No. 642,178. Patented Jan. 30, 1900.

J. R. THOMAS & H. S. SPENCER.

CLAMPING DEVICE.

(Application filed Aug. 21, 1899.)

(No Model.)

Fig. 1.

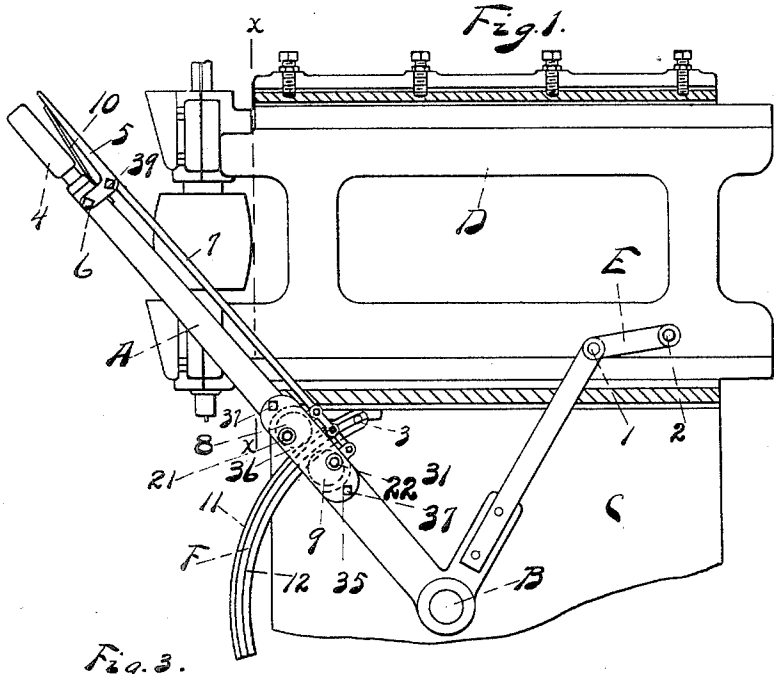


Fig. 2.

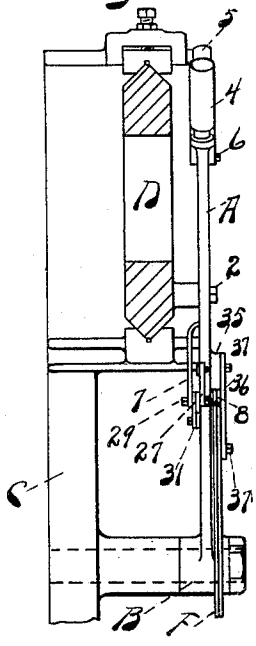


Fig. 3.

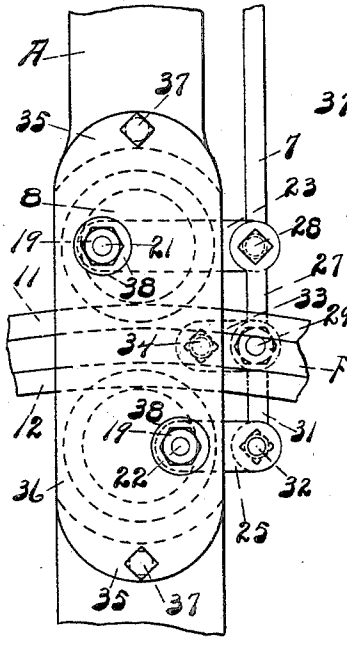


Fig. 4.

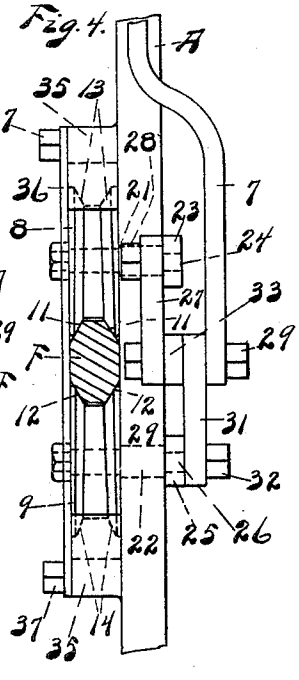
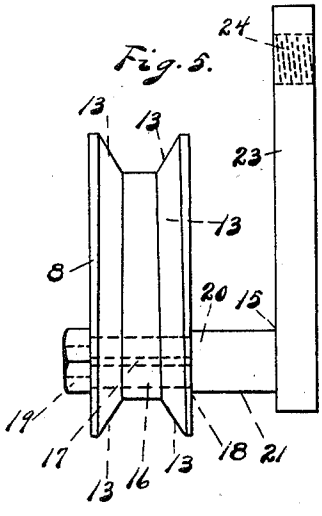


Fig. 5.



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

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CLAMPING DEVICE.

SPECIFICATION forming part of Letters Patent No. 642,178, dated January 30, 1900.

Original application filed February 20, 1899, Serial No. 706,227. Divided and this application filed August 21, 1899. Serial No. 727,924½. (No model.)

To all whom it may concern:

Be it known that we, JOHN R. THOMAS, residing at Cincinnati, and HARRY S. SPENCER, residing at Bond Hill, in the county of Hamilton and State of Ohio, citizens of the United States, have invented a certain new and useful Improvement in Clamping Devices, of which the following is a specification.

Our invention relates to clamping devices; and it consists in the parts and in the novel construction, arrangement, and combinations of parts hereinafter more fully described and claimed.

We have made joint application for Letters Patent on improvement in boring-machines, filed February 20, 1899, being Serial No. 706,227, showing and describing the subject-matter embraced in this application; but we do not claim the same therein, and the present application is a divisional application of the one so previously filed, and reference is hereby respectfully made to the same.

We have illustrated our invention as applied to the spindle-ram of a boring-machine; but it is obvious that the same may be applied in any other connection in which it is desired to use a clamping device, especially in connection with a crank or lever.

In the drawings, Figure 1 represents a side elevation of our improved device, showing the same in connection with a spindle-ram, the slide for which latter is partly in section to more clearly illustrate the same. Fig. 2 is a front elevation of the same with the spindle-bearings removed on the line *x x*, Fig. 1, showing the ram in section. Fig. 3 is an enlarged side elevation of our improved device; and Fig. 4 is an end elevation of the same, showing the tongue in cross-section. Fig. 5 is a detail showing the construction of the shoe.

A represents a shifting lever which may be provided with a pivot B on a frame C. We have shown the lever in the form of a bell-crank lever, the free end of the bell-crank connecting with a suitable movable part, as a spindle-ram D, by means of a link E and the pivots 1 and 2. It is of course obvious that the connection with the ram-slide or other movable part may be made from any suitable point on the lever, and that its pivot may be placed at any suitable point for the purpose in view.

F is a tongue which we have shown arc-shaped and which may be pivoted, as at 3, to the frame. A straight or other suitably-shaped tongue may also be used.

The shifting lever is provided with a grip 4, adjacent to which a trip 5 is supported on a pivot 6. The trip is held in normal position by a spring 10. A shifting link 7 connects the trip intermediately with shoes 8 and 9, adapted to take against the tongue F and hold the shifting lever, with the part moved thereby, in place. The tongue at each edge thereof is provided with wedge-shaped receding faces 11 11 12 12, the shoes being provided with correspondingly-shaped receding-faces 13 13 14 14. Each shoe is preferably hung on a rocking crank 15, a reduced part 16 of the shank 20 of which takes through an aperture in the shoe and has a key 17 taking between the reduced part of the shank and the shoe for securing the two parts firmly together and preventing a relative rotary movement. The rocking crank-shank also has a shoulder 18, against which the shoe takes, and is forced by a nut 19. The part of the rocking crank adjacent to the shoe forms a journal rocking in an aperture in the shifting lever. This journal forms a pivotal point for the shoe, which for the shoe 8 we have designated 21 and for the shoe 9 we have designated 22. The outer part of the rocking crank forms a crank-arm tapped at its outer end. For the shoe 8 we have designated the crank-arm 23 and the threaded aperture 24, and for the shoe 9 we have designated the crank-arm 25 and the threaded aperture 26.

There are preferably two of the contacting or clamping shoes, which for sake of convenience and distinction we have designated 8 and 9. One of the shoes is pivoted to either side of the tongue on the shifting lever, with the tongue passing between them, so that they may make simultaneous contact

with both edges of the tongue. The shoe 8 is pivotally journaled in the shifting lever on the journal 21, as stated, and is connected with the shifting link by a link 27, connecting with the shoe crank-arm by means of a pivot 28, secured in the threaded aperture 24, and with the shifting link by a pivot 29. The other shoe 9 is connected with the shifting link by means of a link 31, attached to the crank-arm of shoe 9 by a pivot 32 and to the shifting link by the pivot 29. A link 33 is pivoted to the pivot 29 at one end and to the shifting lever with a pivot 34 at its other end. This latter link forms a connection between the end of the shifting link and the shifting lever adjacent to the shoes.

The pivot 29, preferably rigidly secured to the shifting link, serves as a common pivot for the links 27, 31, and 33. The pivotal connection 22 of the shoe 9 to the shifting lever A is between the impinging converging faces of the shoe and its connection with the shifting link 7, while the impinging converging faces of the shoe 8 lie between its pivotal connection 21 to the shifting lever and its connection 28, operated by the shifting link. The shoes consequently contact with the tongue from both sides and from both directions, the contact-faces of one shoe tending to bite into the tongue-faces on one side of the tongue, especially when a strain is brought against the clamp from one direction, and the contact-faces of the other shoe acting similarly on the tongue-faces on the other side of the tongue when a strain comes from the opposite direction. The faces of each of the shoes gradually approach each other from a point near the pivotal point of the shoe to points at and beyond the point of contact of the faces with the tongue, the space between the faces growing gradually less longitudinally of the tongue—that is to say, when the trip is released to clamp the shoes the shoes will turn on their pivotal connections with the shifting lever, and as the shoes turn on their pivots the space between the receding faces on the shoes adjacent to the usual point of contact on the tongue grows gradually less in a plane parallel to the axis of the shoe the more the shoe turns. The shoes are so pivotally hung that the operation of the shifting link will also throw both shoes away from the tongue.

The converging faces of each shoe clamp the part of the tongue taking between them, the space between the faces of the shoe and the tongue growing less as the shoe turns on its pivot in the clamping operation. The tongue is also clamped bodily between both shoes.

The shifting lever is provided with lugs 35 35 on either side of the position of the clamping-shoes, preferably formed crescent-shaped. A plate 36 spans the space between the lugs and is held in place by bolts 37. The shoes and the tongue are held snugly between the shifting lever and the plate, but with sufficient play to allow their free movement. The plate is provided with apertures 38 to allow the insertion of a wrench for turning the nuts 19.

When it is desired to shift the ram or other movable part, the hand of the operator takes about the grip 4 and the trip 5, which latter swings on its pivot 6, drawing the trip toward the grip against the action of the spring 10. The shifting link 7 is pivoted to the trip at 39 and is thus drawn lengthwise of the shifting lever toward the grip thereon. The shifting link through its pivot 29 acts on the three links 27, 31, and 33. The link 33 serves through its pivot 29 to the shifting link and its pivot 34 to the shifting lever as a connection between the shifting link and lever. It will thus be seen that the pivot 34 serves as a rocking point for the three links—directly for the link 33 and intermediately for the links 27 and 31. The links 27 and 31 connect, respectively, with the shoes 8 and 9, causing the converging faces of the shoe 8 where they contact with the tongue to move in one direction with relation to the tongue when the trip is brought toward the grip and those of the shoe 9 to move in the opposite direction with relation to the tongue. (See Figs. 3 and 4.) Thus, referring to Fig. 4, it will be seen that the contact-faces of the shoe 8 shown in this figure gradually converge as the distance from the contact-point with the tongue increases, while the contact-faces of the shoe 9 gradually converge as the distance from the contact-point with the tongue diminishes. When, therefore, the converging faces of the shoe 8 are caused to move with relation to the tongue, as stated, a new point in its faces, where the latter are wider apart, is presented to the tongue, and the space between the faces being greater at the new point the tongue is released. The same effect is produced by the moving of the converging faces of the shoe 9 in the opposite direction. At the same time both shoes recede bodily from the tongue, owing to the manner in which they are pivoted eccentrically. When the lever has been shifted, the trip is released and the spring 10 causes the contacting faces to come together and lock the lever in its new position.

It is obvious that changes may be made in the constructions we have preferred to show without departing from the spirit of our invention.

We claim—

1. In a clamping device, the combination of a lever, with a tongue therefor, a receding face on the tongue receding transversely of its length and extending longitudinally of the tongue, a shoe for the tongue, a pivotal connection between the lever and the shoe, a face on the shoe receding oppositely to the tongue-face and constructed and arranged for approaching the tongue-face in a direction parallel to the axis of the shoe when clamping the

lever and the tongue together, substantially as described.

2. In a clamping device, the combination of a lever, with a tongue therefor, a receding face on the tongue receding transversely of its length and extending longitudinally of the tongue, a shoe for the tongue, a pivotal connection between the lever and the shoe, a face on the shoe receding oppositely to the tongue-face and gradually approaching the tongue-face in a plane parallel to the axis of the shoe when taking against the tongue-face, and clamping the lever and the tongue together, substantially as described.

3. In a clamping device, the combination of a lever, with a tongue therefor, a receding face on the tongue receding transversely of its length and extending longitudinally thereof, a shoe for the tongue, a pivotal connection between the lever and the shoe, a face on the shoe receding reversely to the tongue-face and also mounted to gradually approach and recede from the tongue-face in a plane parallel to the axis of the shoe, for taking against the tongue-face and clamping the lever and tongue together, and a shifting link connecting with the shoe and extending adjacent to the handle on the lever, substantially as described.

4. In a clamping device, the combination of a lever, a tongue therefor, faces on the tongue receding from each other transversely of the tongue and extending longitudinally of the tongue, a shoe, a pivotal connection between the lever and the shoe for mounting the shoe eccentrically on the lever, faces on the shoe receding from each other oppositely to the tongue-faces, and converging toward each other, and constructed and arranged for contacting with the tongue-faces for clamping the lever and tongue together, substantially as described.

5. In a clamping device, the combination of a fixed part, a movable part, a shifting lever for adjusting the movable part with relation to the fixed part, a shifting link connecting with the shifting lever, a tongue, and a pair of clamping-shoes connecting with the shifting link, a pivotal connection for each of the shoes for eccentrically pivoting the shoes on the lever, oppositely-receding faces on the tongue and on each of the shoes, receding transversely of the length of the tongue and constructed and arranged for clamping the faces of the one between the faces of the other, and having the receding faces of each of the shoes arranged to converge along their length, one of the shoes taking against the one and the other shoe taking against the other edge of the tongue, substantially as described.

6. In a clamping device, the combination of a fixed part, a movable part, a shifting lever for adjusting the movable part with relation to the fixed part, a pair of clamping-shoes, a pivotal connection for each of the shoes for eccentrically pivoting the shoes to the lever, a tongue taking between the shoes, a clamping-face on each edge of the tongue and on each of the shoes, and constructed and arranged for clamping the faces on the edges of the tongue between the faces on the shoes, a shifting link, and a link between the shifting link and each of the shoes controlled by the shifting link, and constructed and arranged for clamping the lever and the tongue together, substantially as described.

7. In a clamping device, the combination of a fixed part, a movable part, a shifting lever for adjusting the movable part with relation to the fixed part, a pair of clamping-shoes, a pivotal connection for each of the shoes for eccentrically pivoting the shoes to the lever, a tongue taking between the shoes, oppositely-receding faces on the tongue and on each of the shoes receding transversely of the length of the tongue, and constructed and arranged for clamping the faces of the one between the faces of the other, a shifting link, a link rocking on the shifting lever and connecting with the shifting link and operated thereby, and a link between the rocking link and each of the shoes, controlled by the shifting link and the rocking link, constructed and arranged for clamping the lever and the tongue together, substantially as described.

8. In a clamping device, the combination of a fixed part, a movable part, a shifting lever for adjusting the movable part with relation to the fixed part, a shifting link, a pair of clamping-shoes, a tongue taking between them, a connection between each clamping-shoe and the shifting link, a contact-face on each shoe for contacting with the tongue, a pivotal connection for one of the shoes with the shifting lever between the connection of the shoe with the shifting link and its contact-face for the tongue, and a pivotal connection for the other shoe with the shifting lever constructed and arranged with its contact-face for the tongue between its pivotal connection with the shifting lever and its connection with the shifting link, constructed and arranged for clamping the shoes against opposite sides of the tongue from opposite directions, substantially as described.

9. In a clamping device, the combination of a fixed part, a movable part, a shifting lever for adjusting the movable part with relation to the fixed part, a shifting link; a pair of clamping-shoes; a tongue taking between them; a rocking link pivoted to the shifting lever; a link pivoted to each clamping-shoe; and a common pivot for the rocking link, a link for each clamping-shoe and the shifting link; a contact-face on each shoe for contacting with the tongue; a pivotal connection for one of the shoes with the shifting lever between the connection of the shoe with the shifting link and its contact-face for the

tongue; and a pivotal connection for the other shoe with the shifting lever constructed and arranged with its contact-face for the tongue between its pivotal connection with the shifting lever and its connection with the shifting link; constructed and arranged for clamping the shoes against opposite sides of the tongue from opposite directions, substantially as described.

In testimony whereof we have signed our names hereto in the presence of two subscribing witnesses.

JOHN R. THOMAS.
HARRY S. SPENCER.

Witnesses:
PARKE S. JOHNSON,
PHILIP W. TOZZER.