Oct. 16, 1923. 1,470,914

E. C. DAY

UNIVERSAL HANDLE FOR SURGICAL INSTRUMENTS

Filed June 20, 1921 2 Sheets-Sheet 1

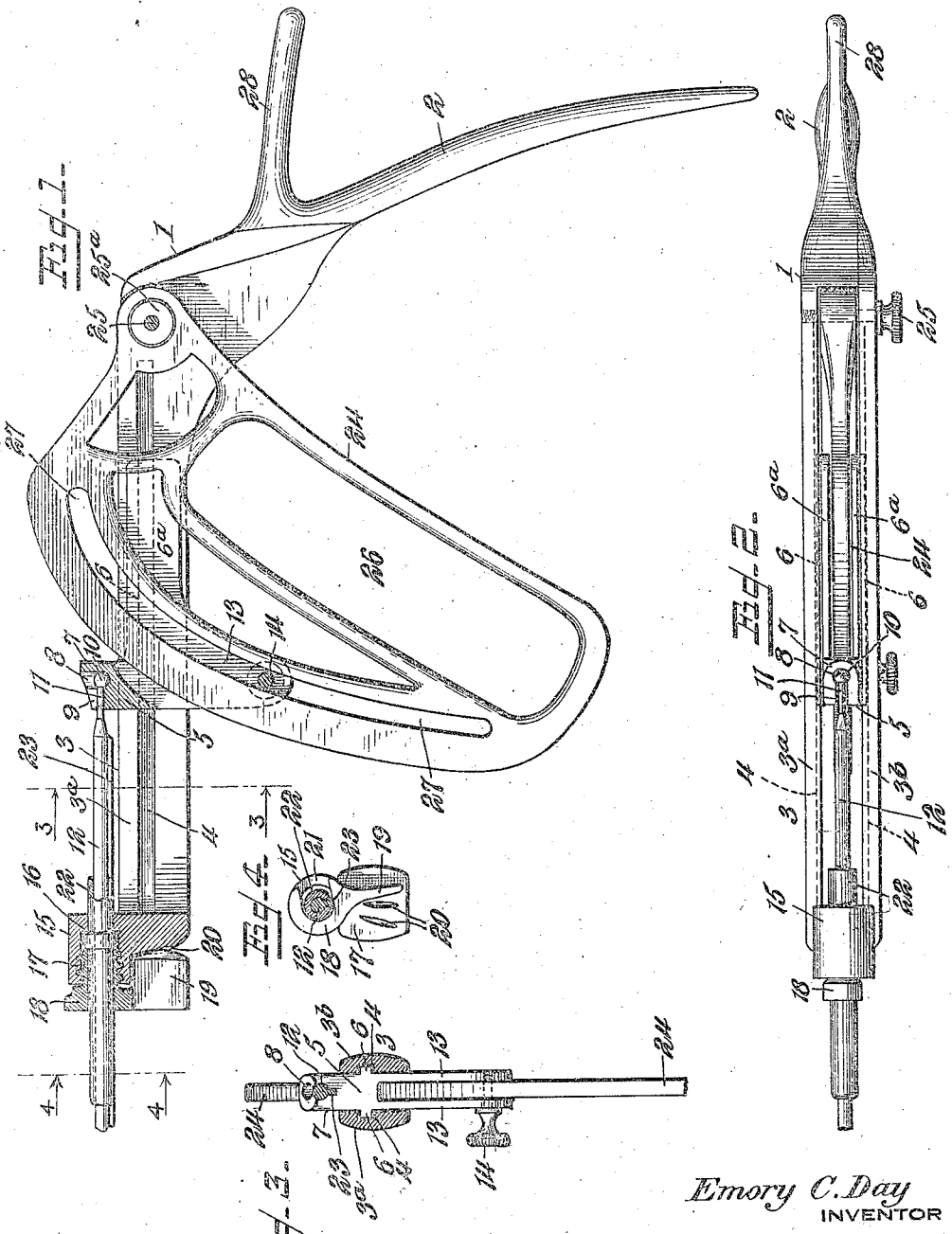


Fig. 1.

Fig. 2.

Fig. 4.

Fig. 3.

WITNESSES

Charles H. Durand

F. T. Chapman.

Emory C. Day
INVENTOR

BY E. G. Siggers

ATTORNEY

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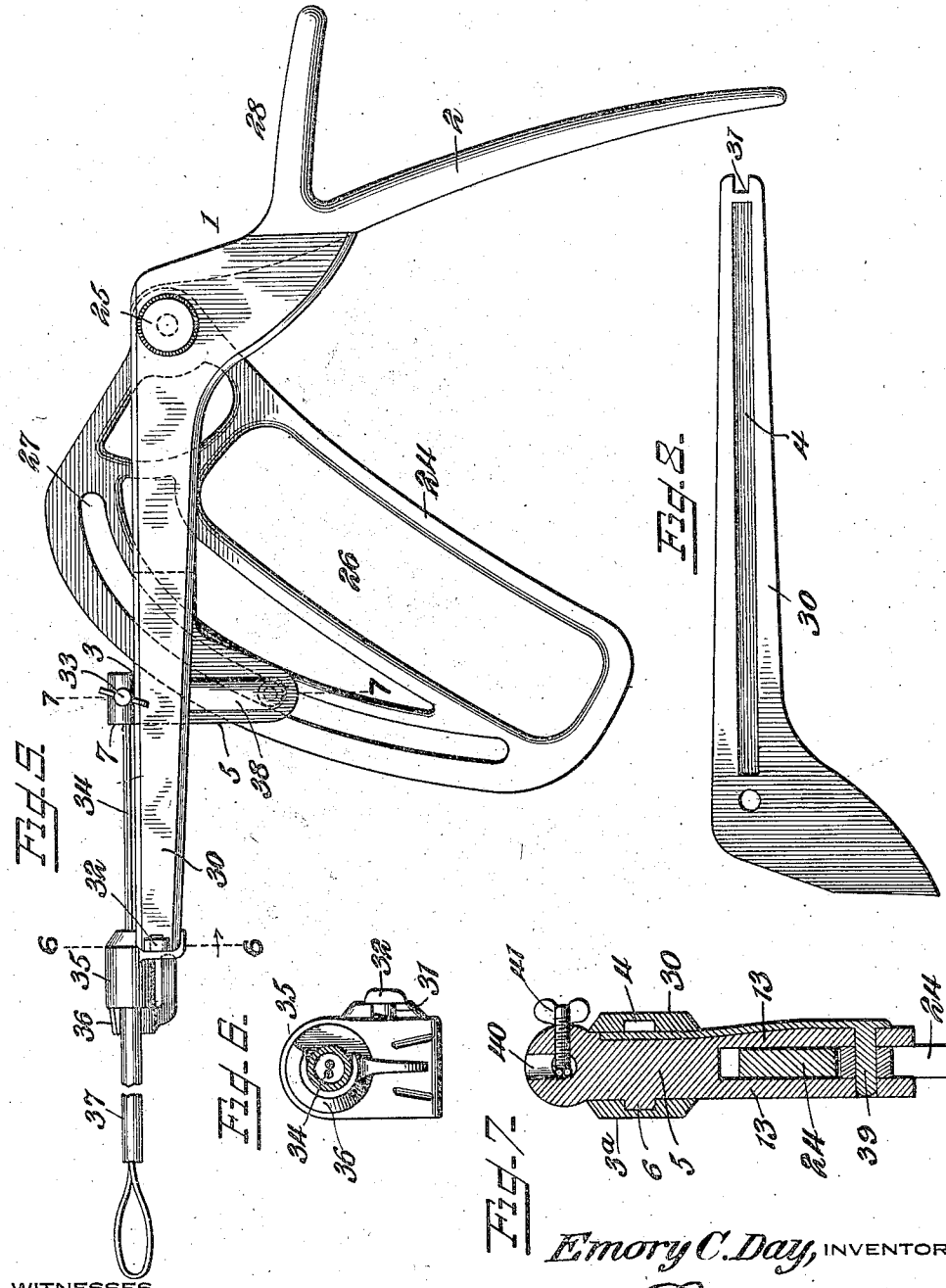


Fig. 5.

Fig. 8.

Fig. 6.

Fig. 7.

WITNESSES

Howard D. Orr.

F. T. Chapman.

Emory C. Day, INVENTOR,

BY E. G. Siggers.

ATTORNEY

Patented Oct. 16, 1923. 1,470,914

UNITED STATES PATENT OFFICE.

EMORY C. DAY, OF LAGUNA BEACH, CALIFORNIA.

UNIVERSAL HANDLE FOR SURGICAL INSTRUMENTS.

Application filed June 20, 1921. Serial No. 478,909.

To all whom it may concern:

Be it known that EMORY C. DAY, a citizen of the United States, residing at Laguna Beach, in the county of Orange and State of California, have invented a new and useful Universal Handle for Surgical Instruments, of which the following is a specification.

This invention has reference to universal handles for surgical instruments, and its object is to provide a handle to which various forms of surgical instruments may be attached and by which they may be operated, the single handle serving for instruments of quite different characters.

The universal handle is such as to receive and operate various forms of accessory surgical instrument adapted to fit it. Among such instruments are those for wire-snare or guillotine tonsilotomy and tonsilectomy instruments, scissors or forceps for cutting and grasping, and various instrumentalities of special or general type for applying movements of the human hand to any instrument of suitable character for the removal of tonsils, polypi and bone, and for the removal or introduction of foreign substances in connection with nose and throat surgery or other natural and artificial body cavities.

The present invention is similar in some respects to a surgical snare and universal handle for which I have executed an application for Letters Patent of even date herewith, the said application being intended more particularly for use as a surgical snare per se, although having capabilities of use as a universal handle for carrying various kinds of surgical instruments. The invention is also similar to the surgical snare for which I filed Letters Patent on December 24, 1919, under Serial Number 347,156.

In accordance with this invention, there is provided an instrument having a body generally simulating a pistol in shape and provided with a pistol grip by means of which the instrument may be firmly held in line with the part to be operated upon, and by means of devices whereby the instrument moves with greatest force when approaching the completion of its movement, the effort on the part of the operator is minimized and equalized and consequently great steadiness in the operation of the instrument is attained.

The universal handle includes a hand grip and a lever relatively located so that both may be grasped by the hand of the operator at one time, and the lever may be operated to draw a slide, movable along the instrument, toward the operator, so as to actuate the particular surgical instrument carried by the handle toward the operator, this contributing to steadiness and certainty of operation.

The silde and lever are connected together by means movable along an elongated slot having a curvature along one edge contributing to the ease of action of the lever, and the slide has means for attaching to it any one of the different instruments for which it is intended.

Moreover, the instrument is so constructed that it may be dismantled without the aid of tools to an extent to permit thorough cleansing, which is paricularly necessary in the case of surgical instruments.

The invention will be best understood from a consideration of the following detailed description, taken in connection with the accompanying drawing forming part of this specification, with the understanding, however, that the invention is not confined to any exact conformity with the showing of the drawing, but may be changed and modified, so long as such changes and modifications mark no material departure from the salient features of the invention, as expressed in the appended claims.

In the drawing:—

Fig. 1 is a longitudinal section, with some parts in elevation, of a universal handle embodying the invention;

Fig. 2 is a plan view of the structure shown in Fig. 1;

Fig. 3 is a section on the line 3—3 of Fig. 1;

Fig. 4 is a section on the line 4—4 of Fig. 1;

Fig. 5 is a side elevation similar to the structure of Fig. 1, but differing in some particulars therefrom;

Fig. 6 is a detail section on the line 6—6 of Fig. 5;

Fig. 7 is a section on the line 7—7 of Fig. 5, but drawn on a larger scale;

Fig. 8 is a rear view of a face plate shown in front section in Fig. 5.

Referring to the drawing, there is a frame 1 somewhat similar in shape to a

pistol and comprising a handhold or pistol grip 2 and a stock 3 in about the same relation to each other as a pistol grip and barrel. The handhold 2 is somewhat elongated so as to furnish ample room for the hand of the operator, while the stock 3 merges into the handhold and is composed of two laterally spaced side members 3^a and 3^b, one of which may be in one piece with the handhold, and the other of which may be removable therefrom. Each of the members 3^a and 3^b is provided with a longitudinal groove 4 on the inner face, so that the grooves 4 face and match each other and are located below the top of the side members 3^a and 3^b. Mounted in the stock 3, between the side members thereof, is a block or slide 5 with ribs 6 on opposite sides, entering the grooves 4 and thereby held in place with freedom of movement lengthwise of the stock. The block 5 is provided with extended tail pieces 6^a constituting continuations of the ribs 6 seated in the grooves 4, so as to provide an extended bearing for the block 5, permitting the latter to move along the stock 3 without rocking.

Rising from the block 5 is a post 7, in the top of which there is sunken a seat 8 having a narrow approach 9 from the forward end of the block, so as to receive a ball extremity 10 and neck 11 fast on or continued from one end of a rod 12 forming a part of the surgical instrument.

Depending from the bottom of the block 5 is a pair of ears 13 joined at their lower ends by a thumb screw 14, and at their upper ends merging into the tail pieces 6^a.

At the front end of the stock 3 there is a post 15 which may be in one piece with the stock, at one side of the latter, and extending through the post 15 in line with the socket 8 is a passage 16 provided with screw threads 17 which may be of the multilated or breech-block type. Adapted to the screw threads 17 in the post 15 is a screw-threaded plug 18 also of the mutilated or breech-block type, and this plug is provided with a spring lug 19 capable of engaging in notches or dimples 20 in the forward face of the post 17, whereby when the mutilated or breech screw plug 18 is moved into the post 15 and turned for a partial rotation, it will bind in the screw threads and be held by the spring lug 19 in the position to which it is adjusted.

The screw plug 18 has a radial slot 21 through one side of sufficient size to pass a guide sleeve 22 extending axially through the head 15, said guide being hollow and slotted longitudinally for the rod 12, which latter is provided with a longitudinal fin 23 to move through the slotted guide 22. The rod 12 is held in the guide 22 by the pressure exerted on the latter by the screw plug 18 when in place.

The instrument is provided with a lever 24 of general rectangular shape having a curved side connected to the upper rear end of the body member 1 by a pivot screw 25, extending through a hub 25^a on the body member 1, and also through the corresponding corner of the lever, this screw acting as a binding screw to hold the side plate 3^b of the stock in place and permitting its removal as well as the removal of other parts also held by the side plate 3^b.

Along one side of the lever is a slot 26 through which the fingers of the hand of the user may be passed so that with the palm of the hand partially encircling the handhold 2 and the fingers extending through the slot 26, the latter may be drawn towards the handhold 2 about the pivot support 25.

The lever 24 is skeletonized for lightness without sacrifice of strength, and that portion of the lever 24 remote from the slot 26 is made sufficiently thin to enter between the ears 13 and continuations of the block 5, so that the lever may have a considerable rocking movement without interference with other parts.

Adjacent to the forward edge of the lever 24 there is formed an elongated slot 27 traversed by the bolt 14 which constitutes a connection between the lever and the block 5.

At the rear of the handhold 2 is a spur 28, high up on the handhold so as to provide an abutment for the hand of the user. This spur may be fixed as shown in Fig. 1, or may be adjustable as shown in the companion application for a surgical snare and universal handle, hereinbefore referred to.

When a suitable implement is attached to the rod 12 at the end remote from the ball 8, the rod 12 and implement are moved lengthwise of the stock through the guide 22 by a suitable manipulation of the lever 26. This causes the screw or pin 14 to move along the slot 27, thereby drawing the block 5 toward the handhold 2, with a speed which is not of necessity the same as the speed of movement of the lever, but which is proportional to the curvature of the surface of the forward edge of the slot. This lever acts primarily as a lever of the third order, but the slot is lengthened to such an extent that the lever acts as a lever of the second order when in certain positions. Such an arrangement permits of the handhold being held firmly in the palm of the hand while the fingers can be closed on the finger hold of the lever, thus drawing the latter toward the palm of the hand and at the same time causing the sliding block to move toward the palm of the hand.

The curved surface of the slot 27 acting on the pin or screw 14 is approximately that

of the curve of a portion of a spiral set eccentrically to the fulcrum of the lever, and by its shape allows a difference between the arc through which the slot moves in any given time and the distance through which the sliding block moves in the same time. This difference of speed between the lever and sliding block produces a difference in force between the lever and the sliding block, so that a light force exerted by the fingers may produce great force in the sliding block and consequently of the accessory instrument.

The length and curve of the surface in the slot permit the fingers, through the lever, exerting their force through a large arc of movement of the lever as well as great force of the sliding block.

The fact that the heavier portion or bulk of the instrument is capable of being held firmly against the palm of the hand, while the lighter or moving parts are actuated by the fingers, permits the operator to hold the entire instrument steady and in one position throughout the time of operating the instrument, and so permits of accurate application of the accessory instrument to the site of the surgical procedure, which procedure is performed with ease.

In the structure shown in Fig. 5 and associated figures, there is shown a universal handle capable of use as a surgical snare and differing in some respects from the device shown in Fig. 1 and associated figures. Since there are parts in the structures of Figs. 1 and 5 that are common to both structures, those parts appearing in both figures and described more particularly with reference to Fig. 1, are provided with the same reference numerals that have already been used in the description of Fig. 1, to avoid repetition.

In the structure of Fig. 5, there is a removable side or face plate 30 similar to the face plate 3^b of Fig. 1, and held in place on the body member 1 by a thumb screw 25, as in Fig. 1. The other or forward end of the face plate 30 has a notch 31 engaging behind a T-head 32 so that the face plate is held at one end by the T-head and at the other end by the thumb screw 25, so that by the removal of the thumb screw 25 alone, the face plate may be removed and the device be dismantled for cleaning or repairs.

The block 5, in the structure of Fig. 5 and associated figures, is provided with a post 7 having a clamp screw 33 whereby a snare strand 34 may be anchored to it. The strand 34 is carried through a post 35, in the form of a sleeve and similar to the post 15 of Fig. 1.

There is also provided a screw-threaded plug 36 similar to the plug 18 of Fig. 1, and encircling a guide tube 37 like the tube 22 of Fig. 1.

Mounted on the slide 5 is a flat spring 38, capable of traveling with the slide back of the face plate 30 and at the end remote from the binding post 7, carrying a pin 39 traversing the ears 13 and passing through the slot 27 so that on rocking the lever 24 about the screw or axis 25, the slide 5 is caused to reciprocate lengthwise of the body portion of the instrument.

The structure of Fig. 5 differs mainly from the structure of Fig. 1 in those parts to which numerals from 30 to 38 are applied, these parts contributing to the ease of dismantling and re-assembling the instrument.

By forming the post 5 with a socket 40 entered by a set screw 41, the instrument may be used as a universal instrument like the structure of Fig. 1.

What is claimed is:

1. A handle for surgical instruments, comprising a handhold and a stock, the latter consisting of laterally spaced side members, a slide movable in the space between said members and slidably engaging the same, a lever pivoted at its top to the end of the stock and movable vertically in the space between said members in rear of the slide, and a direct connection between the lever and the slide in advance of the pivot of said lever, whereby the movement of the lever rearwardly toward the handhold moves the slide rearwardly along said stock.

2. A handle for surgical instruments, comprising a handhold and a stock, the latter consisting of two laterally spaced side members each provided with a longitudinal groove in its inner face, a slide having ribs on opposite sides entering the grooves and movable along the two members of the stock, a lever pivoted at its top to the end of the stock and movable vertically in the space between said members, and a direct connection between the slide and the lever in advance of its pivot, whereby the movement of the lever rearwardly toward the handhold moves the slide rearwardly along the stock.

3. A handle for surgical instruments, comprising a handhold and a stock, the latter consisting of two laterally spaced side members each provided with a longitudinal groove in its inner face, a slide having ribs on opposite sides entering the grooves and movable along the two members of the stock, said slide having rearwardly extended tail pieces arranged along the inside of said members, a lever pivoted at its top to the end of the stock and movable vertically in the space between said tail pieces, and a direct connection between the slide and the lever in advance of its pivot, whereby the movement of the lever rearwardly toward the handhold moves the slide rearwardly along the stock.

4. A handle for surgical instruments, comprising a handhold and a stock, the lat-

ter consisting of laterally spaced side members, a slide movable in the space between said members and slidably engaging the same, a post rising from the slide above the stock, said post having an open seat, a rod forming part of the surgical instrument having a ball extremity to be received in said seat, a pivoted lever in advance of the handhold, and a direct connection between the slide and the lever.

5. The combination with a stock, a handhold depending from the stock, a lever pivoted at its top to the stock and depending downwardly in front of the handhold, a slide movable along the stock, a post rising from the slide, a rod forming a part of the surgical instrument, means for connecting one end of the rod to said post, a rigid post on the stock spaced from the other post, and clamping means carried by the second-mentioned post.

6. A handle for surgical instruments, comprising a handhold and a stock, the latter consisting of laterally spaced side members, a slide movable in the space between said members and slidably engaging the same, said slide having depending spaced ears, provided with a screw or pin, a lever pivoted at its upper end to the stock and movable vertically in the spaces between said members and said ears, said lever having a curved slot to receive said screw or pin, and constituting a direct connection between the lever and the slide, whereby the movement of the lever toward or from the handhold reciprocates the slide along the stock.

7. A handle for surgical instruments comprising a handle and a stock, a slide movable along the stock, a handhold depending from the rear end of the stock at an angle and provided with an outstanding spur forming an abutment for the hand, a lever pivoted at its upper end where the handhold joins with the stock and extending downwardly therefrom in advance of the handhold, and means for connecting the lever to the slide below the pivot of the lever, said means consisting of a curved slot along the lever and a pin or screw on the slide.

8. A handle for surgical instruments comprising a stock, a rigid handhold at one end of the stock, a slide movable longitudinally along the stock, means for connecting accessory surgical instruments to the slide, a lever pivoted at its upper end to the stock and having a curved slot along the margin remote from the handhold, and a pin or screw connected to the slide and passing through said slot, said lever having a slot to receive the fingers of the hand, whereby upon movement of the lever rearwardly toward the handhold the slot traverses the pin or screw and moves the slide rearwardly.

9. A handle for surgical instruments comprising a stock, a handhold depending from the stock at its rear end, a slide movable longitudinally along the stock, means for connecting accessory surgical instruments to the slide, and a lever having a substantially rectangular form with one of the long sides curved, said lever being pivoted at its upper corner away from the curved side to the corner where the handhold joins with the stock, and provided with a long curved slot spaced from the curved edge of said lever, and a pin or screw carried by the slide and fitting in said curved slot.

10. A handle comprising a body portion provided with a pistol grip and a seat to receive accessory instruments, a slidable block engaging the body portion and supplied with a seat or post for engaging the accessory instruments, and a lever pivoted on the body portion and provided with a fingerhold and with a flange pierced by a curved slot having the edges of the slot defining a curved surface engaging a fixed part of the slidable block.

11. A handle comprising a suitable body portion, a slidable block, reciprocable means for engaging accessory instruments applied to the body portion and the slidable block, and a lever pivoted on the body portion and provided with a flange pierced by a slot through the thickness of the flange, said slot being curved to form a curved actuating surface engaging the slidable block and said curve approximating the curvature of a portion of a spiral.

12. A handle for surgical instruments, comprising a suitable body with a handhold, reciprocable means on the body for carrying and actuating accessory surgical instruments, and a lever pivoted on the body and to the reciprocable means, said body having a removable face plate on the side with a notch at one end and a clamp screw at the opposite end to secure the face plate in holding relation to the reciprocable means and lever, whereby on the removal of the clamp screw the handle may be dismantled for cleaning and repairs.

13. A handle for surgical instruments, provided with a reciprocable block having means for carrying and actuating surgical instruments, guiding means in the handle for the block, a lever pivoted on the handle and provided with a curved slot, and connecting means between the lever and block including a pin carried by the block engaging the curved slot for converting rocking movements of the lever into reciprocatory movements of the block to actuate the surgical instruments.

14. The combination with the stock having a post provided with a passage, said passage having mutilated screw threads, a screw-threaded plug also having mutilated screw threads, means carried by the screw plug and engaging a fixed part to hold the

screw plug in its adjustment, said plug having a radial slot, a hollow guide sleeve adapted to be passed into said slot, said sleeve being provided with a longitudinal slot, and a rod passed through the sleeve and having a longitudinal pin to move in the slot of said sleeve, said rod being held in the sleeve by the pressure exerted on the latter by the screw plug when in place.

In testimony, that I claim the foregoing as my own, I have hereto affixed my signature.

EMORY C. DAY.