

June 11, 1929.

E. E. STEVENSON

1,716,840

POLISH ROD GRIP

Filed March 9, 1925

2 Sheets-Sheet 1

Fig. 1.

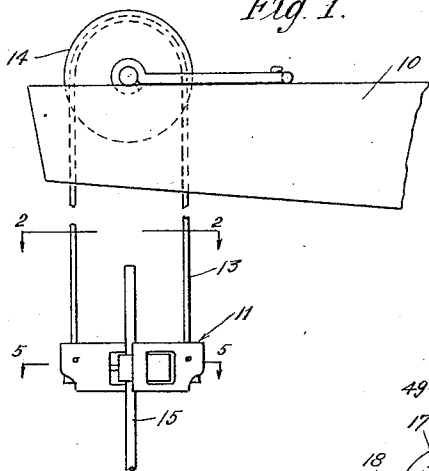


Fig. 2.

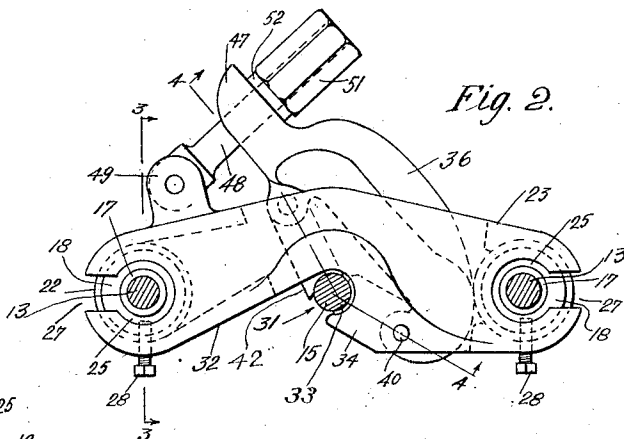


Fig. 3.

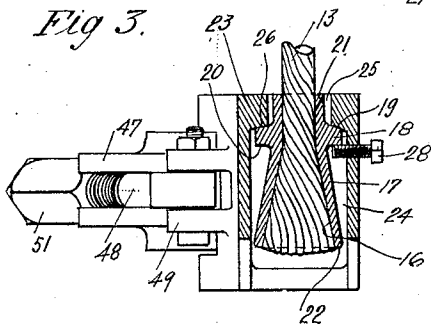


Fig. 4.

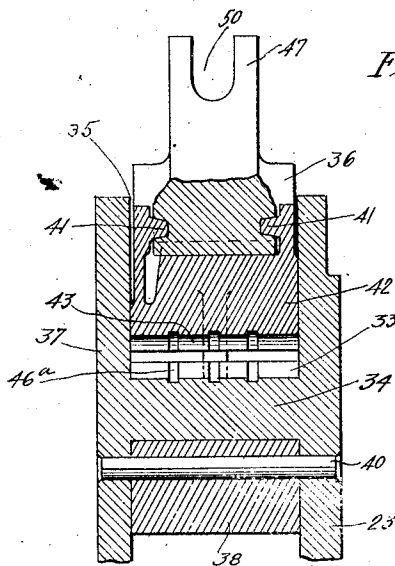
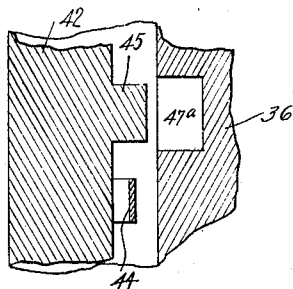


Fig. 7.



Inventor.
Edward E. Stevenson.

Attorney.

June 11, 1929.

E. E. STEVENSON

1,716,840

POLISH ROD GRIP

Filed March 9, 1925

2 Sheets-Sheet 2

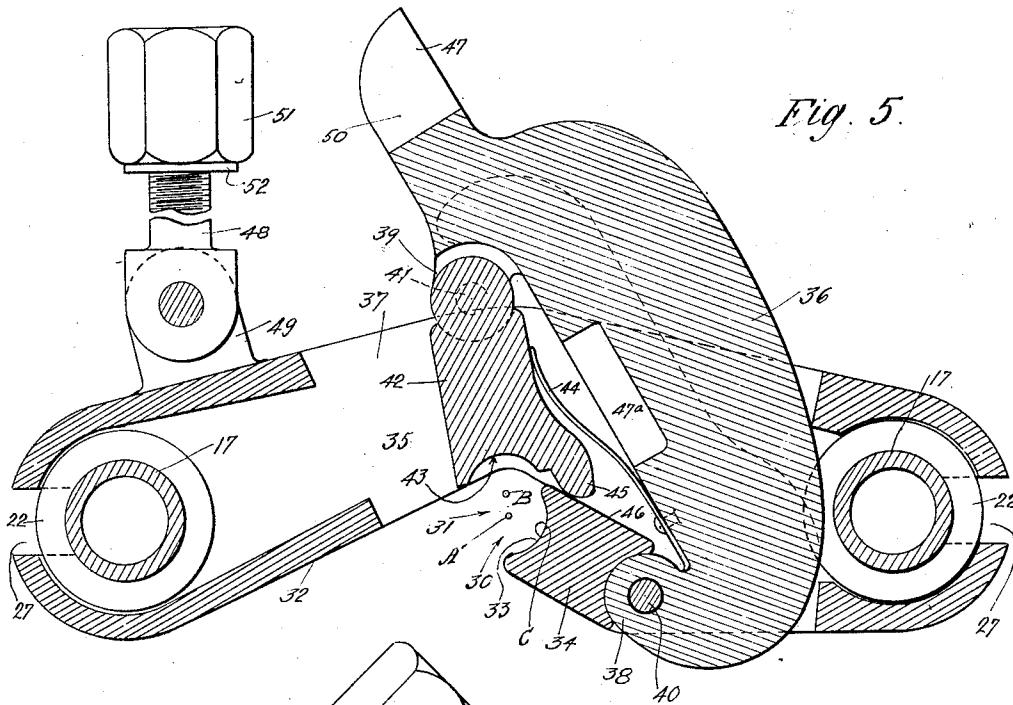


Fig. 5.

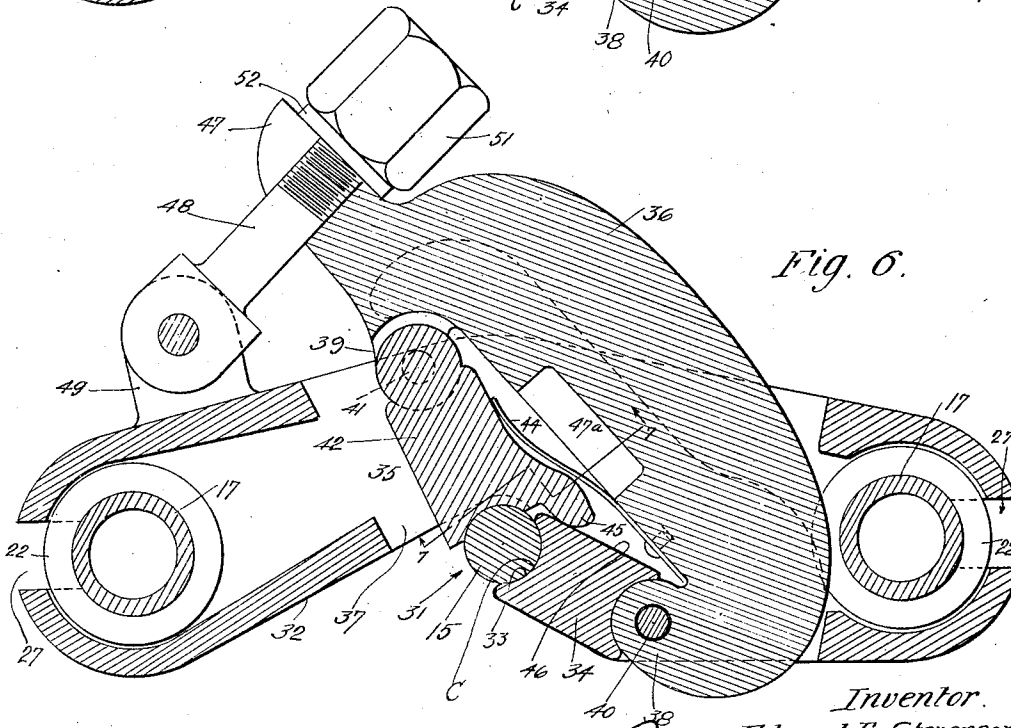


Fig. 6.

Inventor.
Edward E. Stevenson.

Wm. T. Buckles
Attorney.

UNITED STATES PATENT OFFICE.

EDWARD E. STEVENSON, OF LOS ANGELES, CALIFORNIA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO EMSCO DERRICK & EQUIPMENT COMPANY, OF LOS ANGELES, CALIFORNIA, A CORPORATION OF CALIFORNIA.

POLISH-ROD GRIP.

Application filed March 9, 1925. Serial No. 14,303.

This invention has to do generally with clamping devices and is particularly applicable to grips suspended from walking beams over deep well pumps and adapted to be clamped to sucker rod lines, whereby reciprocating movement of the beams is transmitted to the sucker rods and the pump plungers at the bottom thereof. While the invention in its broader aspects, is not limited to this particular application, I will describe it as so applied in order that a full understanding may be had of a typical embodiment; it being understood, however, that this is not to be construed as limitative on the invention.

Due to the great weight of sucker rod lines in wells of any considerable depth, it is essential that the grip clamp the rods most tightly to prevent longitudinal slippage of the rods. My device is capable of thus gripping the rods without in any way mutilating or weakening them, and yet the device may be applied and detached with minimum effort and in minimum time. Since the clamp is adapted to have only a frictional grip on the polish rod, it may be equally well applied thereto at any point along its longitudinal extent, there being no necessity of shouldering or otherwise specially forming the rod to take the clamp, or in any way altering the several elements to fit a given installation.

The usual clamp comprises two members hinged connected at one end and adapted to take the rod between them, there being means for applying power to the other ends of the members for moving them into clamping engagement with the rod. Therefore, the connection at one or the other ends of the members must be broken to enable the operator to apply and remove such grips from given rods, a time consuming and arduous task, especially in view of the comparatively great bulk and weight of grips (they run from forty to one hundred pounds, and since they are suspended in midair by flexible means, they swing about in a disconcerting manner when tools are applied thereto.) In contra-distinction to such an arrangement, my grip embodies a vertical channel in the outer face of the body member so the device is applied to a given rod by merely thrusting the body member towards the rod, there being provided a jaw

movably mounted on the body member 55 which is then adapted to be moved towards the channel and grip the rod between it and the channel face. It is not necessary that the jaw project clear across the channel mouth, as is true of usual grip jaws, in order to hold the rod from accidental displacement.

I provide a toggle joint arrangement for urging the movable jaw towards the channel and thus gain tremendous leverage advantage, ample frictional grip on the rod being thus assured.

The flexible supporting means is attached directly to the body member at opposite sides of the rod receiving channel, an obvious advantage over the type of grip wherein one end of the supporting cable is attached to the body member and the other end to the hinged jaw.

Furthermore, none of the strain imposed by the weight of the sucker rod line is put upon the movable connection between body member and movable jaw, a fact not true of usual grips, to their disadvantage.

The device is so designed that it is capable of well withstanding the extremely severe service conditions to which it is exposed.

Further objects and features of novelty will be made apparent in the following detailed specification, reference being had to the accompanying drawings, in which:

Fig. 1 is a fragmentary view of a walking beam carrying my improved grip;

Fig. 2 is an enlarged plan view on line 2—2 of Fig. 1;

Fig. 3 is a transverse section on line 3—3 of Fig. 2;

Fig. 4 is an enlarged section on irregular line 4—4 of Fig. 2;

Fig. 5 is an enlarged section taken about on the line 5—5 of Fig. 1, but showing the grip open;

Fig. 6 is a view similar to Fig. 5 but showing the grip closed about a rod; and

Fig. 7 is a fragmentary section on irregular line 7—7 of Fig. 6.

First referring to Fig. 1, numeral 10 designates a usual walking beam adapted to be reciprocated by any suitable means (not shown). While the grip 11 may be supported by or suspended from beam 10 in any suitable manner, I will describe the particular and preferred means illustrated, but

this is not to be considered as in any way limiting the invention.

A cable 13 is trained over sheave 14, the latter being journaled on the beam, and is attached at its opposite ends to grip 11, the grip, in turn, being clamped (in a manner to be described) on the uppermost length or polish rod 15 of a usual sucker rod line. The sheave and cable connection between beam and grip serves as an equalizer to compensate the variable angularity of the beam, it being understood that during the down stroke of the beam, the sucker rod line gravitates by reason of its great weight, increased, of course, by the weight of the grip and pump plunger. The cable ends are passed into the taper bores 16 of sleeves 17 and anchored therein by spreading and leading-in the cable strands. Sleeves 17 have external peripheral flanges 18 presenting upwardly facing shoulders 19 and downwardly facing shoulders 20, the outside diameter of the sleeve portion 21 which extends above the flange being of substantially uniform diameter throughout its longitudinal extent, whereas sleeve portion 22, below the flange, is conical.

At each end of grip body member 23 is a vertically extending bore, the lower portion 24, thereof, being of a diameter to take sleeve portion 22, and the upper portion 25 being of a diameter to take sleeve portion 21. A shoulder 26 is formed at the junction of the two bore diameters, the sleeve being introduced from beneath the body member and being then thrust upwardly until flange shoulder 20 engages shoulder 26. Vertically extending slots 27 in the ends of the body member open into bores 24, 25, being of a width to allow transverse movement of cable 13 therethrough when the sleeves are brought into vertical alinement with the body member bores preliminarily to introduction of the sleeves thereto.

Set screws 28 extend into bores 24 to form stops beneath shoulders 20, whereby the sleeves are prevented from dropping from the body member bores in the event beam 10 descends without a coincident descension of grip 11, a condition which sometimes arises when the pump plunger sticks in the barrel and prevents sucker rod gravitation. The described connection between cable and grip is sufficiently flexible for the purpose.

A channel 30 extends vertically across the forward side or face of body member 23 the channel being located approximately midway between bores 25 and with its axis A approximately in line with the two bores 25. It will be noted that channel mouth 31 opens somewhat towards one end of the body member rather than opening perpendicularly to the common axial plane of bores 25. Guide face 32 of member 23 inclines and leads directly to the channel mouth, so, in applying

the grip to rod 15, the operator has but to push the grip towards the rod until face 32 is engaged, whereupon endwise movement of the grip draws the channel about the rod. Application of the grip may be described as a hooking operation, as the body member with its channel, forms, in effect, a hook adapted to be engaged with the rod by relative horizontal movement.

Face 33 of channel 30 is preferably arcuate, and may be considered properly as a jaw or gripping face, since it is between this face and a movable jaw member that rod 15 is adapted to be clamped. I will, therefore, term portion 34 of body 23, a jaw member, which in the illustrated embodiment of the invention is integral and therefore fixed in position with regard to body 23.

The interior of body member 23 is cored out at 35 to receive lever 36 and its associated parts, said lever resting on and being pivotally supported by the wall or plate 37 which defines the lower extent of the cored out portion.

The opposite ends of lever 36 are provided with opposed hooks or offset portions 38, 39, pin 40 extending through the body member and portion 38 to support the lever pivotally, cored out portion 35 being of sufficient lateral extent to allow considerable range of pivotal movement to the lever.

Pivoted at 41 to lever 36 (Fig. 4) is movable jaw 42, the free end 43, of which is preferably arcuate. As will be later apparent, lever 36 and jaw 42 may be considered together as a gate for confining a rod within channel 30. And it will be noted that the lever furnishes the sole connected support for the jaw, and that the jaw is bodily movable with respect to the body member. Spring 44 is interposed between lever 36 and jaw 42 and functions yieldingly to swing jaw 42 outwardly, the outward movement of the lever being limited by the sliding engagement of the jaw carried stop lug 45 with the inner face 46 of jaw 34. Spring 44 and lug 45 serve to maintain the jaws in predetermined relative position when the grip is opened up as in Fig. 5, so rod 15 will be received between opposed jaw faces 33 and 46, Fig. 6, to present better gripping surfaces when the body member is hooked on the rod, and they also serve to guide the jaw into complementary relation with face 33 when the lever is moved pivotally to close the grip. Lever 36 is recessed at 47^a to accommodate lug 45 when the lever is swung to its limit in a clockwise direction (as viewed in Fig. 6).

Assuming that the rod has been entered in channel 30, counter-clockwise movement of lever 36 swings the pivotal end of jaw 42 in the same direction, but due to the sliding engagement of lug 45 with stationary

jaw 34, the free end of the jaw is merely swung partially around the rod and into engagement therewith at the side approximately opposite jaw 34. Now, since axis A lies at a point considerably distant from the line of centers of pivot points 40, 41 when the grip is open (Fig. 5) the distance between said pivot points is considerably less than the distance between axis A (or a given point C on face 33) and point 40 plus the distance between axis A (or said given point) and point 41. Hence, when lever 36 is moved in a direction (counterclockwise, as viewed in Fig. 5) tending to line up said pivot points with axis A the distance between point 41 and said axis is diminished and jaw 42 is consequently moved longitudinally, as well as angularly, towards fixed jaw 34, the distance between axis A and point 40 being invariable. In other words, the lever and jaws function after the manner of a toggle joint, it consequently being possible to exert tremendous compression on the rod between the jaws by simple angular movement of the lever. In the illustrated embodiment, the lengths of the jaws (considered as the distance from their axes A and B to pivot points 40 and 41, respectively) is such that even though lever 36 be swung to bring axis B approximately coincident with axis A (Fig. 6) jaws 34 and 42 are still longitudinally out of alignment with said pivot points. Therefore, clamping action may be exerted on a polish rod even though it be of considerably less diameter than that indicated at 15.

As a convenient means for moving lever 36 to clamping position, I provide thereon a bifurcated nose 47, an eye bolt 48 being pivotally mounted between ears 49 on the rearward side of the body member and being adapted to be swung into and out of the nose slot 50. Nut 51 is threaded on the bolt, it being evident that threading nut 51 along the bolt and into contact with nose 47 swings the lever in a manner to throw jaw 42 into clamping position. Washer 52 may be interposed between the nut and nose for obvious reasons.

Lever 36 and bolt 48 may be considered as comprising a toggle-joint whereby jaw 42 is bodily moved into and out of clamping position or, in other words, is moved longitudinally and angularly towards or away from face 33; and nut 51 comprises the means for actuating this toggle in a manner to move said jaw towards face 33.

It will be noted that it is not necessary to project the movable jaw entirely across channel mouth 31 in order to hold the rod within the clamp and that it takes very little movement of said jaw either to open or close the grip, thereby greatly facilitating the application and removal of the grip.

It will also be noted that when the jaw is

moved to open the grip, the path of the rod in a direction parallel to face 32 from the channel to a position of clearance from the grip is entirely unobstructed, thus obviously facilitating application and release of the grip.

Since the ends of cable 13 are approximately in the plane of the axis of channel 30 and hence of rod 15, it will be seen the lines of draft from beam to grip and from grip to rod are in approximately coincident vertical planes so there is no tendency to cant the grip and rod during beam reciprocation.

It is believed a full understanding of the invention may be had from the foregoing, but it will be understood the drawings and description are to be considered as merely illustrative of and not restrictive on the broader claim appended hereto, for various changes in design, structure and arrangement may be made without departing from the spirit and scope of said claims.

Having described a preferred form of my invention, I claim:

1. A device of the character described, embodying a body member having a rod engaging face, a jaw movable bodily with respect to the body member and connected thereto through a toggle joint, said joint being adapted to be actuated to carry the movable jaw towards and away from the rod engaging face.

2. A device of the character described, embodying a body member having a rod receiving channel extending vertically along one of its sides, the channel mouth opening towards one end of the body member, a longitudinally movable jaw on the body member and extending transversely thereof with its pressure face at one side of the channel, and means adapted to move the jaw transversely with respect to the body member and longitudinally towards and away from the opposite side of the channel.

3. A device of the character described, embodying a body member having a rod receiving channel extending vertically along one of its sides, the channel mouth opening towards one end of the body member, a longitudinally movable jaw on the body member and extending transversely thereof with its pressure face at one side of the channel, and a toggle-joint connection between the body member and movable jaw adapted to be actuated to move said jaw transversely with respect to the body member and longitudinally towards and away from the opposite side of the channel.

4. A device of the character described, embodying a body member having a rod receiving channel extending vertically along one of its sides, the channel mouth opening towards one end of the body member, a longitudinally movable jaw on the body

member and extending transversely thereof with its pressure face at one side of the channel, a toggle-joint connection between the body member and movable jaw adapted to be actuated to move said jaw transversely with respect to the body member and longitudinally towards and away from the opposite side of the channel; and means adapted to actuate the toggle-joint connection to move said jaw longitudinally towards said opposite side.

5. In a device of the character described, a body member, the forward face of the member having a portion inclining towards the medial vertical axis of the member and terminating in a hook portion adapted to define a vertically extending channel for receiving a rod, and a movable jaw on the body member adapted to be moved toward and away from the hook to grip the rod therebetween and to release the rod from therebetween, respectively, the path of the rod in a direction parallel to said inclined portion and from the channel to a position of clearance from the body member being entirely unobstructed when the jaw is moved to rod-releasing position.

6. In a device of the character described, a body member having a rod gripping face, a lever pivotally connected to the body member at a point laterally spaced from said face, a jaw pivotally mounted on the lever at a greater distance from said pivotal point than is the gripping face, and the distance between points of pivotal connection being not more than the distance between the point of jaw connection and a given point on said gripping face plus the distance between the point of lever connection with the body and said given point on the gripping face during pivotal movement of the lever, and means for guiding the movable jaw into complementary relation with respect to said gripping face when the lever is moved pivotally in one direction; all in a manner whereby pivotal movement of the lever in said one direction moves the jaw longitudinally towards the gripping face.

7. In a device of the character described, a body member having a rod gripping face, a lever pivotally connected to the body member at a point laterally spaced from said face, a jaw pivotally mounted on the lever at a greater distance from said pivotal point than is the gripping face, and the distance between points of pivotal connection being not more than the distance between the point of jaw connection and a given point on said gripping face plus the distance between the point of lever connection with the body and said given point on the gripping face during pivotal movement of the lever, and means for guiding the movable jaw into complementary relation with respect to said gripping face when the lever is moved pivotally in one direction; all in a manner whereby pivotal movement of the lever in said one direction moves the jaw longitudinally towards the gripping face; and coacting means on the body member and lever adapted to be actuated to move the lever positively in said one direction.

8. In a device of the character described, a body member having a rod gripping face, a lever pivotally connected to the body member at a point laterally spaced from said face, a jaw pivotally mounted on the lever at a greater distance from said pivotal point than is the gripping face, and the distance between points of pivotal connection being not more than the distance between the point of jaw connection and a given point on said gripping face plus the distance between the point of lever connection with the body and said given point on the gripping face, during pivotal movement of the lever, and means for guiding the movable jaw into complementary relation with respect to said gripping face when the lever is moved pivotally in one direction; all in a manner whereby pivotal movement of the lever in said one direction moves the jaw longitudinally towards the gripping face; and disengageable means on the body member adapted to connect the free end of the lever to the body member and to be actuated to move the lever positively in said one direction.

9. In a device of the character described, a body member having a rod gripping face, a lever pivotally connected to the body member at a point laterally spaced from said face, a jaw pivotally mounted on the lever at a greater distance from said pivotal point than is the gripping face, and the distance between points of pivotal connection being not more than the distance between the point of jaw connection and a given point on said gripping face plus the distance between the point of lever connection with the body and said given point on the gripping face during pivotal movement of the lever; all in a manner whereby pivotal movement of the lever in one direction moves the jaw longitudinally towards the gripping face.

10. A device of the character described, embodying a body member with a rod engaging face, a jaw on the body member which is movable rotatably and longitudinally towards and away from said face, and a toggle-joint adapted to be actuated so to move the jaw.

11. A device of the character described, embodying a body member having a rod engaging face, a lever pivoted on the body member at a point offset with respect to that face, a rod-gripping jaw pivoted on said lever and substantially opposed to said face, and means for moving the lever to move the jaw towards and away from said face.

12. A device of the character described,

embodying a body member having a rod engaging face, a lever pivoted on the body member at a point offset with respect to that face, a rod-gripping jaw pivoted on said lever and substantially opposed to said face, said lever forming the exclusive mounting of the jaw on the body, and means for moving the lever to move the jaw towards and away from said face.

13. A device of the character described, embodying a body member having a rod engaging face, a lever pivoted on the body member at a point offset with respect to that face, a rod-gripping jaw pivoted near one end on said lever and substantially opposed to said face, said jaw being movable pivotally with respect to the lever, means adapted to guide the free end of the jaw during its pivotal movement, and means for moving the lever to move the jaw towards and away from said face.

14. A device of the character described, embodying a body member having an opening extending horizontally therethrough, a rod engaging face at one side of the body member and in line with said opening, a movable, rod-engaging jaw in the opening, and means operable from the other side of the body member for moving the jaw through the opening and towards said face.

15. A device of the character described, embodying a body member having an opening extending horizontally therethrough, a rod engaging face at one side of the body member, a movable, rod-engaging jaw in the opening, and means for moving the jaw through the opening and towards said face.

16. A device of the character described, embodying a body member having a rod receiving channel, and a gate for confining a rod within the channel, said gate comprising two pivotally connected members, one of which is pivotally connected to the body, and the other being movable with respect to the body member into and out of a position closing said channel and means to move said one gate member pivotally, said one gate member forming the sole connected support for the other gate member.

17. In a device of the character described, a body member having a rod engaging face, a pair of pivotally connected members, one of said pair of members being pivotally connected to the body member at a point offset with relation to said face, the other of said

pair of members having a free end projecting from said one member towards said face and being adapted to exert clamping pressure against a rod on said face by virtue of pivotal movement of said one member.

18. In a device of the character described, a body member having a rod-receiving channel extending vertically along its forward side, and releasable means associated with the body member and operable from its rearward side and adapted to be operated to hold a rod within the channel.

19. In a device of the character described, a body member having a rod-receiving channel extending vertically along its forward side between its ends and opening towards one of said ends, and releasable means associated with the body member and operable from its rearward side and adapted to be operated to hold a rod within the channel.

20. In a device of the character described, a body member, a rod-gripping member movably associated with the body member and adapted to be moved into and out of operative engagement with a rod at the forward side of the body member, and means operable from the rearward side of the body member to move the gripping member.

21. In a device of the character described, a body member having a rod engaging face, a lever pivoted on the body member at a point offset with respect to that face, a rod-gripping jaw pivotally connected to said lever and substantially opposed to said face, and a spring between the lever and jaw, said spring being adapted yieldingly to move the jaw pivotally with respect to the lever in a given direction.

22. In a device of the character described, a body member having a rod engaging face, a lever pivoted on the body member at a point offset with respect to that face, a rod-gripping jaw pivotally connected to said lever and substantially opposed to said face, a spring between the lever and jaw, said spring being adapted yieldingly to move the jaw pivotally with respect to the lever in a given direction, and coacting means on the jaw and body member adapted to limit the extent of jaw movement under the influence of the spring.

In witness that I claim the foregoing I have hereunto subscribed my name this 14 day of Feb., 1925.

EDWARD E. STEVENSON.