(No Model.)

E. SHAW.

CLAMP.

No. 360,974. Patented Apr. 12, 1887.

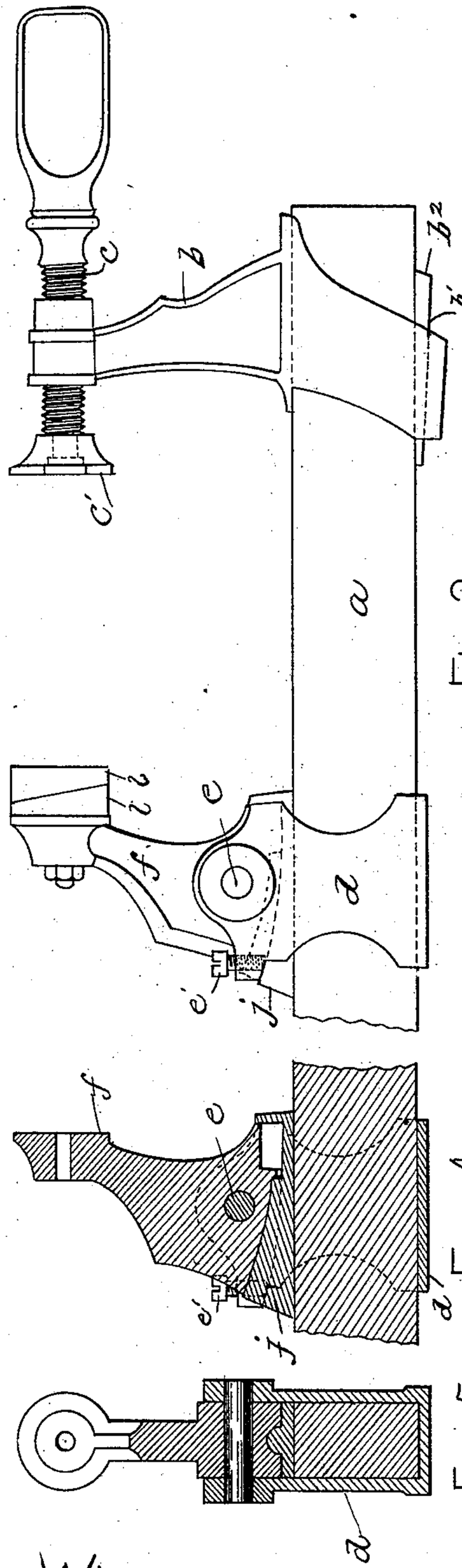

Fig. 3.

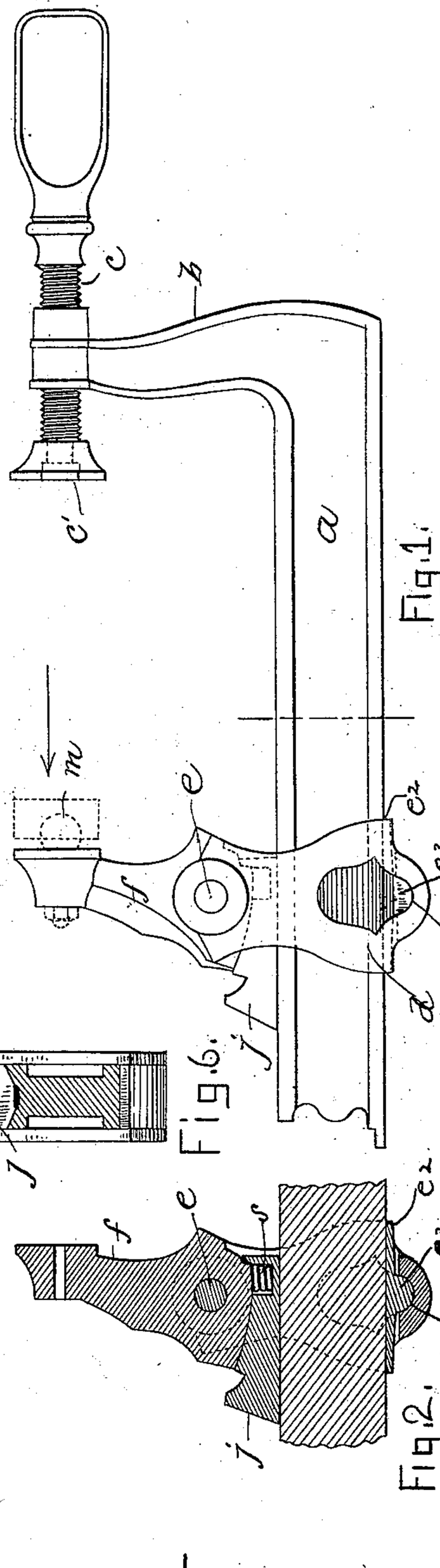

Fig. 1.

Fig. 4.

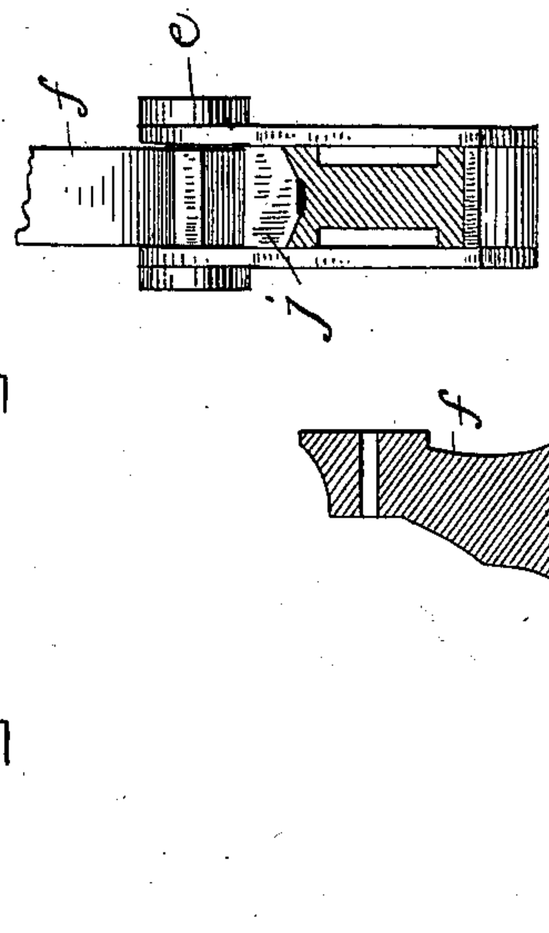

Fig. 6.

Fig. 5.

Fig. 2.

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UNITED STATES PATENT OFFICE.

EDGAR SHAW, OF LYNN, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE SHAW MANUFACTURING COMPANY, OF BOSTON, MASSACHUSETTS.

CLAMP.

SPECIFICATION forming part of Letters Patent No. 360,974, dated April 12, 1887.

Application filed November 10, 1885. Serial No. 182,398. (No model.)

To all whom it may concern:

Be it known that I, EDGAR SHAW, of Lynn, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Clamps, of which the following is a full, clear, and exact description, which will enable those skilled in the art relating thereto to make and use the same, reference being had to the accompanying drawings, forming a part of this specification.

The invention relates to that class of clamps that consist, generally, of a bar or beam provided with two clamping arms or jaws, one of said jaws carrying a clamping-screw and being formed on or attached to the beam, and the other arm or jaw being carried upon a slide or yoke which is adapted to be moved along the beam and to be firmly locked thereon at any point by the application of the clamping-pressure to the jaw.

With these clamps the locking of the movable slide with its attached jaw to the beam has usually been accomplished by the arm or its slide engaging with notches or teeth on the beam. This method is objectionable, first, because the beam must be specially constructed, and, next, because the movable slide and jaw cannot be quickly adjusted to all sizes of work, as its adjustability is limited by the distance apart of the notches on the beam. So, also, clamp-beams having unnotched or plain surfaces have been provided with an adjustable jaw carried by a slide which was constructed with an angular bearing, which, by the leverage action of the jaws, was caused to take a biting hold upon the beam. And the objections to this method of locking the slide with its attached jaw to the beam are that they are liable to slip when the clamping-pressure is applied, and the beam soon becomes so indented and roughened as to greatly impair the operable efficiency of the clamp.

The object of the present invention, therefore, is to produce a beam-clamp of improved construction and operation in which the objections referred to shall be obviated.

The invention consists of a beam-clamp in which the adjustable yoke or slide, carrying a clamping arm or jaw, is provided with a shoe, wedge, block, or similar device, which is secured to or held in operable position by the slide and is interposed between the jaw and the beam or between the slide and the beam, which shoe, wedge, or block has on the side toward the beam a flat bearing-surface, and is arranged to act in conjunction with the slide and jaw to frictionally lock them to the beam upon the application of pressure to the clamping-arm.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a side elevation of one form of my improved clamp. Fig. 2 represents a longitudinal section of a portion thereof. Fig. 3 represents a side elevation of another form of my improved clamp, showing a wooden beam. Fig. 4 represents a section of the jaw and slide shown in Fig. 3. Fig. 5 represents a section on line *x x*, Fig. 3. Fig. 6 represents a section on line *z z*, Fig. 1.

The same letters of reference indicate the same parts in all the figures.

In the drawings, *a* represents the beam or bar of a beam-clamp, which beam is constructed with plain or flat upper and lower edges; and *b* represents an arm formed on or rigidly attached to the beam at one end.

c represents a screw working in a tapped socket in the arm *b*, and having a clamping-plate, *c'*, at one end.

d represents a slide or yoke, composed of two sides or ears at opposite sides of the beam and a connecting cross-piece bearing on the lower edge of the beam or on an interposed shoe, as the case may be. Said slide carries a jaw, *f*, which may be either rigidly attached to the slide, thus forming a part thereof, or pivoted thereto so as to be capable of rocking or oscillating on the slide.

The lower end of the jaw *f* is over the upper edge of the beam. When the jaw is attached to the slide so as to be capable of rocking independently, it is secured by a pivot, *e*, to ears at the upper ends of the sides of the slide, so that when pressure is exerted on the upper end of the jaw *f* in the direction indicated by the arrow in Fig. 1 a portion of its lower end at one side of the pivot *e* is pressed downwardly on a shoe, *j*, interposed between the jaw and the upper edge of the beam *a*, and

at the same time the portion of the slide *d* extending across the flat lower edge of the beam is pressed upwardly against such edge or against the shoe underneath the beam, as the case may be. The slide and jaw are thus locked to the beam wholly by friction, so that they cannot be moved while pressure is applied to the upper end of the jaw, the beam being firmly grasped between the block or shoe *j* and the lower portion of the slide, or between the block or shoe *j* and the shoe underneath the beam, as the case may be.

The form of the lower end of the jaw *f*, as also the form of the shoe, may be variously modified. In Figs. 1 and 2 I have shown the jaw as extended and slightly curved and bearing on a wedge-shaped shoe, while in Figs. 3 and 4 it is substantially straight. Other modifications may be adopted without departing from the spirit of my invention.

The shoe, as shown in the drawings, is bent up in front of the lower inner end of the clamping-jaw, and this is for the purpose of holding the shoe in place between the jaw and the beam, as obviously, when the clamping arm or jaw is moved along the beam, it will be necessary that the shoe (at such time loosened from between the slide or jaw and the beam) be carried with it. Any other suitable means, however, may be employed for thus holding or securing the shoe or wedge in operable position between the slide and the beam or the jaw and the beam.

If preferred, the jaw *f*, when a pivoted one is used, may bear directly on the upper edge of the beam, instead of on a shoe interposed between the jaw and the beam. I prefer the shoe, however, because it furnishes, when desired, a more extended clamping or friction surface than can be practically secured by the jaw without using the shoe, and also because it protects the edge of the beam from wear and may be renewed at slight expense when worn or broken.

When the jaw *f* is mounted on the slide so as to be incapable of rocking, it may be cast so as to form a part of the same piece therewith; or it may be rigidly secured to the side pieces of the slide by bolts or screws. I prefer, however, to connect the jaw with the slide by means of the pivot *e*, as before described, and, if desired, to make it practically rigid by one or more set-screws, *e'*, inserted in tapped orifices in the lower and rear portion of the jaw, so as to bear against the shoe *j* at one side of the pivot, or directly upon the upper edge of the beam in case the shoe be not used. This construction also enables the slide to be adjusted to the depth of the beam, as may become desirable when the latter is made of wood and shrinkage occurs, or when wear of the same is to be compensated for.

A shoe or rocking plate, e^2, having a flat upper surface and provided with laterally-projecting trunnions e^3, may be interposed between the lower cross-piece of the slide and the lower edge of the beam. The trunnions e^3 are rounded and rest in ears or sockets e^4, formed in the slide, so that the plate e^2 can rock slightly in the slide to conform to the beam and maintain an extended bearing on the lower edge of the same when the slide is tipped backwardly by pressure exerted against the jaw *f*. This rocking plate is available in any form of such clamp; but it will not usually be employed, except when the clamping-arm is rigid with the slide, or when it is desired to construct the slide with a specially-extended or particularly-shaped locking-surface for the lower edge of the beam. Thus, if the clamping-arm be rigid with the slide, the best action is secured by using a shoe or plate on the lower edge of the beam as well as on the upper edge, as without such lower plate the pressure would be greatest at one end of the slide and the beam would be indented and roughened; but with the plate the pressure would be uniform throughout the length thereof, and undue wear upon the beam would be obviated. When the arm is pivoted to the slide, the upper shoe only will ordinarily be required, particularly with wooden beams, as the slide would be automatically adjusted so as to bear sufficiently even upon the under edge of the beam. In the case of metal beam-clamps, the strain they are subjected to and the unyielding character of their beams require slides provided with extended locking-surfaces arranged to act in the most efficient manner to lock the slide to the beam, and to this end the rocking plate is used; and either the upper or lower shoe or plate may be provided with a still more extended bearing-surface by recessing the edge of the beam, as seen in Fig. 6, and shaping the shoe or plate to correspond thereto.

In Fig. 3 I have shown the construction which I use when the beam is made of wood. In this case the yoke of the fixed jaw *b* is formed with a socket, *b'*, in its lower portion to receive the beam, and is secured to the beam by a wedge-shaped key, b^2, driven in between the bottom of the socket *b'* and the lower edge of the beam.

The jaw *f* may be provided at its upper end with pivoted wedge-shaped plates *l l*, Fig. 3, or with a plate, *m*, having a hemispherical boss fitting in a socket in the jaw *f*, as shown in Fig. 1. The jaw is thus adapted to hold articles of irregular shape, the plates *l* or *m* being adapted to assume various inclinations.

When it is desired to move the adjustable clamping-jaw *f*, its upper end is pressed forward to cause its lower end and the slide to release their hold on the beam, when the jaw and slide may be freely moved on the beam. When the jaw *f* is adjusted and the article to be clamped is placed between the jaw and the plate *c'* of the clamping-screw, the pressure effected by operating the screw causes the jaw and the slide or the interposed shoe and the slide to grasp the beam, the jaw being thus held as firmly as if it were rigidly attached to the beam.

When the adjustable jaw *f* is pivoted to the

slide, I prefer to place a spring, *s*, under the forward portion of the jaw, as shown in Fig. 2, such spring normally pressing the jaw backward and causing the rear portion of its lower end to bear with a yielding pressure on the shoe *j*, so that the jaw *f* is normally in position to be instantly affected by the pressure exerted against it. This same purpose may be accomplished by a piece of rubber placed between the lower edge of the beam and the slide *d'*; but I prefer a spiral spring, as shown.

In the above constructions the hinged jaw by preference forms the top of the yoke or slide; but obviously the top of the slide may be otherwise constructed, and the jaw it carries may be rigidly or pivotally attached thereto in other ways than those herein shown or described. So, too, although the rigid clamping-arm—that is, the clamping-arm formed on or attached to the bar or beam—has been herein described as carrying the clamping-screw, this screw may be carried upon the arm which is carried upon the adjustable slide. Furthermore, I anticipate that it is possible to use the rocking gib or shoe upon the top of the beam as well as upon its lower edge, or both.

It will be seen that by my improvements I am enabled quickly to slide the movable jaw *f* to any desired point on the beam and effectively to lock it thereto by friction only, and all liability of said jaw slipping on the beam or of injury thereto by the clamping operation is avoided.

Having now fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a beam-clamp, the combination of the beam, an adjustable slide adapted to be moved along the beam and provided with a clamping arm or jaw, and a shoe which is secured to the slide and interposed between the slide and the beam, substantially as set forth.

2. In a beam-clamp, the combination of the beam, an adjustable slide adapted to be moved along the beam and provided with a clamping arm or jaw, and a shoe which is secured to the clamping-arm and is interposed between the arm and the beam, substantially as set forth.

3. In a beam-clamp, the combination of the beam, a slide adapted to be moved along the beam and carrying a clamping arm or jaw, and a rocking plate pivotally supported on the slide and bearing against the beam, substantially as set forth.

4. In a beam-clamp, the combination, with the beam, of a slide which is adapted to be moved along the beam, and which carries a clamping-jaw pivoted to said slide, the lower end of said jaw being over the upper edge of the beam, substantially as set forth.

5. In a beam-clamp, the combination, with the beam, of a slide which is adapted to be moved along the beam, a clamping-jaw pivoted to and carried upon said slide, and a block or shoe interposed between the lower end of the jaw and the upper edge of the beam, substantially as set forth.

6. In a beam-clamp, the combination of the beam, a slide adapted to be moved thereon, a jaw pivoted to and carried upon said slide, a shoe interposed between the beam and the jaw, and a spring arranged to hold the jaw normally in operative position, substantially as set forth.

7. In a beam-clamp, the combination, with the beam, of a slide adapted to be moved along the beam and carrying a clamping arm or jaw, a block or shoe interposed between the upper edge of the beam and the jaw, and a rocking plate or shoe pivotally supported on the slide and bearing against the lower edge of the beam, all substantially as set forth.

8. In a beam-clamp, the combination of a clamping-jaw which is pivotally attached to a slide, which slide is adapted to be moved along the beam, a shoe or wedge interposed between said pivoted jaw and the beam, and a set-screw, *e'*, passing down through the lower and rear part of said jaw, and adapted to limit, or, if desirable, entirely to prevent, the backward motion of the pivoted jaw, substantially as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 5th day of November, 1885.

EDGAR SHAW.

Witnesses:
C. F. BROWN,
H. BROWN.