

June 3, 1930.

J. S. TAYLOR

1,762,037

PIPE HOLDER AND ELEVATOR

Filed Oct. 23, 1926

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Fig. 1.

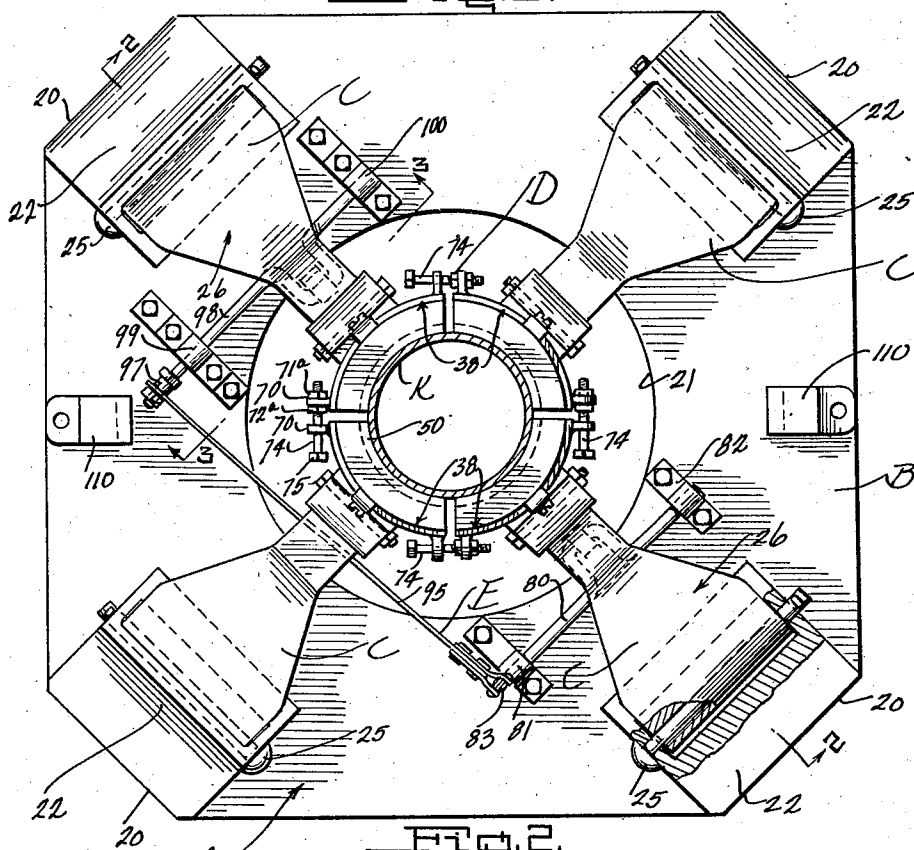
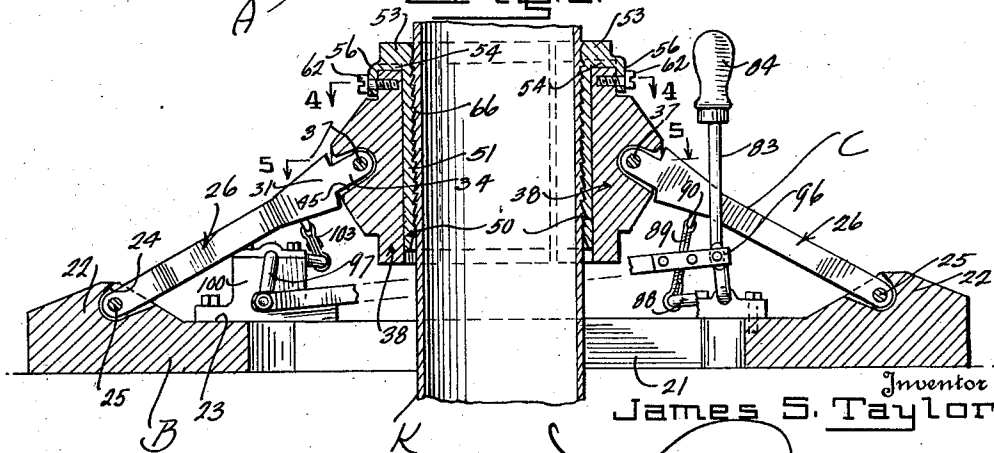


Fig. 2.



Inventor
James S. Taylor

By Lancaster & Morris
Attorney

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Fig. 3.

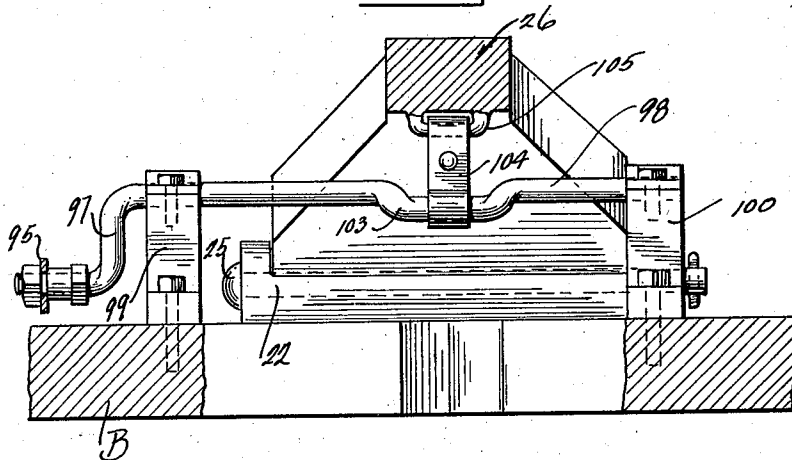


Fig. 4.

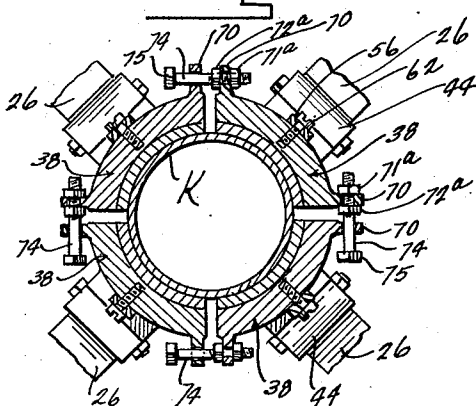


Fig. 5.

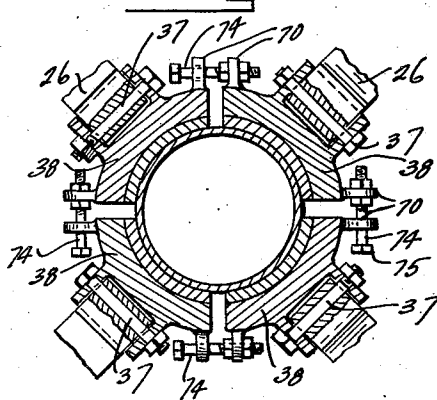
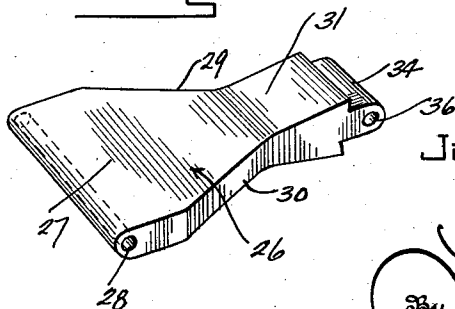


Fig. 6.



James S. Taylor
Inventor

Paul Lancaster A. Marvin
Attorneys

June 3, 1930.

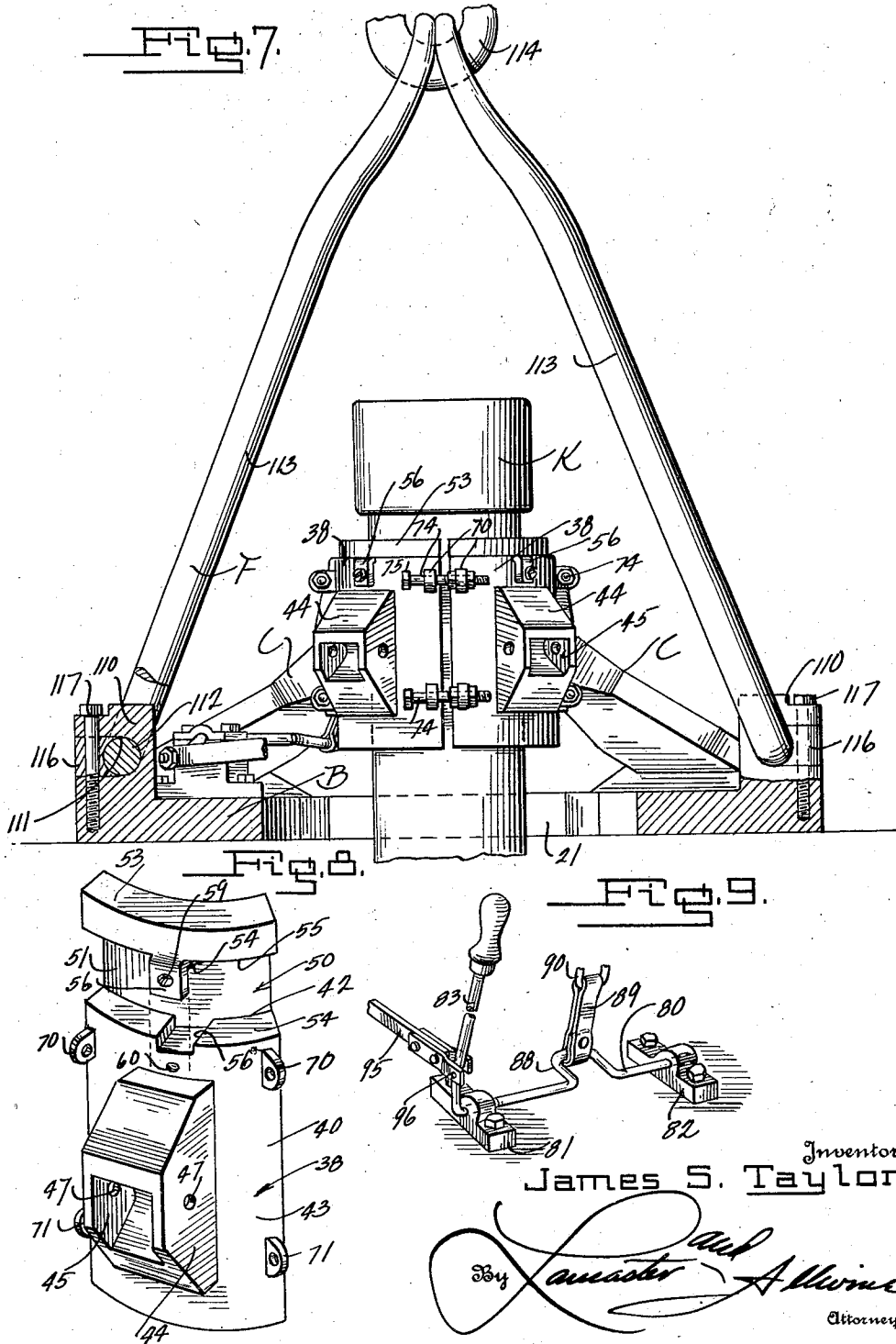
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UNITED STATES PATENT OFFICE

JAMES S. TAYLOR, OF WYNONA, OKLAHOMA, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, OF THREE-EIGHTHS TO LORY J. MILDREN, OF PONCA CITY, OKLAHOMA, AND TWO-EIGHTHS TO C. E. REED, OF WICHITA, KANSAS

PIPE HOLDER AND ELEVATOR

Application filed October 23, 1926. Serial No. 143,689.

This invention relates to an improved well casing or tubing holder and elevator.

The primary object of this invention is the provision of an improved mechanism preferably adapted to be used in connection with oil wells for the efficient holding of well pipe, such as casings and tubing in order to support the pipe efficiently upon the well platform, or permit the elevation of the tubing in connection with a conventional elevator mechanism.

A further object of this invention is the provision of an improved type of well casing support, embodying a novel type of jaw mechanism embodying a plurality of jaws which operate in unison to uniformly grip the casing circumferentially thereabout, whereby obviating eccentric well casing support action, as is caused by conventional casing supporting mechanism.

A further object of this invention is the provision of a relatively simple operable type of well casing and elevator including a plurality of jaws which may be efficiently and quickly operated by means of a single person.

Other objects and advantages of this invention will be apparent during the course of the following detailed description.

In the accompanying drawing, forming part of this specification, and wherein similar reference characters designate corresponding parts throughout the several views,

Figure 1 is a plan view of the improved pipe holder and elevator.

Figure 2 is a sectional view taken transversely thru the improved pipe or casing holder and elevator, substantially on the line 2—2 of Figure 1, showing jaws with serrations biting into the material of a pipe.

Figure 3 is a sectional view taken substantially on the line 3—3 of Figure 1.

Figures 4 and 5 are sectional views taken substantially on their respective lines in Figure 2 of the drawings.

Figure 6 is a perspective view of a connecting link for swivelly mounting a jaw upon the base of the improved holder and elevator.

Figure 7 is a view illustrating the manner in which the improved pipe holder may be

used as an elevator for elevating well tubing and casings.

Figure 8 is a perspective view of the exterior of one of the jaws, showing the relation in which the liner is received in the same.

Figure 9 is a fragmentary perspective view of certain jaw operating mechanism embodied in this invention.

In the drawings, wherein for the purpose of illustration is shown a preferred embodiment of this construction and means by which the same may be used either as a casing support upon the well platform or as an elevator, the letter A may generally designate the improved pipe holder and elevator, which may comprise a supporting base B, having novel jaw structures C mounted thereon, preferably four in number, being connected for synchronous opening and closing, by means D. Operating means E is provided for manually causing the opening and closing of the jaws in cooperation with the means D. The means F may be provided for connecting with the base B when the device is being used as an elevator for well casing and tubing.

The base B is relatively heavy, preferably being made of material suitable to withstand the strains and forces placed thereon incident to the holding and elevation of well casing and tubing, as will be understood by those skilled in the art to which this invention relates. The base B in the plan view is preferably polygonal in form, somewhat in the nature of a square with the corners thereof removed to provide the bevel edges 20, adjacent which the four jaw structures have their pivotal connection. The base B centrally thereof is provided with a preferably circular opening 21 thru which the upper end of a tubing or casing K extends, as is illustrated in Figure 7 of the drawings.

Referring to the jaw constructions the same are each identical, and each of the same is provided with a preferably integral bearing 22 at one of the corners on the base B, being raised from the normal top surface 23 of the base B. Each bearing 22 is provided with a socket opening 24, thru which a transverse pivot pin 25 extends, to pivotally connect the lower end of a jaw supporting link 26. The

jaw supporting link 26 is best illustrated in perspective in Figure 6 of the drawings, having a lower widened end 27 provided with a transverse opening 28 to receive the pin 25 above mentioned. At a distance above the widened end 27 the same is provided with converging side edges 29 and 30, which extend to a portion 31 which may be termed the upper or forward reduced portion, that is, reduced as to width, but said portion 31 increases in thickness towards the free end thereof opposite the pivot end of the base B, as is well shown in Figures 2 and 6 of the drawings.

At its jaw connected end the link 26 is provided with a forward jaw connecting shank 34, provided with a transverse opening 36 therein parallel to the opening 28 above mentioned, adapted to receive a pivot pin 37, mounted on one of the jaw members 38, in order to connect the latter thereto for oscillation thereon.

The construction of each jaw member 38 is well illustrated in the various views of the drawings, as including a transversely concavo-convex or segmental body 38 providing a liner receiving concave face 42 and a convex outer face 43. On the convex face 43 is disposed a radial link connection 44, which provides an outwardly disposed socket 45 therein adapted to receive the shank 34 or the connecting link 26 above mentioned. The side walls of the extension 44 are apertured at 47 for receiving the ends of the pin 37 which as above mentioned is used to pivot the jaw member 38. The pins 25 and 37 are both detachable, and are in the nature of rivets of approved formation.

The jaw bodies 38 are of course concentric, in so far as the arrangement on the device is concerned, and are always arranged in annular relation, to provide a passageway which is truly circular for receiving a casing or tubing K. Each jaw 38 receives a detachable liner 50, on the concave face 42 thereof. Due to the extreme forces placed thereon the liner 50 is of an exceptionally durable metal construction, and includes the concavo-convex segmental body portion 51, adapted to fit into conformity over the concave surface 42 of the jaw member 38; it being understood that in width the liner 50 exactly conforms with the curvature of the body 40. The liner body 50 at the top thereof is provided with an overhanging flange 53, which overlies the top surface 54 of the body 40 of the jaw member 38, to serve as protection for the jaw body portion, and to serve to anchor the liner onto the jaw body. As an additional means to securely and effectively connect the liner to the jaw body 40 the said top wall 53 is provided with a depending lug 54 extending below the normal bottom surface 55 of the flange 53, which is adapted to seat within a recess 56^a formed

inwardly of the top surface 54 of its respective jaw body 38, as illustrated in Figure 8, to maintain the liner 50 in position on the jaw body 40 against circumferential movement. As a means to limit longitudinal movement of the liner 50 with respect to the jaw body 40, a depending flange 56, preferably contiguous with the lug 54 is suspended from the wall 53, beyond the outer surface thereof, adapted to fit over the outer surface of the jaw body 40, the same having an opening 59 therein to align with a screw threaded opening 60 transversely thru the body 40, to receive a detachable screw 62 illustrated in Figure 2 of the drawings, to retain the liner in non-movable relation upon the jaw body, as can be understood from the drawings. The inside concave surface of the liner 50 is provided with a toothed surface 66, illustrated in Figure 2 of the drawings, preferably tapered upwardly in order to effectively grip the tubing or casing K to prevent the same from slipping downwardly thru the jaw construction.

Referring to the means D for maintaining the uniformity in operation of the jaws, each jaw member 38 on the external surface 43 of the body 40 thereof, adjacent each of the side edges thereof, is provided with upper and lower apertured lugs 70 and 71. When the jaws 38 are in position, the upper apertured lugs 70 of the facing sides of adjacent jaws will have the axes thereof in aligning relation, for receiving bolts or guide pins 74. The guide pin 74 for each pair of aligning apertured lugs of adjacent jaws, is rigidly connected in an adjustable relation with one of the lugs, and slidably extends thru the aperture of the other lug. Thus, as is illustrated in the various views of the drawings, the guide pin or bolt 74 is provided with a screw threaded shank which extends thru one of the lugs, having lock nuts 71^a and 72^a at opposite sides of said lug 70. The smooth end of the shank of the bolt 74 extends thru the aperture of the other lug 70, as is illustrated in Figure 4 of the drawings, and the head of the bolt 74 serves to prevent the bolt from being removed from the aperture of the last mentioned lug 70. Thus, it is apparent that each of the jaws is connected at the upper and lower end thereof by means of the guide bolts 74 to the upper and lower ends of the adjacent jaw, to insure that all of the jaws will open and close in an exact concentric relation.

The jaw structures C are pivoted in diametrically opposed pairs, by means of the links 26, so that it is apparent that upon lifting upwardly on the link 26 of one jaw, and due to the guide pins or bolts 74, the other jaws will likewise be lifted upwardly and moved outwardly concentric with the other jaws.

Referring to the operating means E, the

same includes a shaft 80, pivotally supported on bearings 81 and 82 beneath one of the jaws C, with the shaft 80 extending in a line at right angles to the link 26 beneath which it is placed. The shaft 80 at one end thereof is provided with an upwardly extending substantially vertical lever 83, having a handle 84 on the top thereof. This shaft 80 intermediate the ends thereof, as illustrated in Figure 9 is provided with a throw portion 88, to which is pivotally connected a link 89; the opposite end of said link 89 having a connection at 90 to the jaw link 26 immediately thereabove, adjacent the outer end of said jaw link 26, so that it is readily apparent upon oscillation of the shaft 80, that the link 26 will be alternately elevated and lowered, due to the link and throw portion connection, to elevate and lower the jaw member 38. The lever handle 83 is provided with a connecting rod 95, pivotally connected at 96 thereto, which extends transversely across the base, preferably at right angles to the shaft 80, and at its opposite end connected to an arm 97 of a second shaft 98, which is pivotally supported on bearings 99 and 100 beneath the link 26 of a jaw structure which is diametrically opposed from the jaw structure beneath which the first mentioned shaft 80 is mounted. The shaft 98 is mounted exactly parallel to the shaft 80, and intermediate the ends thereof the same has a throw portion 103, illustrated in dotted lines in Figure 1 of the drawings, and also illustrated in Figure 3 of the drawings, which throw portion is connected to a link 104 which in turn is connected at 105 to the jaw connected link 26 immediately thereabove. It is readily apparent that upon swinging of the lever 83, both shafts 80 and 98 will be simultaneously rocked, to simultaneously elevate or lower the jaw links 26 respectively thereabove, and to consequently cause a proximate or remote movement of the jaw members 38 which are respectively connected thereto. It is not necessary to place operating lever means below the other two jaw constructions, since due to the means D above described all of the jaws will be operated in unison to uniformly and concentrically expand or contract with respect to a casing or tubing which may be received therethrough.

In the application of the invention as a casing holder upon a well the base B is of course rested upon the platform, casing, or any other suitable location where the same can support the well casing or tubing K in the desired relation. It is at once apparent, since the links 26 diverge upwardly, at an angle to the horizontal, on which the base B rests, that due to the weight of the casing K, the jaws 38 will have a clamping action upon the casing which increases proportionate to the weight of the casing.

In order to release the casing it is merely

necessary for the operator to swing the lever 83 from the position illustrated in Figure 2 of the drawings, away from the well casing K received between the jaws 38, and this will move the jaws 38 away from each other, concentrically and uniformly away from the casing K in order to release the latter.

As above mentioned the improved casing holder is adaptable for use as an elevator. To this end, the base B is provided with upstanding connecting ears 110, at diametrically opposed sides thereof, having horizontal sockets 111 therein, open horizontally outwardly at the outer sides of the base B. The sockets 111 are adapted to receive therein the hook-shaped ends 112 of suitable elevator reins or rods 113, illustrated in Figure 7 of the drawings, which are suitably connected to a cable hook or coupling 114. The rods 113 extend upwardly from the ears 110 in a converging relation towards the coupling 114. In order to retain the hooks 112 in the socket openings 111, suitable filler pieces 116 are provided for fitting in the socket openings 111, at the outer sides of the hooks 112 when received therein; the filler pieces 116 being apertured for the reception of detachable bolts or screws 117, which engage transversely thru the ears 110 across the socket 111, as is illustrated in Figure 7 of the drawings.

From the foregoing description of this invention it is apparent that a novel type of well casing holder, support, and elevator has been provided, which will efficiently support the casing in an evenly clamped and durable manner, against liability of accidental slipping of the casing, or disconnection thereof. The ease with which the jaw construction may operate is a commendable feature, since it merely necessitates the intervention of a single operator in order to operate all of the jaws, and this is contrary to conventional practice where clamping slips are used to support casings, which in themselves provide a very unsatisfactory and eccentric grip on the well casing, and require the combined efforts of several persons in order to connect or disconnect.

Various changes in the shape, size, and arrangement of parts may be made to the form of invention herein shown and described, without departing from the spirit of the same or the scope of the claims.

I claim:

1. As an article of manufacture a jaw construction for well casing holders comprising a concavo-convex jaw, a concavo-convex metal liner for the concave side of said jaw, said concavo-convex liner having a flange at one end thereof adapted to overlie one end edge of said jaw, said jaw being recessed in the top of the edge over which said flange lies, and said flange having a depending lug adapted to fit into said recess to prevent circum-

ferential movement of the liner with respect to the jaw.

2. As an article of manufacture a jaw construction for well casing holders comprising a concavo-convex jaw, a concavo-convex metal liner for the concave side of said jaw, said concavo-convex liner having a flange at one end thereof adapted to overlie one end edge of said jaw, said jaw being recessed in the top of the edge over which said flange lies, said flange having a depending lug adapted to fit into said recess to prevent circumferential movement of the liner with respect to the jaw, and means for securing the liner to the jaw, in a non-obstructing relation with respect to the concave face of said concavo-convex liner.

3. In a well casing holder the combination of a supporting base, links pivoted on said base, jaws pivoted on said links operating means carried by the base and operating on less than the total number of links to directly move the jaws connected to said links on which the operating means operates, and means carried by the jaws of those links upon which the operating means operates said means being connected with the remaining jaws to insure movement of the latter jaws upon operation of the other jaws.

4. In a well casing holder the combination of a supporting base, oppositely disposed pairs of jaws in a concentric relation, links pivoting the jaws of one pair to the base, links pivoting the jaws of the other pair of jaws to the base, operating means carried by the base and operating on the links of one pair of jaws, and means connecting the last mentioned jaws with the jaws of the other pair to cause a uniform concentric opening or contracting movement of said jaws during movement of said operating means.

5. In a well casing holder the combination of a supporting base, oppositely disposed pairs of jaws in a concentric relation, links pivoting the jaws of one pair to the base, links pivoting the jaws of the other pair of jaws to the base, operating means carried by the base and operating on the links of one pair of jaws, and means connecting the last mentioned jaws with the jaws of the other pair to cause a uniform concentric opening or contracting movement of said jaws during movement of said operating means, said last mentioned means which connects said jaws comprising pins rigidly carried by each of said jaws having a slidable connection on the adjacent jaws.

6. In a well casing holder the combination of a base, links pivoted upon said base, jaws pivoted upon said links, operating means carried by the base and including shafts with throw portions beneath said links, and links connecting said throw portions with the first mentioned links to operate the same for mov-

ing the jaws in a contracting or opening relation.

7. In a well casing holder the combination of a supporting base, links pivoted upon said supporting base, jaws pivoted upon said links, transverse shafts rotatable on the base in transverse relation beneath said links, said shafts including throw portions, means for synchronously operating said shafts, and means connecting the throw portions of said shafts with the links for pivotally moving the same.

8. In a well casing holder and elevator, a base having an opening for the passage of a well casing, segmental jaws on opposite sides of said opening and centrally in line diametrically therewith, a link for each jaw pivoted thereto and to the base, said links being opposite each other and disposed in a vertical plane diametrically relative to said opening and centrally of the jaws to which they belong, a pair of shafts, one beneath each of said links, said shafts being transverse to said links and having throw portions centrally thereof adapted for movement in said diametrical vertical plane, the throw portions having connection with said links for applying power to the undersides of said links to move said jaws, and means connecting said shafts whereby upon movement of one throw portion of one shaft to cause a like and corresponding movement of the other throw portion of the other shaft.

9. In combination in apparatus of the class described a base having an opening, a pair of jaws, relatively disposed at opposite sides of said opening links pivotally connecting the jaws on the base, each link being connected at one end to the respective jaw and at the other end to the base, means for operating said pair of jaws to open and close the same, other jaws arranged intermediate the jaws first mentioned, links pivoting the last mentioned jaws on the base similar to the first mentioned jaws and sliding connections between the operated jaws and the intermediate jaws whereby the latter partake of the movement of the pair of jaws first mentioned, substantially as described.

10. In apparatus according to the preceding claim in which the sliding connections are arranged between each edge of each intermediate jaw and the adjacent edge of the operated jaw, substantially as described.

11. In a well casing holder, the combination of a supporting apertured base, links pivoted on the supporting base surrounding the aperture therein, jaws pivoted on the proximate ends of said links at the central portion of each jaw between the side edge thereof, said jaws forming the quadrantal segments of an annular jaw structure, said pivoted connection of the jaws to the links being tangentially disposed relative to said annular jaw structure, and sliding

connections between the adjacent jaws tangentially disposed across the adjacent side edges of the jaws, said connections being disposed adjacent the pivotal connections of the links with the jaws and lateral thereof, and means mounted on the base for opening and closing the jaws.

12. In a well casing holder the combination of a supporting apertured base, links pivoted upon the supporting base surrounding the aperture therein, jaws pivoted upon the proximate ends of said links at the central portions of the jaws between the side edges thereof, sliding connections between the adjacent jaws disposed along the adjacent margins of the jaws and laterally of the pivotal connections of the links with said jaws, and means mounted on the base for opening and closing the jaws, consisting of lifting and lowering devices connected with the links beneath the same and intermediate the connection of the links with the base and their respective jaws.

13. In a well casing holder, the combination of a substantially flat relatively shallow supporting base having a casing receiving opening therethrough, links pivoted directly on the top of said base and extending upwardly and inwardly over said opening, jaws pivoted on the inner ends of said links so that said jaws are disposed over said opening and above the top surface of said base, and operating means mounted upon the top surface of said base and operating beneath the links intermediate the ends thereof for causing the elevation and lowering of the links and the opening and closing of the jaws therewith all above the top surface of said base, said jaws being concentrically arranged above and about the opening and each forming a quadrant of an annulus, the links being diametrically disposed, one for each jaw.

JAMES S. TAYLOR.