus from the pipe in case it is found the pipe cannot be cut or pulled.

Sometimes the stuck drill pipe may be broken off in the hole and the lower end of it stuck in the earth and it becomes desirable to produce a forced circulation down through the stuck drill pipe to the bottom of the hole to wash out the earth in which the stuck drill pipe is embedded; and in such cases it is common practice to insert a packer into the well at the bottom of a pipe through which water is forced into the top end of the broken stuck pipe; and an object

of this invention is to provide means whereby the stuck pipe can be tightly packed inside the pipe through which water is delivered to it, and whereby such packer may be withdrawn in case it is found desirable so to do.

An object of this invention is to provide means whereby the release of the cutting, pulling or packing device can be easily effected by operation of the pipe which carries the tool.

Other objects are strength, cheapness and simplicity of construction, and ease and certainty of operation to effect the release.

An object of the invention is to so construct the device that when the same is assembled and placed in the fishing tool in which it is to be operated, it is possible to rotate such tool in either direction when lowering into the hole; and when the depth is reached at which the stuck pipe or tool is to be operated upon, upward movement of the fishing tool will cause the device to engage the stuck pipe or tool joint, and the pull may be applied to the joint while the device is rotated in either direction, or not at all, as may be desired, and an object is to prevent release of the hold on the stuck pipe or tool until such release is desirable.

Another object is to so construct the device that a powerful upward pull may be exerted to hold packing or to lift pipe or tools out of the hole.

Another object is to effect the release of the device without rotation in such direction as would unscrew the operating pipe.

Another object is to so construct the device that after it is released it cannot again engage the stuck pipe until withdrawn and re-set.

Another object is to prevent any loosening of the hold of the device on the pipe which is being withdrawn from the hole.

Other objects, advantages and features of invention may appear from the accompanying drawings, the subjoined detail description and the appended claims.

The accompanying drawings illustrate the invention constructed for use as an "overshot".

Figure 1 is an axial section of a device of the overshot type embodying this invention, connected to the lower end of the operating pipe, a fragment of which is shown. A fragment of the drill stock or pipe is also shown as engaged by the engaging dog of

the "mouse trap". The parts are shown in the position for lowering to the depth desired; the "mouse trap" being supported by a helical spring. Attention is directed to the fact that in this position the shoe of the tool may be drawn up, thus compressing the helical spring without changing the position of the mouse trap. In this position of the parts the rotation of the operating pipe will turn the shoe and the "mouse trap" in either direction.

Fig. 2 is a view analogous to Fig. 1 showing the lower part of the "mouse trap" in the same engaging position but omitting the drill pipe shown in Fig. 1. The operating hooks have been raised by the operating pipe and partly lowered toward a hooking position. In Figs. 1 and 2 the lower hook ring is connected by a breakable connection with the "mouse trap".

Fig. 3 is a view analogous to Figs. 1 and 2 showing the hooks engaged and the operating pipe lifted; the connection being broken and the master springs withdrawn from behind the dogs shown in pipe-engaging position in Figs. 1 and 2. In this view the dogs are shown in retracted position to release the stuck drill pipe, not shown. The breakable connection between the lower hook ring and the "mouse trap" is broken and dropped down and the master springs of the dog are shown drawn up to release the dogs which are shown retracted to a vertical position by their retracting springs.

Fig. 4 is an enlarged fragmental sectional detail to illustrate the driving pins and breakable connection between the lower hook ring and the frame of the "mouse trap". Dotted lines indicate the connecting position and solid lines indicate the position to which the connecting and drive pins have dropped back.

Fig. 5 is an enlarged detail of one of the driving pins with breakable temporary connection in section on line x^6 , Figs. 1 and 2.

Fig. 6 is a contracted fragmental view showing the parts in the released position shown in Fig. 7, and also showing a fragment of the stuck drill stock or pipe released.

Fig. 7 is a contracted fragmental axial section with the parts in position indicated in Fig. 6, and showing the master springs holding the dogs retracted.

Fig. 8 is a section on line x^8 , Fig. 6, showing the device removed from the drill pipe and set to the position shown in Fig. 1.

Fig. 9 is a section on line x^9 , in Fig. 7, omitting the upper hook ring.

Fig. 10 is an elevational detail of the upper hook ring; the hooks on the farther side of the ring being omitted to avoid confusion.

Fig. 11 is an elevational detail of the lower hook ring and its master springs.

Fig. 12 is a fragmental view partly in section showing the "mouse trap" proper, detached, and the dogs retracted by their retracting springs; also showing the temporary connecting means in disengaging position.

Fig. 13 is a view of a modified form of the device in drill pipe engaging position; a fragment of the drill pipe being shown and in which form the dogs of the "mouse trap" are operated by racks, springs, and pins. In this form the breakable connection, not here shown, is the same as that shown in the other views.

Fig. 14 is a fragmental view illustrating another form of construction involving the combination of the principles of Fig. 13 and the preceding views.

Fig. 15 is a fragmental sectional detail of another form of the temporary connection between the "mouse trap" housing and a ring that holds the master spring.

Fig. 16 is a diagrammatic fragmental sectional detail to illustrate the application of this invention to pack and release a broken drill pipe.

The mouse trap may be of any suitable construction and in Figs. 1, 2, 3, 6, 7, 8, 9 and 12, it is shown as comprising a cylindrical mouse-trap housing or frame 1 forming means adapted to accommodate the stuck pipe or tool stock a , and having a chamber enlarged between its upper and lower ends as at 2 to accommodate the dogs 3 and the dog retracting springs 4. The dogs and the retracting springs are held in place by an internal sleeve 5 fastened by screws 6 to the housing 1; and when the dogs are otherwise free, the retracting springs hold the dogs outwardly so that the dogs are contained in the cavity 2. The housing is preferably anti-frictionally mounted on an annular anti-friction bearing 7 mounted on a loose shouldered bushing 8 that is supported by a helical spring 9 engaging the under side of shoulder 10 that is formed by reducing the lower portion of the bushing 8. Said spring is supported by the shell 11 of the device, which is carried by the operating pipe 12 that is screwed into the top of said shell 11. Said shell is internally enlarged and threaded as at 13 to receive the shoe 14.

The shell 11 is provided at its lower end with a seat 15 to support the helical spring 9, and is provided with an annular chamber 16 that confines the lower portion of said spring to hold the spring to position coaxial with the shell.

The spring 9 is so constructed as to normally hold the shouldered bushing 8 a considerable distance above the inner wall 17 of the shell; so that the bushing and the

mouse-trap housing or frame are axially movable to accommodate pressures upon the spring 9. Said inner wall serves as a spring guide and also serves as a support for the mouse-trap housing during upward pulls on the drill pipe.

Above the mouse-trap housing 1 there are provided two interlocking members comprising the lower hook ring 18 and the upper hook ring 19. The lower hook ring is adapted to rest upon the upper end of the mouse-trap housing 1, and is provided with the master springs 20 fixed to said lower hook ring by any suitable means as the rivets 21. Said lower hook ring is provided on its upper end with upwardly extending projections constituting hooks 22 and abutments 23, 24 and 24'. The upper hook member 19 is provided with downwardly extending hooks 25, and is fixed by suitable means, as the screws 26 to the shell 11 and is movable up and down by said shell which is screwed upon the operating pipe 12.

Releasable, temporary connecting means are provided to connect between the housing 1 and the lower hook ring 18, and the same is adapted to be set to hold the lower edge of the member 18 to the housing 1. Said connecting means comprise the reciprocating rod 27 having a shoulder 28 bearing against the under-side of the top shoulder 29 of the housing 1, the upper end of the rod being fixed in the ring 18 by a pin 30 extending through the ring 18 and the upper end of said rod 27. Said rod extends into the sockets 31 and 32. While the parts are thus connected, the lower hook ring 18 is held up by the helical spring 9 into positive contact with the lower end of the upper connecting member 19.

When the parts are assembled as at Fig. 1, the master springs 20 of the dogs act upon the outer faces of the dogs 3 and press the same inward, thus overcoming the smaller retracting springs 4 and forcing the dogs into engagement with the drill stock or pipe *a*. The lower connecting member or hook ring 18 is provided with oppositely arranged abutments 24, 24' between which the hooks of the upper ring are inserted so that while the parts are in the position shown, with the connecting rods in the sockets of the ring, the device can be lowered into the hole that surrounds said drill stock or pipe *a*, and can be rotated as a unit in either direction by simply revolving the operating pipe 12. The tool can also be lowered into the hole and pushed downward forcibly by the same means.

The rods projecting up into the sockets 32 serve to prevent relative rotation between the lower ring 18 and the housing 1; but the rods 27 do not extend to the bottom of their sockets 31 in the housing

1; and when the device has been lowered to the depth at which it is desired to make the dogs take hold of the drill pipe *a*, an upward movement of the operating pipe 12 will withdraw the hooks 25 from the recesses between the abutments 24 and 24' and compress the helical spring 9.

When said hooks have been drawn up to above the level of the hooks 22 on the member 18, the operating pipe 12 may be turned and brought into position to enter the space between the other hooks, and may be lowered and revolved to engage the hooks 22.

When the hooks of the upper ring are engaged with the hooks of the lower ring, an upward movement of the operating pipe 12 will shear the pins 30 and thus break the connection between the lower connecting ring 18 and the housing 1 which is held against upward movement by engagement of the dogs with the drill stock *a*. The dogs engaged with said stock hold the housing 1 with the result that the pin 30 is sheared; and with the further result that the rod 27 thereupon drops down into the socket 31, and its upper end falls below or is flush with the top of the mouse-trap housing 1.

In this position, which is shown in Fig. 3, the operating pipe 12, and the engaging members 18 and 19 may be revolved independently of the mouse-trap. When the lower ring is thus elevated, the master springs 20 escape the dogs 3, but upward pressure of the helical spring 9 holds the dogs 3 so engaged with the drill stock *a*, that the retracting springs cannot retract the dogs until the operating pipe 12, carrying the shell 11, is lowered with a rotating movement until the lower ends of the master springs 20 press downward upon the upper edges of the dogs 3, and thus allow the retracting springs 4 to force the dogs 3 out, and as the operating pipe 12 is again lowered and rotated, the master springs 20 will be inserted between the drill pipe *a* and the dog 3, thus positively forcing the dogs out and preventing the dogs from again engaging the drill pipe until the device is withdrawn from the hole, and reset, and the operation of the "mouse-trap" above described, repeated.

In Fig. 13 the dogs 33' are pivoted at 33 in the mouse trap housing 34 and are provided with teeth 35 engaging a rack 36 forming the lower end of the reciprocating rod 37, the lower end of which operates in the mouse trap housing 34 and the upper end of which is pushed up into the stationary ring 38 made fast to the shell 11 into which the pipe 12 is screwed.

This contrivance is adapted to allow the dogs 33' to freely pass down past the joints 33 in the pipe *a*.

It is understood that in the form shown in Fig. 13, the same breakable connection is employed as in the other views, but is hidden from sight in this view by the drill pipe.

In this form, when the operating pipe 12 is pulled up, the reciprocating rods 37 are held stationary and the ring 38 is lifted high enough so that it can be turned around above the upper end of the rods 37, the spring 9 being compressed to this action. To release the dogs from the pipe the operating pipe 12 is turned to bring the solid parts of the ring 38 above the pins 37 then the operating pipe 12 is lowered onto the pins, pushing the pins downward, and by this action moving the pipe engaging dogs 33' outward away from the collar 39. Then upon an upward movement of the operating pipe 12, the spring 9 holds the housing 40 in contact with the upper ring 38 so that the dog reciprocating pins do not move from their depressed position, and the dogs therefore are not allowed to engage the pipe. This holds good until the mouse trap is drawn out of pipe 12 and reset.

In Fig. 14, the pins 41 are held downward by springs 42 to engage the rocking dogs 43 which are normally held by springs 20' in pipe engaging position as shown in the figure. The upper ends of the pins 41 are constructed with the breakable connection 44 corresponding to the breakable connection shown in Figs. 1-12.

To release the dogs the hook ring 18 is connected as in said other figures and the operation of releasing the dogs is practically the same as in Figs. 1-9.

In Fig. 15 the connection between the mouse trap housing and the operating pipe is threaded so that by rotating the operating pipe the ring 45 is unscrewed from the housing 46. By unscrewing the operating pipe sufficiently to draw the master springs 20 from the tops of the dogs 47. The resilient means 4 throw the dogs back behind the master springs 20 and said resilient means 4 hold the dogs out of contact with the pipe until the mouse trap is withdrawn and reset.

In Fig. 16, 48 indicates the broken drill pipe, 49 the packing and 50 the dogs engaged with the joint of the drill pipe. 51 is the operating pipe. The operating pipe in this view has been pulled, compressing the packing 49 against the broken and stuck drill pipe so that the water forced down through the operating pipe will pass on down through the broken drill pipe to the bottom of the well, not shown, thus to wash out the earth from around the tools. In this form the releasing means may be of any of the types heretofore shown.

I claim.

1. In a device of the character set forth, three superposed members adapted for rotating and axial movement relative to each

other, and for interlocking and unlocking alternately to prevent and allow relative axial movement; the lower member being temporarily connected with the middle member; dogs carried by the lower member to engage a pipe; resilient means carried by the middle member and adapted to hold the dogs alternately in pipe engaging and pipe freeing position; yielding means subject to said resilient means and adapted to move the dogs past said resilient means when the members are sufficiently separated to allow the dogs and said resilient means to escape each other.

2. The combination of a frame adapted to accommodate a pipe; dogs carried by the frame and adapted to engage the pipe; yielding means to hold the dogs out of pipe engaging position; a ring rotatable relative to and movable toward and from the frame; means to prevent relative rotation of said ring and frame when they are adjacent each other; means to temporarily prevent separation of the ring and frame; resilient means on said ring to hold the dogs in pipe engaging position at one time, and out of pipe engaging position at another time; and an annular member adapted to interlock with the ring to rotate the same, and to move the ring axially relative to the frame.

3. A device of the character set forth comprising three superposed members adapted for rotative and axial movement independently of each other; pipe engaging means carried by the lower member; and resilient means to move and to hold said pipe engaging means out of engaging position.

4. A device of the character set forth comprising three superposed members adapted for rotative and axial movement independently of each other; pipe engaging means carried by the lower member; and resilient means carried by the middle member to render the pipe engaging means in the lower member effective and adapted to be temporarily connected to the lower member.

5. A device of the character set forth comprising three superposed members adapted for rotative and axial movement independently of each other; pipe engaging means carried by the lower member; and resilient means carried by the middle member to render the pipe engaging means in the lower member effective and adapted to be temporarily connected to the lower member, said upper member being adapted to move said middle member rotatably axially relative to said lower member so that the pipe engaging means carried by the lower member will escape the resilient means carried by the middle member.

6. A device of the character set forth comprising three superposed members adapted

for rotative and axial movement relative to and independently of each other; pipe engaging means carried by the lower member; and resilient means carried by the middle member and adapted to normally hold said pipe engaging means in engaging position; said upper member being adapted to so move said middle member that the pipe engaging means will escape the resilient means carried by the middle member.

7. The combination of a frame; pipe engaging means carried by said frame; a member rotatable relative to said frame; resilient means carried by said member and adapted to normally hold said pipe engaging means in pipe engaging position; means adapted to move said member so that said pipe engaging means escape said resilient means; and means to move said pipe engaging means to inoperative position after escaping said resilient means.

8. The combination of an annular member; dogs carried by said annular member and adapted to engage a pipe; yielding means to hold the dogs in pipe engaging position; a second annular member rotatable relative to and movable toward and from the first mentioned member; means for temporarily connecting said annular members to each other; a third annular member rotatable relative to and movable toward and from said other members, and adapted to move said second member rotatably and axially so as to separate said second member

from said first mentioned member and to disengage said yielding means from said dogs so that said dogs will escape said yielding means; and resilient means to hold said dogs out of pipe engaging position after disengagement from said yielding means.

9. The combination of a shell containing two members temporarily connected together, means carried by one of said two members adapted to engage a pipe; said members being movable rotatably and axially relative to said shell; resilient means adapted to hold said members upward in said shell; means above said two members and fixed to said shell adapted to separate said two members by rotative and axial movement.

10. The combination with a cylindrical shell of an annular member in said shell provided with means adapted to engage a pipe and movable rotatably and axially relative to said shell, resilient means adapted and arranged to press said annular member upward in said shell; and resilient means carried by the annular member to hold the pipe engaging means out of pipe engaging position.

In testimony whereof I have hereunto set my hand at Santa Ana, California, this 3rd day of June, 1922.

CLAUDE E. BROWN.

Witnesses:

JAMES R. TOWNSEND,
N. J. WARNER.