B. ANDREWS, Jr.

TUBE CLAMP AND ELEVATOR.

APPLICATION FILED FEB. 17, 1908.

908,061.

Patented Dec. 29, 1908.

3 SHEETS—SHEET 1.

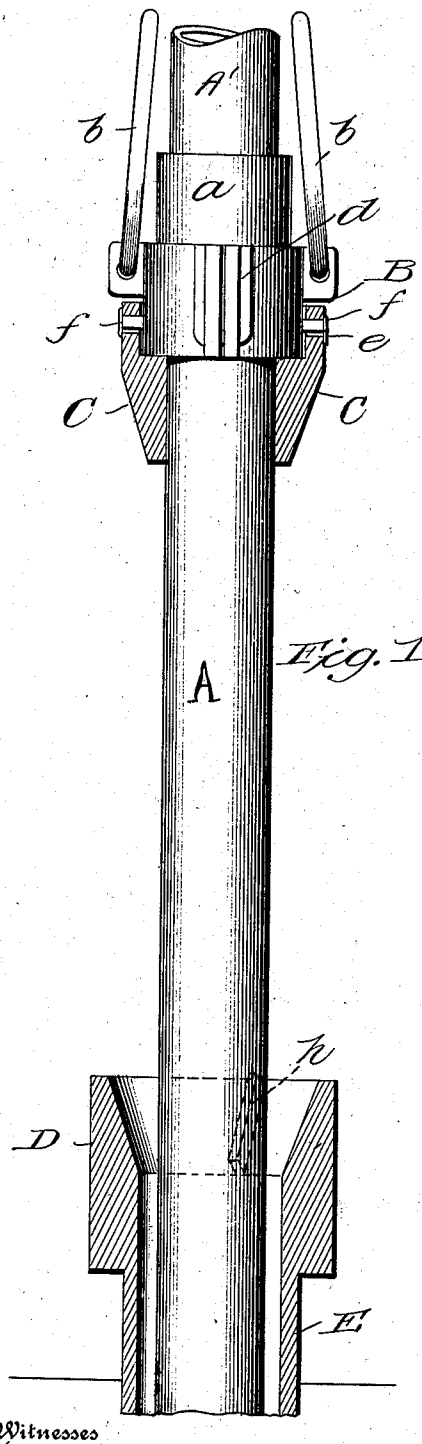
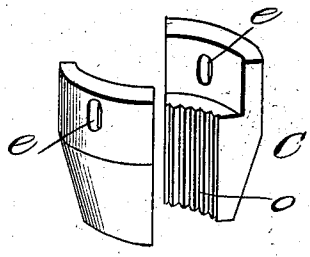


Fig. 1.

Fig. 3.



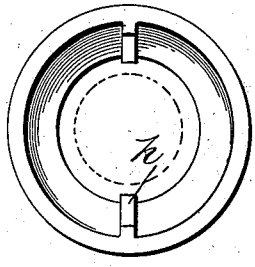


Fig. 4.

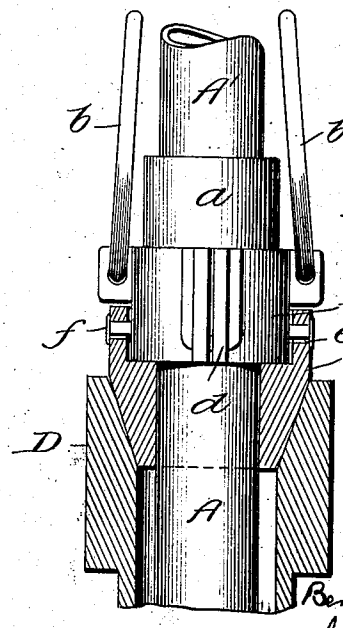


Fig. 2.

Witnesses

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3 SHEETS—SHEET 2.

Fig. 5.

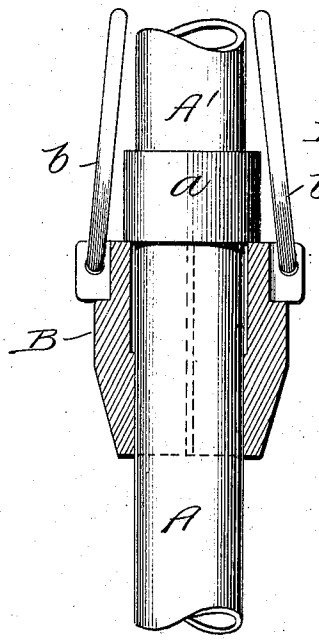


Fig. 6.

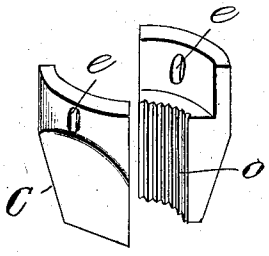


Fig. 7.

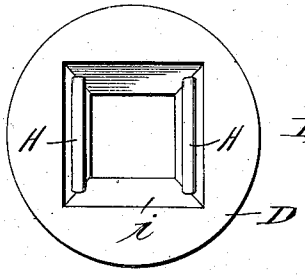


Fig. 8.

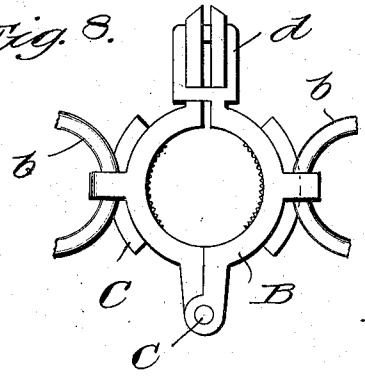
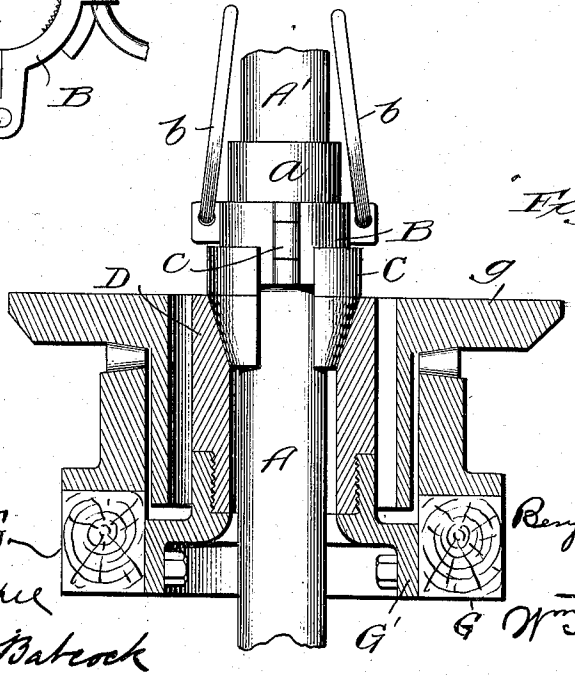


Fig. 9.



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3 SHEETS—SHEET 3.

Fig. 10.

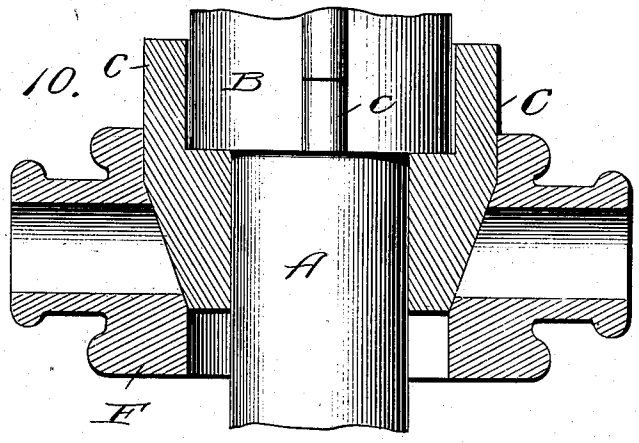


Fig. 11.

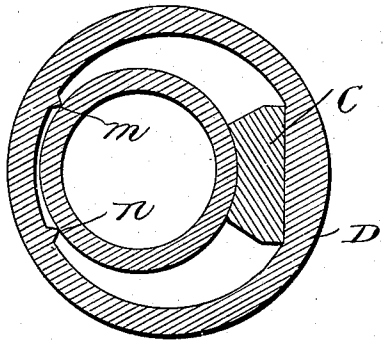
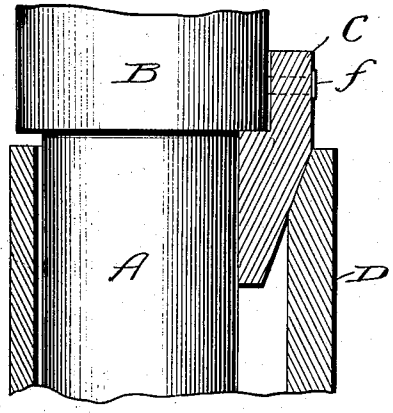


Fig. 12



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UNITED STATES PATENT OFFICE.

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TUBE CLAMP AND ELEVATOR.

No. 908,061. Specification of Letters Patent. Patented Dec. 29, 1908.

Application filed February 17, 1908. Serial No. 416,283.

To all whom it may concern:

Be it known that I, BENJAMIN ANDREWS, Jr., a citizen of the United States, residing at Mexico, country of Mexico, have invented certain new and useful Improvements in Tube Clamps and Elevators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Heretofore it has been generally necessary in unscrewing sections of pipe or tubing used in oil wells and for similar purposes to hold one of said sections motionless by a pair of clamping tongs known as the back-up tongs while using a second pair of tongs to turn the other section.

It is obviously desirable to substitute for the back-up tongs some automatic means for clamping the pipe against turning and to make such means operative only when the elevator is in the proper position for such engagement, the weight of the pipe and the contact of a fixed device or devices independent of the elevator causing such clamping action without interfering with the other functions of said elevator.

To this end my invention consists in the construction and combination of parts hereinafter more particularly set forth and claimed.

In the accompanying drawings, Figure 1 represents a view in vertical section partly in side elevation and broken away of two sections of drill pipe or boring tube, an elevator and the clamping wedges and annular back-up head embodying my invention, said head being on the upper end of the casing tube of the well and said back-up head and gripping wedges not being in operative contact; Fig. 2 represents a similar view of the same with these parts in operative contact; Fig. 3 represents a detail perspective view of the conoidal clamping wedges; Fig. 4 represents a plan view of the back-up head in which the said wedges fit; Fig. 5 represents a detail view similar to the upper part of Fig. 1 showing a modification; Fig. 6 represents a detail view of a modified form of the gripping wedges; Fig. 7 represents a plan view of the corresponding form of the back-up head; Fig. 8 represents a plan view of the elevator and attached parts shown in Fig. 5; Fig. 9 represents a vertical section of the table of a rotary boring machine, showing the devices embodying my invention applied thereto, these being partly in elevation; Fig. 10 represents a similar view of these devices embodying my invention arranged in an oil well casing head; Fig. 11 represents a sectional view of a modification of the said devices, using only one wedge; and Fig. 12 represents a vertical section of the same partly in elevation.

AA′ two tube sections, the lower one showing the usual terminal collar *a*.

B designates the annular elevator, provided as usual with suspending links *b* and consisting mainly of an annular body in two sections, hinged at *c* (Fig. 9) and connected by a catch *d* when closed around the pipe.

The above construction of this elevator and the form shown in the drawings form no part of this invention. Slightly different forms in common use may be substituted the weight of said pipe section rests wholly on the elevator and is the only force acting on the wedges, its action being a vertically downward pressure.

C designates a pair of clamping devices or wedges, preferably in the form of longitudinal sections of a cone, depending from said elevator on opposite sides thereof and attached thereto and being allowed a certain amount of yielding or movement toward each other so as to clamp the tube between them when pressed inward as hereinafter described. This movement is preferably provided for by the slots *e* in the upper ends of said clamping wedges, receiving headed studs *f* which project from the said elevator and allow a certain amount of yielding independent of the said elevator. As shown in Fig. 5, I sometimes make these wedges integral with the elevator and construct the latter so that its edges will not come quite together, the gap between them allowing the necessary yielding instead.

D designates an annular part or device which may be called a back-up head and may be fixed on an exterior well tube E (Fig. 11) or in a casing head F (Fig. 10) or within the central opening of rotary machine table G Fig. 9. In the last named case this annular part is provided with detachable supporting brackets G′ which are bolted to the said table. If intended for use with the conoidal form of clamping wedges the internal opening of said annular part is circular and tapers conoidally. It is also provided with stop ribs *h* to prevent the turning of said wedges

in the head. In some instances I use wedges of prismatic form and make the internal opening of said annular part prismatic also, as shown at *i* in Fig. 7. Anti-friction rolls H may be set into opposite faces of said back-up head for bearing on said wedges. Both the inner face of the back-up head and the outer face of each wedge may be inclined as shown or it will suffice to incline either the former or the latter.

When the elevator and pipe move up or down the wedges are normally quite free of the pipe and there is no interference with the ordinary operations of the elevator. But when the descending elevator and pipe reach the level of the back-up head the exterior of the clamping wedges will press against the inner face of said head or the rollers thereon and the inclination aforesaid with the weight of the pipe will force said wedges to clamp the pipe between them. The inner faces of the wedges normally extend inward farther than the inner face of the elevator to insure certain clamping action.

As shown in Figs. 11 and 12 I may use only a single wedge, the pipe then fitting against points *m*, *n* at the opposite side of the opening of said back-up head and being clamped by said wedge against the same. Otherwise the operation is as before described. The operative faces of the wedges are provided with vertical ridges *o* to secure a better hold on the pipe.

The weight of the tube is supported by the annular elevator B since this fits under the shoulder or collar *a*. The weight of the tube therefor presses continuously on said wedges C which are attached to said elevator and practically parts of it, the elevator wedges and pipe all moving vertically downward together until the inclined outer faces of said wedges reach the corresponding inner face of fixed part D, when the contact of said inner faces diverts the vertical pressure of gravity toward the axis of the pipe thereby causing the grooved and ribbed inner faces *o* of said wedges to grip said pipe so that it will not turn within them. One pipe section may thus be held immovable while an adjoining section is turned for screwing or unscrewing, or one section may be held and turned while the other is fixed.

The above action of the gripping wedges requires no means for positively pressing on the back of the wedges or applying friction thereto, nor any devices whatsoever in addition to the fixed part D, the elevator, the pipe and the single set of wedges for contact with part C. These wedges are not for lifting or lowering the pipe, that duty being performed by the elevator without any wedging action or reliance on grip or friction, said elevator being simply closed and fastened under said collar or shoulder that the latter may rest thereon. As soon as the upward pull on the elevator begins the wedges C are freed thereby without difficulty from the fixed part D. The very great simplicity of this tube clamping device both in construction and operation and the instantaneousness of its grip and release are especial points in its favor.

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

1. An elevator provided with depending clamping devices, in combination with an annular part provided with stops or ribs to prevent said devices from turning, such part being provided with an inclined internal face or faces arranged to engage the exterior faces of said clamping devices and force said devices toward each other for clamping a tube between them substantially as set forth.

2. An elevator provided with depending clamping devices, in combination with an annular part provided with stops or ribs to prevent said devices from turning and with an internal face or faces arranged to engage the external faces of said clamping devices, one of the engaging faces in each instance being inclined and arranged to force inward the clamping device, the said devices being thereby closed on the tube between them substantially as set forth.

3. An elevator provided with depending clamping wedges, in combination with an annular fixed part provided with stops or ribs for preventing the turning of said wedges, said annular part being internally inclined for contact with the outer faces of said wedges to force them inward on a tube between them substantially as set forth.

4. An elevator provided with depending clamping wedges, having outer faces in the form of longitudinal cone sections and inner faces which are curved to fit a tube and have vertical ribs formed thereon, in combination with a fixed annular part having a conoidal inner face arranged for contact with the outer faces of said wedges to force the latter inward against a tube between them, said annular part having means to keep said wedges from turning substantially as set forth.

5. An elevator provided with depending clamping wedges having outer faces in the form of longitudinal cone-sections and inner faces which are curved to fit a tube and have vertical ribs formed thereon, in combination with a fixed annular part having a conoidal inner face arranged for contact with the outer faces of said wedges to force the latter inward against a tube between them, said annular part being also provided with stops or ribs to keep said wedges from turning, substantially as set forth.

6. An elevator for hoisting pipe-sections out of a well or lowering them into the same, in combination with a clamping piece depending therefrom and provided with ribs to

prevent the pipe from turning and a fixed device on which said clamping piece rests when the pipe-sections are to be screwed and unscrewed, and which is provided with means to keep said clamping piece from turning, the outer face of said clamping device and the inner face of said fixed part being inclined to the axis of the pipe, and the weight of the pipe consequently tending to tighten the said clamping device upon it, substantially as set forth.

7. In combination with an elevator adapted to surround a pipe, for supporting said pipe, a gripping device or devices attached to said elevator to move up and down therewith and fixed means arranged for contact with the outer faces of said devices as the latter descend under the weight of said pipe, the contact faces of said devices and fixed means being adapted to force the said devices inward against said pipe for gripping the latter against turning substantially as set forth.

8. In combination with a pipe section, an annular elevator fitting around said pipe, receiving the weight of said pipe section to raise and lower the same, means for gripping the pipe to prevent its turning, attached to said elevator, and a fixed part arranged for contact with said means, the contact faces of said means and fixed part being adapted under the action of the weight of the pipe to force the said means into gripping contact with the pipe, said means being normally out of such contact as soon as lifted from said part.

9. An elevator for pipe-sections provided with a depending clamping piece and having a pin and slot connection therewith to allow a certain amount of play of the latter, in combination with a fixed part arranged to support said clamping-piece and elevator, said clamping piece and fixed part having an inclined face between them, in order that the weight of the pipe, drawing on the elevator, may cause said clamping piece to be forced inward substantially as and for the purpose set forth.

10. An elevator provided with a pair of depending clamping wedges and having pin and slot connections with them to allow them a certain amount of independent motion, in combination with a fixed part surrounding the pipe and wedges and supporting said wedges and elevator, said fixed part and wedges having an inclined face or faces between them in order that the weight of the pipe, drawing down said elevator and wedges, may cause the latter to clamp said pipe between them substantially as set forth.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

BENJAMIN ANDREWS, JR.

Witnesses:

JOHN L. FLETCHER,

RICHARD E. BABCOCK.