

Nov. 27, 1928.

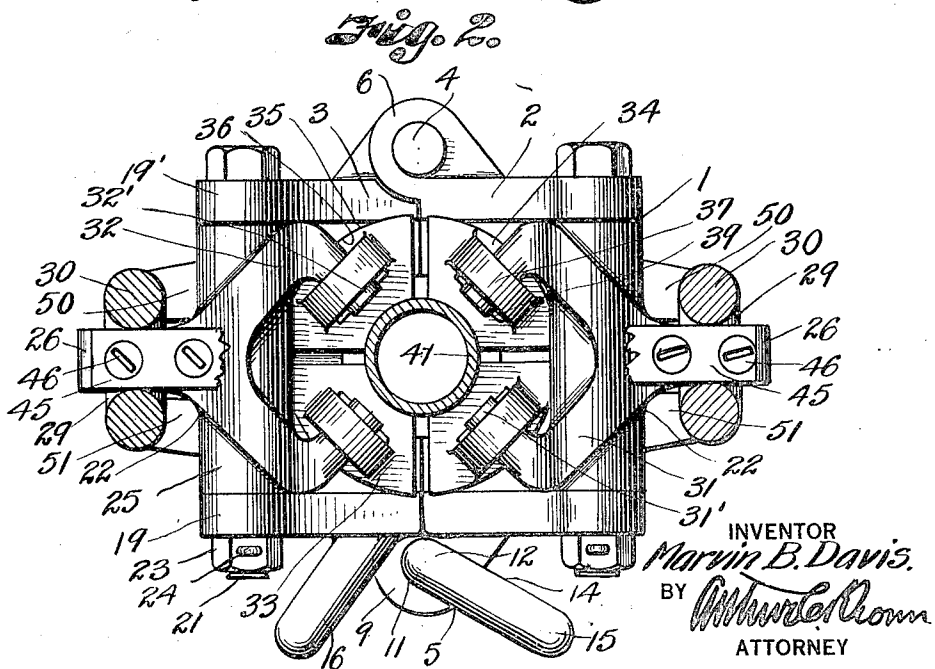
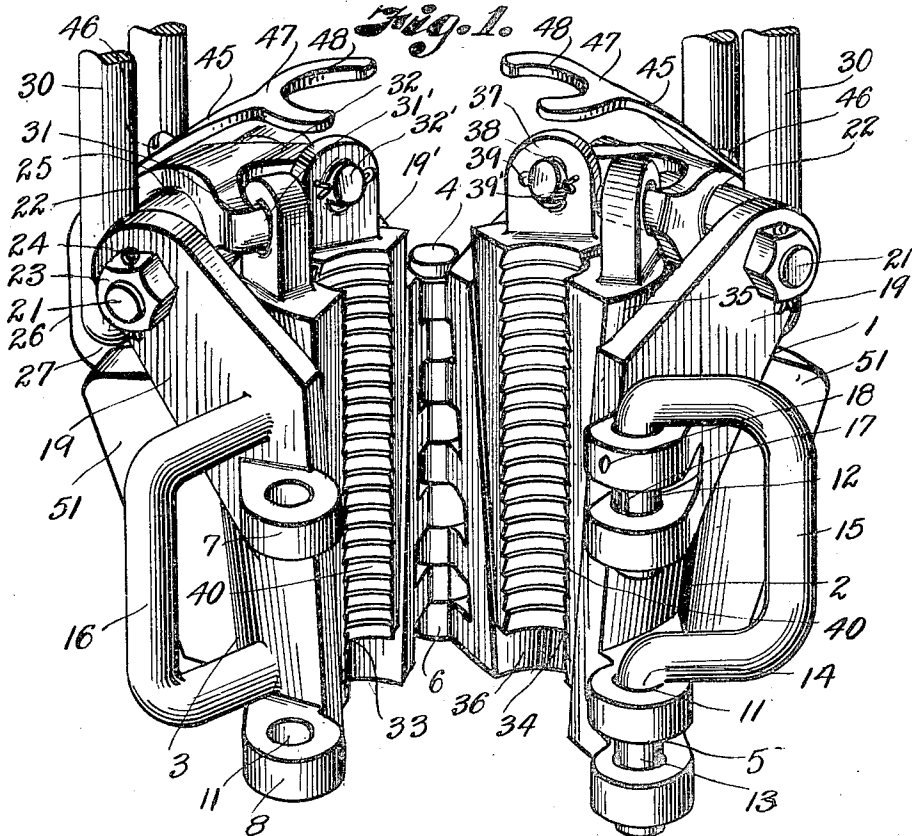
1,693,478

M. B. DAVIS

PIPE CLAMP

Filed Aug. 21, 1925

3 Sheets-Sheet 1



INVENTOR
Marvin B. Davis.
BY *Arthur L. Brown*
ATTORNEY

Nov. 27, 1928.

1,693,478

M. B. DAVIS

PIPE CLAMP

Filed Aug. 21, 1925

3 Sheets-Sheet 2



INVENTOR
Marvin B. Davis.
BY *Arthur C. Brown*
ATTORNEY

Nov. 27, 1928.

1,693,478

M. B. DAVIS

PIPE CLAMP

Filed Aug. 21, 1925

3 Sheets-Sheet 3

Fig. 5.

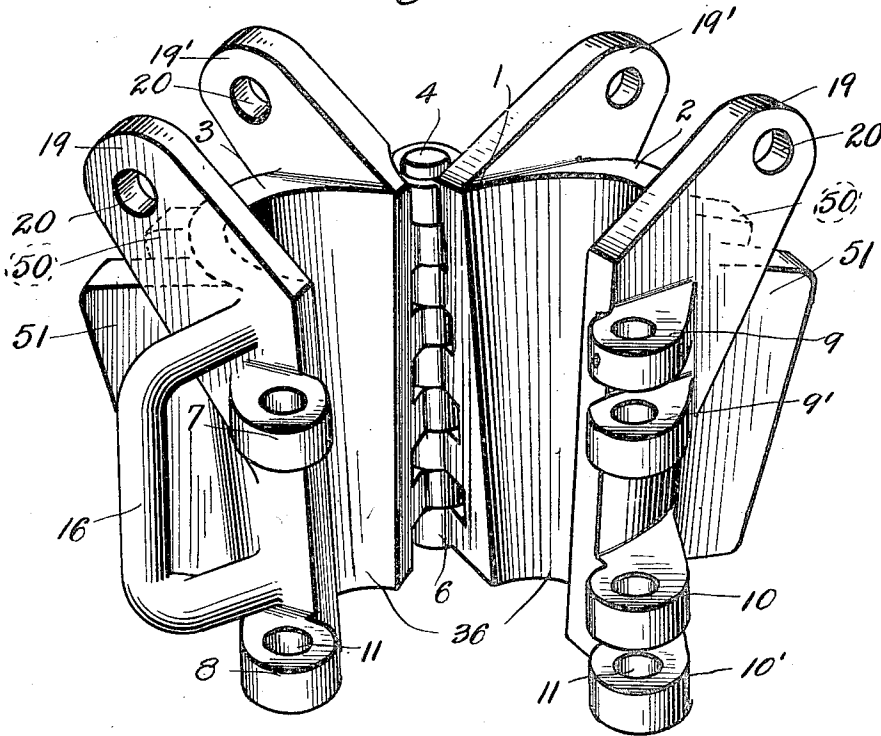


Fig. 6.

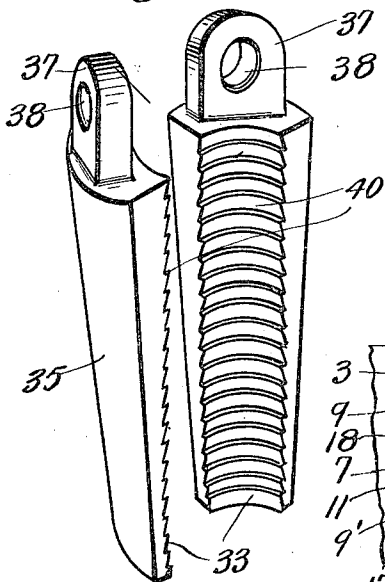


Fig. 7.

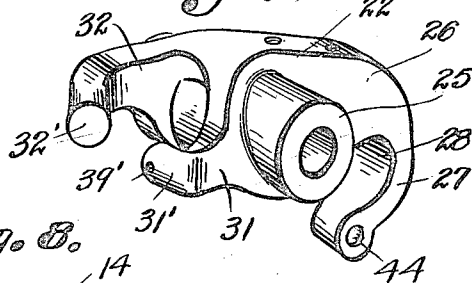
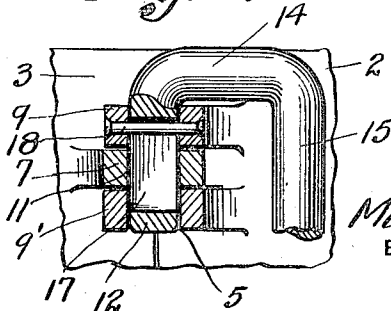


Fig. 8.



INVENTOR
Marvin B. Davis.
BY *Marvin B. Davis.*
ATTORNEY

UNITED STATES PATENT OFFICE.

MARVIN B. DAVIS, OF KANSAS CITY, MISSOURI, ASSIGNOR TO GEORGE KRELL, OF
SAPULPA, OKLAHOMA.

PIPE CLAMP.

Application filed August 21, 1925. Serial No. 51,563.

My invention relates to a pipe clamp of that character employed in oil field operations, and more particularly to one for use in pulling or setting casing, tubing or rods, and which will hereinafter be referred to as "pipe" with the understanding that such term is sufficiently comprehensive to include any form of object with which the invention may be employed; the principal object of the invention being to effect application of the clamp to the body of a pipe as distinguished from the connections or couplings as in the common practice.

In pulling and setting pipe it is desirable to grip the pipe as near the end as possible and in some forms of clamps heretofore employed, the load is applied to the coupling collar, with the not infrequent result that the collar collapses under the strain. With my invention I avoid application of the load to the collar, but I do, however, employ the collars as means for effecting application of the clamp to the body of the pipe below the collar.

In accomplishing this and other objects of the invention, I have provided improved details of structure hereinafter described and illustrated in the accompanying drawings, wherein

Fig. 1 is a perspective view of a clamp embodying my improvement, showing the clamp in open position ready for application to a section of pipe.

Fig. 2 is a plan view of the clamp as applied to the pipe, and after the slips are set.

Fig. 3 is a vertical, sectional view of the clamp, showing the setting members in feeling relation to the pipe.

Fig. 4 is a similar view, showing the jaws set in gripping contact with the pipe.

Fig. 5 is a perspective view of the clamp frame, the slips and slip-setting mechanism being removed for better illustration.

Fig. 6 is a detail perspective view of a pair of slips.

Fig. 7 is a perspective view of one of the slip-setting levers, and

Fig. 8 is a longitudinal, sectional view through the operating handle.

Referring more in detail to the drawings by numerals of reference,

1 designates a slip carrying frame comprising right and left halves 2 and 3, each semi-circular in cross section, and hingedly connected by a pin 4 so that they may open and close about a pipe and be latched by a

latching mechanism 5, hereinafter described. The members 2 and 3 are duplicates except for the latch elements. Each half is provided with hinge lugs 6 spaced to mesh with like lugs on the mating half, the lugs being provided with openings to receive the pin 4. The latch mechanism comprises ears 7 and 8 on the left half adapted to mesh with pairs of ears 9—9' and 10—10' on the right half. The ears are provided with openings 11 for receiving the ends 12 and 13 of a latching bar 14 having a handle 15 which may be employed by the operator for manipulating the right half of the clamp, and for his convenience I provide the left half with a handle bar 16 for operating that half. To prevent lifting of the latch out of the top ear 9, I provide the end 12 of the latch with a slot 17 which engages a pin 18 in the ear to limit the movement of the latch bar and retain it in functional position (Fig. 8).

Extending upwardly and outwardly from the top of each of the frame members, and preferably integral therewith, are paired ears 19—19' having openings 20 within which is rotatably mounted the shaft 21 of a slip-operating and supporting lever 22. The shaft 21 is here shown as a bolt provided with a nut 23 for retaining the bolt in place and itself keyed by a cotter pin 24.

Each slip-operating lever comprises a sleeve or hub 25 having an outwardly extending arm 26 provided with a hooked end 27 to form a seat 28 for receiving the cross bar 29 of a hanger link 30 by which the clamp is suspended from the tackle mechanism (not shown). Also extending from the hub 25, opposite the arm 26 and projecting toward the center of the clamp is a pair of slip-carrying arms 31 and 32, having inturned fingers 31', 32'.

I provide a pair of slips 33, 34 for each half of the clamp, each slip being preferably quarter round in cross section and elongated with its outer face, 35, tapered to conform to the tapered bore 36 of its frame member, to afford a radial wedging action when the slips are forced down within the frame members 2 and 3. Each slip is provided at its upper end with an ear 37 having an aperture 38 to receive the finger 31' or 32' of a complementary carrying arm 31 or 32, and is retained thereon by a cotter pin 39 or the like which extends through an opening 39' in the carrying finger. The aperture 38 in the

ear of the slip is somewhat larger than the finger, and preferably oval shaped to permit longitudinal play of the slips without binding of the connection, when the arms
5 move in a circular path and the slips somewhat vertically during setting travel of the slips.

The slips are provided on their inner surfaces with teeth 40 to insure a firm grip of
10 the pipe, and are so assembled within the frame members that each pair forms a vertically divided, substantially semi-circular gripping jaw on each half of the frame so that when the clamp is closed about the pipe
15 41, the slips combine to grip the pipe as illustrated in Figs. 2 and 4.

It is desirable that the clamp take hold only near the end of a pipe section, and to insure this positioning and also to avoid
20 necessity for manual closing of the slips, I provide for preliminary application of the clamp to the pipe at any point throughout its length, and automatic closing of the jaws only at the desired location adjacent the end
25 of the pipe. In this way it is possible to apply the clamp at any convenient point in the length of the pipe, then lift the clamp idly over the pipe until it reaches the clamping position, where automatic action is effected to close the slips on the pipe, so that
30 continued lifting of the clamp carries the pipe along with the clamp. To accomplish this it is necessary to have the slips normally spread sufficiently to permit idle movement
35 over the pipe. This is accomplished by springs 42, one for each slip-actuating lever. The springs are preferably coiled in tension, one end of each spring being fastened to a
40 lug 43 extending outwardly from the bottom edge of the frame, and the other end hooked in an opening 44 in the end of its complementary slip lever arm 27. The combined
45 strength of the two springs is somewhat greater than the weight of the clamp, consequently, the arms 27 of the slip levers are normally rocked downwardly and the slip-supporting arms upward under tension of
50 the springs, as illustrated in Fig. 3, thus normally holding the slips away from the pipe to provide clearance between the slips and
55 pipe and to permit the clamp to move idly over the pipe. To overcome this spring tension and set the jaws or slips, I provide each slip-actuating lever with an inwardly extending
60 feeler arm 45, comprising a flat spring secured to the top of each lever by screws 46 and provided with a head 47 having an inwardly opening, circular recess 48 of slightly greater diameter than the pipe but
65 of smaller diameter than the coupling collar 49 on the end of the pipe, so that when the feelers reach the collar, they are stopped thereby and hold against further movement along the pipe. Continued upward movement of the clamp frame causes the slip

levers to rock against the tension of the springs 42 so that movement of the slips is reversed and the tapered bore of the frame moving upwardly over the oppositely tapered walls of the downwardly moving
70 slips cam the slips inwardly to grip the pipe, so that further upward movement of the frame causes the pipe to move along with the clamp.

To protect the springs 42 from being accidentally displaced or broken, I provide each
75 member 2 and 3 with wings 50 and 51 between which the springs are housed.

While I have included description of operation of the clamp along with the description
80 of its structure, the operation may be briefly stated as follows:

Assuming the clamp to be constructed and assembled as described, and to be employed
85 for setting pipe, and assuming a stack of pipe sections in the derrick, with their coupling collars at the top, the operator on the tubing board tilts a section of pipe against the finger board, swings the clamp over it
90 and fastens the latch, the clamp usually being applied about 8 or 10 feet below the upper end of the pipe. The tackle then lifts the clamp, which slides over the pipe until the feeler heads engage the coupling collar,
95 when movement of the clamp along the pipe is stopped and the slips moved against the pipe. As movement of the tackle is continuous, setting of the slips is practically instantaneous and lift of the clamp is uninterrupted, the only difference being that prior
100 to the setting of the slips the clamp moves idly over the pipe while afterwards the pipe is carried with the clamp. The slips having gripped the pipe, the latter is elevated, carried to position, and lowered to connect with
105 pipe already in the well, after which the clamp is unlatched by an operator at the well platform and the clamp sent back for a new section of pipe, the springs 42 automatically rocking the stop levers to spread the slips
110 to release the held pipe and prepare the clamp for a new section when the clamp is relieved from weight of the pipe.

When pipe is to be "pulled", the operation described is reversed, the operation of the
115 clamp itself, however, being the same.

What I claim and desire to secure by Letters-Patent is:—

1. A clamp comprising a frame including hingedly connected members adapted to close
120 about an object to be clamped, slips loosely mounted in the frame and means on the frame and engageable with an object to be clamped to interrupt travel of the slips with the frame, the frame being operable on the slips to effect
125 radial closing movement thereof upon continued movement of the frame.

2. A clamp comprising a frame including hingedly connected members adapted to close
130 about an object to be clamped, slips carried

by and movable relative to the frame, and means on the frame and engageable with an obstruction on the object to be clamped to interrupt travel of the slips, the frame and slips having complementary cam surfaces whereby the held slips are moved radially to gripping position upon continued travel of the frame.

3. A clamp comprising a frame including hingedly connected members adapted to close about an object to be clamped, slips loosely suspended within the frame, means normally, yieldingly retaining the slips in open position, and means on the frame and engageable with an obstruction on the object to be clamped to interrupt travel of the slips with the frame, the slips and frame having complementary cam surfaces for effecting radial closing movement of the slips upon continued longitudinal travel of the frame.

4. A clamp comprising a frame including hingedly connected members adapted to close about an object to be clamped and having a downwardly tapering bore, tapered slips loosely suspended in said bore, means normally, yieldingly retaining the slips in spaced relation, and means on the frame and engageable with an obstruction on the object to be clamped in the path of the clamp to initiate closing movement of the slips, the frame exerting closing pressure on the slips upon continued travel of the frame.

5. A clamp comprising a frame, levers axially mounted in the frame, slips mounted on said levers for radial and longitudinal movement relative to the frame, means normally, yieldingly retaining the levers in slip-retracting position, and feeler arms connected with the levers and engageable with an obstruction in the path of the clamp, to shift the levers and initiate closing movement of the slips against the tension of said yielding means, the frame being engageable with the slips to exert gripping pressure thereof upon continued travel of the frame.

6. In a clamp, a frame comprising a tapered bore, levers axially mounted on the frame and comprising axle members, tapered slips axially and slidably moveable on said members, means normally, yieldingly retaining the levers in retracted position, and feeler arms on the levers engageable with an obstruction in the path of the clamp to rock the levers and initiate closing movement of the slips, the tapered surfaces of the frame and slips co-operating to effect further closing travel of the slips upon continued longitudinal travel of the frame.

7. A clamp comprising frame members, levers pivotally mounted on the frame members, slips mounted on the inner ends of the levers, hanger links engageable with the ends of the levers opposite the slips to support the clamp, and means on the levers engageable with an obstruction, to rock the levers and shift the slips to gripping position.

8. A clamp comprising frame members having complementary tapered bore portions, levers pivotally mounted in the frame members, tapered slips loosely suspended from the levers into the bore portions of the frame members, hanger links suspending the frame from said levers, springs connecting the levers and frame members, to normally retain the levers in retracted position against the weight of the frame, and feeler arms on the levers engageable with an obstruction to shift the levers against the tension of said springs and effect initial closing movement of the slips, the tapered surfaces of the frame and slips co-operating to effect further closing movement of the slips upon continued longitudinal movement of the frame.

9. A clamp of the character described comprising a frame having a tapered bore, slips having tapered walls engageable with the bore to clamp the slips against an object to be clamped when the frame is lifted with the slips in engagement with the object, means automatically opening the slips when relieved of weight of the object, and means, associated with the automatic opening means, suspending the frame and tending to close the slips.

10. A clamp of the character described comprising a frame having a tapered bore, slips having tapered walls engageable with said bore to close the slips against an object to be clamped, levers on said frame suspending the slips in the bore, means engaging the levers for suspending the frame, means yieldingly resisting tendency of said suspending means to close the slips against the object, and means for initiating closing movement of the slips.

11. A clamp of the character described comprising a frame movable along an object to be clamped and having a tapered bore, slips having tapered walls for engaging said bore to close the slips, means associated with the slips for suspending the frame and closing the slips, and means normally resisting closing of the slips and adapted for automatically opening the slips when the slips are relieved of excessive closing thrust.

In testimony whereof I affix my signature.
MARVIN B. DAVIS