No. 804,229. PATENTED NOV. 14, 1905.

T. C. HUTCHINSON.

FORCEPS AND THE LIKE.

APPLICATION FILED JULY 27, 1904.

2 SHEETS—SHEET 1.

Fig. 1.

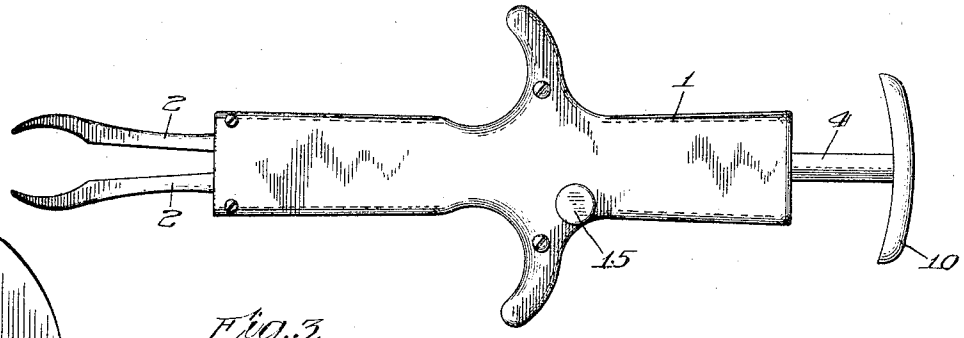


Fig. 3.

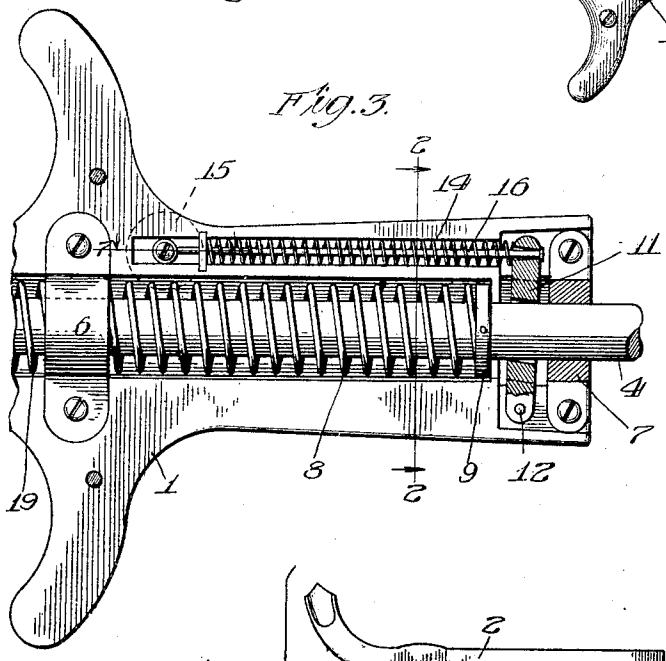


Fig. 2.

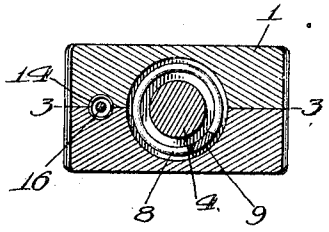


Fig. 8.

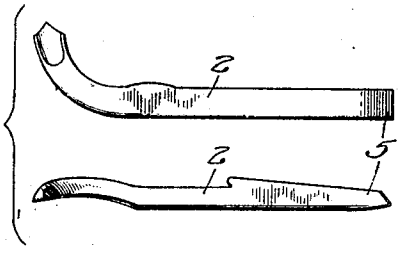


Fig. 9.

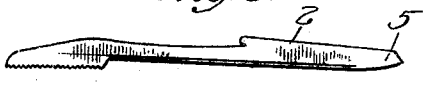
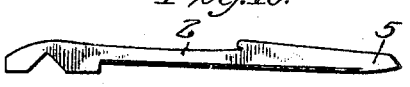


Fig. 10.



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2 SHEETS—SHEET 2.

Fig. 4.

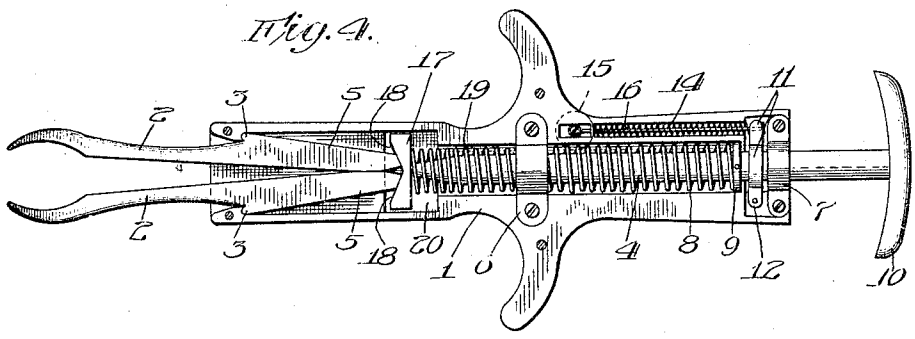


Fig. 5.

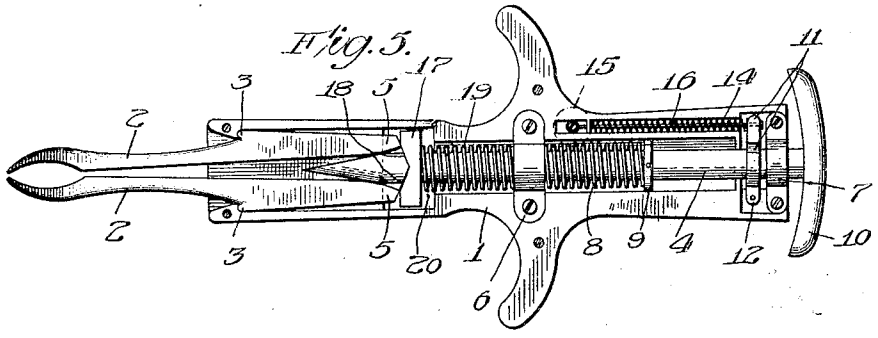


Fig. 6.

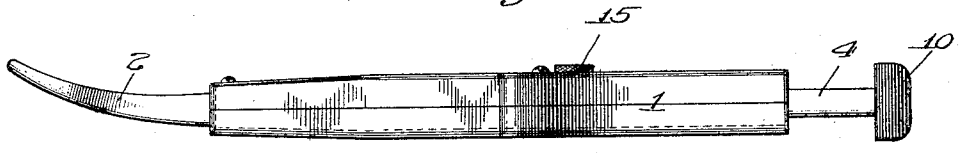
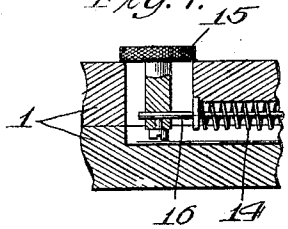


Fig. 7.



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UNITED STATES PATENT OFFICE.

THOMAS C. HUTCHINSON, OF DECORAH, IOWA.

FORCEPS AND THE LIKE.

No. 804,229. Specification of Letters Patent. Patented Nov. 14, 1905.

Application filed July 27, 1904. Serial No. 218,435.

To all whom it may concern:

Be it known that I, THOMAS C. HUTCHINSON, a citizen of the United States of America, residing at Decorah, in the county of Winneshiek and State of Iowa, have invented certain new and useful Improvements in Forceps and the Like, of which the following is a description.

My invention relates to that class of devices known as "pincers," and particularly that class of pincers known as "pliers" or "forceps," and with slight modifications it may be readily employed for any of the many purposes to which that class of devices is particularly adapted.

The object of my invention is to produce a simple and effective device of the kind described, in which the opposing jaws may be closed upon an object with any desired pressure and at the same time be under the control of the operator. It may also be constructed to automatically lock when closed to the desired point, so that in the subsequent manipulation of the instrument by the operator the pressure will not be varied or inadvertently increased or diminished, while at the same time the pressure may be readily modified as desired.

To this end my invention consists in the novel construction, arrangement, and combination of parts herein shown and described, and more particularly pointed out in the claims.

In the accompanying drawings, wherein like or similar reference characters indicate like or corresponding parts, Figure 1 is a plan view of my device as applied to dentists' forceps. Fig. 2 is an enlarged section taken substantially on line 2 2 of Fig. 3. Fig. 3 is an enlarged partial section of my device, taken substantially on line 3 3 of Fig. 2. Fig. 4 is a similar section of the entire device, showing the position of the parts with the jaws or beaks open. Fig. 5 is a section similar to Fig. 4, showing the position of the parts with the jaws closed. Fig. 6 is a side elevation of my device with one form of dentists' beaks in place. Fig. 7 is an enlarged partial section of the preferred form of my device, taken substantially on line 7 7 of Fig. 3; and Figs. 8, 9, and 10 are detail views of some of the types of jaws or beaks with which my device may be advantageously equipped.

In the preferred form of my device shown in the drawings, 1 is a stock or frame of the tool, provided with opposing arms or levers 2 2, pivotally connected to the frame 1 near one end thereof, as at 3 3 in Figs. 4 and 5. As thus connected at a point between their ends one end of the arms extend into the stock, as shown, while the other end extends outward and forms a gripping or working portion of the tool. 4 is a longitudinally-movable wedge-bar positioned in the opposite end of the stock and having one end positioned between the ends 5 5 of the arms 2. It will be obvious that upon pressing the wedge-bar toward the jaws or arms the inner ends of the arms will be pressed apart, while the outer ends will be forced toward one another. In the preferred form the inner end of the wedge-bar is wedge-shaped, the ends of the arms being correspondingly formed to coöperate therewith. Any preferred means may be employed for manipulating the wedge-bar 4. Thus it may be operated and maintained by the grip of the operator alone, or it may be supplied with means for maintaining the parts in any desired adjusted position. As shown in the drawings, 6 and 7 are suitable guides for the bar 4, and a spring 8 is provided to normally hold the bar resiliently in its outer position. The spring 8 is preferably arranged within the stock with one end bearing against the guide 6 and its other end bearing against a collar 9, pinned to the bar 4, or equivalent means provided for the same purpose. In the preferred form means are also provided to limit the outward movement of the bar. As shown, the collar 9 performs this function by contacting with a suitable shoulder formed on the inner face of the stock for that purpose or equivalent means. The outer end of the bar 4 is formed to conveniently fit the palm of the hand. As shown, it is provided with a head 10 for that purpose, which serves as a convenience in operating the device.

In the preferred form of my device I provide a locking device for holding the bar 4 in any adjusted position. This preferably consists of a lever 11, pivoted upon the stock 1 at 12 and having an opening through which the bar 4 slides freely when the lever 11 is substantially at right angles to the bar; but when the free end of the lever is resiliently pressed outward, as by the spring 14, it will cramp upon the sides of the bar and automatically lock the same from any outward movement by the well-known cramping action, yet leaving it perfectly free to be moved inward. To release the bar 4 from the lock, a suitable operating-button 15 is connected to

the free end of the lever 11 by the rod 16, and by moving the free end of the lever inward it is prevented from cramping upon the bar 4, leaving the same free to be moved outward by the spring 8 as far as necessary.

In the preferred form of my device the arms 2 are arranged to be removable, so that one stock may be supplied with any desired number of arms having their outer ends formed for special purposes, if desired, and to this end the pivotal supports of the arms 2 in the stock 1 at 3 are specially formed in any preferred manner. As shown, they are formed by providing a hook-shaped recess at either side of the stock to loosely engage suitable bosses formed upon the arms. To remove an arm from the stock, it is only necessary to first move the arm inward until the boss is beyond the point of the hook, when it can be moved toward the center and readily taken out. To resiliently hold the arm-bosses in the recess in the stock, and also to bring the ends 5 of the arms together when the bar 4 is in its outer position, a block 17 is provided with inclined faces 18 18, arranged to be pressed against the ends of the arms 2 by the spring 19, one end of which bears against the guide 6 and the other end against the block 17, which is preferably located in a recess 20, so that when the arms are both removed from the stock the block 17 cannot fall out of place.

In the drawings and foregoing description my device is shown with arms, which are removable from the stock; but it is obvious that if preferred the arms may be permanently fixed within the stock without departing from the spirit of my invention.

In Figs. 1, 4, 5, and 6 I have shown my device equipped with arms or beaks especially adapted for the use of dentists in the extraction of teeth. Also in Fig. 8 another form of arm or beak is shown designed for the same purpose. In Fig. 9 an arm is shown adapted to be used as a common plier, and in Fig. 10 arms adapting my device to be used as a wrench are shown. It is evident that arms may be formed for any desired purpose and be either permanently fixed in a stock or arranged to be used interchangeably with others, as desired.

In the foregoing description the operation of my device is explained and a further description is deemed unnecessary.

It is obvious that my device may be employed for grasping a tool—such, for example, as a screw-driver or the like—and, if desired, the power exerted to set the jaws of the device may be supplemented by suitable mechanism for that purpose.

In the specification I have described only the preferred form of my device, and it is obvious that various immaterial modifications may be made without in the least departing from the spirit of my invention. Hence I do not wish to be understood as limiting myself to the exact form and construction shown.

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

1. A device of the kind described, comprising a stock, a pair of opposing arms pivotally and detachably supported upon said stock near one end thereof by means of bosses formed upon the arms at a point between their ends engaging with inwardly-opening hook-shaped recesses formed in said stock, and a movable block resiliently pressed against the inner ends of said arms, tending to prevent the disengagement of the arms from said stock, in combination with means for controlling the lateral movements of the arms.

2. A device of the kind described, comprising a stock, and a pair of opposing arms pivotally supported at a point between their ends upon said stock near one end thereof, in combination with a longitudinally-slidable wedge-bar having one end positioned between the inner ends of said arms and means for sliding said bar, whereby upon operating the wedge-bar the outer ends of the arms will be forced toward each other.

3. A device of the kind described, comprising a stock, and a pair of opposing arms pivotally supported at a point between their ends upon said stock near one end thereof, in combination with a longitudinally-slidable bar partly contained within the stock and having one end positioned between the inner ends of the arms and the other end projecting from the stock, whereby upon sliding said bar inward the inner ends of the arms are forced apart and the outer or free ends are forced toward each other.

4. A device of the kind described, comprising a stock, and a pair of opposing arms pivotally supported at a point between their ends upon said stock near one end thereof, in combination with a longitudinally-movable wedge-bar partly contained within the stock, and a spring arranged upon said bar tending to normally force the bar outward, the inner end of said bar being positioned between the inner ends of said arms, whereby upon forcing the bar inward the inner ends of the arms are forced apart and the outer ends are forced toward each other.

5. A device of the kind described, comprising a stock and a pair of opposing arms pivotally supported at a point between their ends upon said stock near one end thereof, in combination with a longitudinally-movable wedge-bar partly contained in said stock, a stop to limit the outward movement of said bar, and a spring arranged to resiliently force said bar outward, the inner end of said bar being positioned between the inner ends of said arms, whereby upon forcing the bar inward the inner ends of the arms are forced apart and the outer ends are forced toward each other.

6. A device of the kind described, comprising a stock, a pair of opposing arms pivotally supported at a point between their ends upon said stock near one end thereof, in combination with a longitudinally-movable wedge-bar partly contained within said stock, a stop to limit the outward movement of said bar, a spring arranged upon said bar to resiliently force the same outward, an automatic lock arranged to engage said bar in any position and prevent its outward movement, and means for releasing said bar from said lock, the inner end of said bar being positioned between the inner ends of said arms, whereby upon forcing the bar inward the inner ends of the arms are forced apart and the outer ends are forced toward each other.

7. A device of the kind described, comprising a stock, a pair of opposing arms pivotally supported at a point between their ends upon said stock near one end thereof, and a movable block resiliently pressed against the inner ends of the arms presenting an inclined surface to each arm, whereby the arms are pressed longitudinally of the stock and their inner ends are pressed toward each other, in combination with a longitudinally-movable wedge-bar partly contained within the stock, having one end positioned between the inner ends of said arms whereby upon forcing said bar inward the inner ends of the arms are forced apart and the outer ends are forced toward each other.

8. A device of the kind described, comprising a stock, a pair of opposing arms pivotally supported at a point between their ends upon said stock near one end thereof, and a movable block resiliently pressed against the inner ends of the arms provided with an inclined surface contacting with the outer face on the end of each arm, whereby the arms are normally pressed longitudinally of the stock and their inner ends are pressed toward each other, in combination with a longitudinally-movable wedge-bar partly contained within the stock, and a spring arranged to force said bar outward, the inner end of said bar being positioned between the inner ends of said arms, whereby upon forcing the bar inward the inner ends of the arms are forced apart and the outer ends are forced toward each other, and upon retracting the bar the arms will assume the reverse position.

9. A device of the kind described, comprising a stock, a pair of opposing arms pivotally supported at a point between their ends upon said stock near one end thereof, and a movable block resiliently pressed against the inner ends of the arms, presenting an inclined surface to the outer face on the end of each arm, whereby the arms are normally pressed longitudinally of the stock and their inner ends are pressed toward each other, in combination with a longitudinally-movable wedge-bar partly contained within the stock, a stop to limit the outward movement of said bar, and a spring arranged to normally force said bar resiliently outward, the inner end of said bar being positioned between the inner ends of said arms whereby upon forcing the bar inward the inner ends of the arms are forced apart and the outer ends are forced toward each other, and upon releasing said bar the arms will assume the reverse position.

10. A device of the kind described, comprising a stock, a pair of opposing arms pivotally supported at a point between their ends upon said stock near one end thereof, and a movable block resiliently pressed against the inner ends of the arms, presenting an inclined surface to the outer face on the end of each arm, whereby the arms are normally pressed longitudinally of the stock and their inner ends are pressed toward each other, in combination with a longitudinally-movable wedge-bar partly contained within the stock, a stop to limit the outward movement of said bar, a spring arranged upon said bar to resiliently force the same outward, an automatic lock arranged to engage and retain said bar in any desired position and prevent its outward movement, and means for releasing said bar from said lock, the inner end of the bar being positioned between the ends of said arms, whereby upon forcing the bar inward the inner ends of the arms are forced apart and the outer ends are forced toward each other, and temporarily locked in such position, and upon releasing the lock the parts will automatically assume their normal positions.

11. In a device of the kind described, the stock provided with shoulders near one end thereof for pivotally and detachably engaging a pair of opposing members therewith, in combination with a pair of opposing levers adapted to be positioned within the stock provided with means between their ends for pivotally and detachably engaging said shoulders, and means for controlling the movement of the inner ends of the levers.

12. In a device of the kind described, an arm provided with a boss formed at a point between its ends, adapted to coöperate with a recess formed in a stock for pivotally and detachably engaging said arm with said stock.

13. A device of the kind described, comprising a stock, and a pair of arms pivotally supported at a point between their ends near one end of the stock and detachable therefrom, in combination with a longitudinally-movable wedge-bar positioned in the other end of the stock with its inner end between the inner ends of the arms whereby upon forcing said bar inward the inner ends of the arms are forced apart and the outer or free ends are forced toward each other.

14. A device of the kind described, comprising a stock, a pair of opposing arms pivotally and detachably supported upon said stock near one end thereof by means of bosses formed

upon the arms at a point between their ends engaging with inwardly-opening hook-shaped recesses formed in said stock, and a movable block resiliently pressed against the inner ends of said arms, tending to prevent the disengagement of the arms from said stock, in combination with a longitudinally-movable wedge-bar partly contained within the stock, with its inner end positioned to slide between the inner ends of said arms, and a spring tending to force said bar outward.

15. A device of the kind described, comprising a stock formed with laterally-projecting finger-grips, and a pair of opposing arms pivotally supported at a point between their ends upon said stock, in combination with a longitudinally-slidable wedge-bar having one end positioned between the inner ends of said arms and means for sliding said bar.

16. A device of the kind described, comprising a stock, and a pair of arms pivotally supported at a point between their ends near one end of the stock and detachable therefrom, in combination with a longitudinally-movable wedge-bar partly contained within said stock, a stop to limit the outward movement of said bar, and a spring arranged to normally tend to resiliently force said bar outward, the inner end of the bar being positioned between the inner ends of said arms, whereby upon forcing the bar inward the inner ends of the arms are forced apart and the outer ends are forced toward each other.

17. A device of the kind described, comprising a stock, a pair of arms pivotally and detachably supported upon said stock near one end thereof by means of bosses formed upon the arms at a point between their ends engaging with inwardly-opening hook-shaped recesses formed in the stock, and a movable block provided with inclined faces, resiliently pressed against the inner ends of the arms, tending to prevent the disengagement of the arms from said stock and also to force the inner ends of the arms toward each other, in combination with means for controlling the lateral movements of the arms.

18. A device of the kind described, comprising a stock, a pair of arms pivotally and detachably supported upon said stock near one end thereof by means of bosses formed upon the arms at a point between their ends engaging with inwardly-opening hook-shaped recesses formed in the stock, and a movable block provided with inclined faces, resiliently pressed against the inner ends of the arms, tending to prevent the disengagement of the arms from the stock and also to force the inner ends of the arms together, in combination with a longitudinally-movable wedge-bar partly contained within the stock, with its inner end extending through said block and positioned to slide between the inner ends of said arms.

19. A device of the kind described, comprising a stock provided at one end with means for detachably and pivotally supporting a pair of arms at a point between their ends, at the other end with a longitudinally-movable wedge-bar provided with a stop to limit the outward movement thereof, a spring arranged upon said bar to resiliently force the same outward, an automatic lock arranged to engage said bar in any position and prevent its outward movement, means for releasing said bar from said lock, and a movable block arranged within the stock resiliently pressed against the inner ends of the arms presenting an inclined surface to the outer face of the end of each arm, whereby the arms are normally pressed longitudinally of the stock and their inner ends are pressed toward each other, in combination with a plurality of interchangeable pairs of opposing arms each pair adapted to be pivotally and detachably supported in the end of the stock with their inner ends embracing the inner end of the wedge-bar, whereby upon forcing said bar inward the inner ends of the arms are forced apart and the outer ends are forced toward each other.

20. In a device of the kind described, the stock provided at one end with a pair of oppositely-disposed and inwardly-extending hook-like shoulders, in combination with a pair of opposing arms comprising a pair of levers partly extending into the stock and provided with corresponding shoulders located at a point between their ends, whereby the arms may be loosely and pivotally engaged with the shoulders, and means for controlling the movement of the inner ends of the levers.

21. A device of the kind described, comprising a stock, a pair of arms pivotally and detachably supported upon said stock near one end thereof by means of bosses formed upon the arms at a point between their ends engaging with inwardly-opening recesses formed in said stock, and a movable block resiliently pressed against the inner ends of the arms tending to prevent the disengagement of the arms from said stock, in combination with a longitudinally-movable wedge-bar partly contained within the stock, with its inner end positioned to slide between the inner ends of the arms, a spring tending to force said bar outward, and a lock to prevent the outward movement of said bar.

22. A device of the kind described, comprising a stock, a pair of arms pivotally and detachably supported upon said stock near one end thereof by means of bosses formed upon the arms at a point between their ends engaging with inwardly-opening hook-shaped recesses formed in the stock, and a movable block provided with inclined faces, resiliently pressed against the inner ends of the arms, tending to prevent the disengagement of the arms from the stock and also to force

the inner ends of the arms together, in combination with a longitudinally - movable wedge-bar partly contained within the stock, with its inner end positioned to slide between the inner ends of the arms, a spring tending to force said bar outward, and a lock to prevent the outward movement of said bar.

In testimony whereof I have hereunto signed my name in the presence of two subscribing witnesses.

THOMAS C. HUTCHINSON.

Witnesses:

R. ALGYER,

CHRISTINE PETERSON.