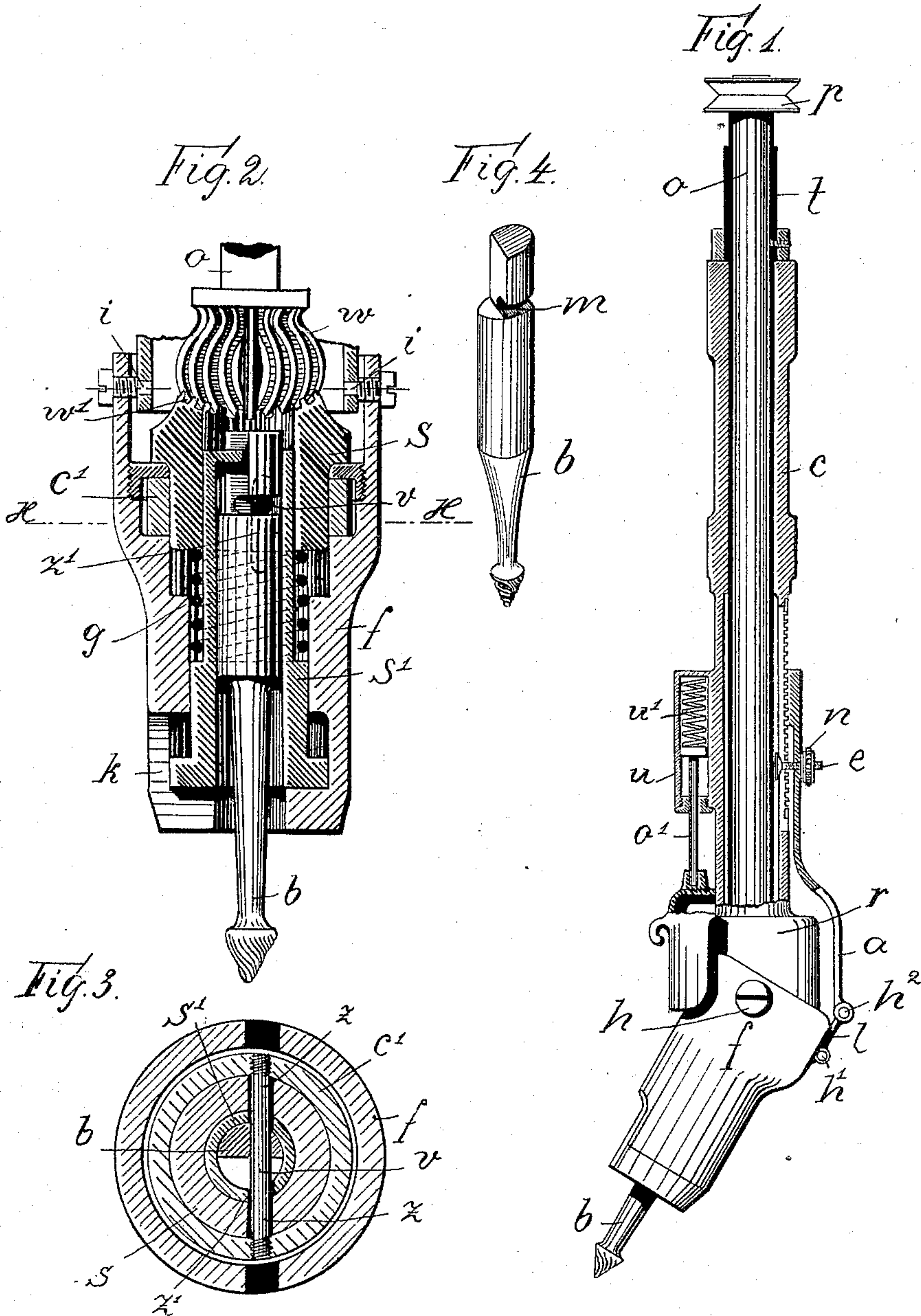


(No Model.)

J. WEBER & H. HAMPEL.  
DENTAL BORING APPARATUS.

No. 493,846.

Patented Mar. 21, 1893.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

JAMES WEBER AND HUGO HAMPEL, OF BERLIN, GERMANY, ASSIGNORS OF  
ONE-HALF TO JOSEPH DAVIDSOHN, OF SAME PLACE.

## DENTAL BORING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 493,846, dated March 21, 1893.

Application filed January 4, 1892. Serial No. 416,994. (No model.) Patented in Germany March 4, 1891, No. 60,956.

*To all whom it may concern:*

Be it known that we, JAMES WEBER and HUGO HAMPEL, subjects of the King of Prussia, German Emperor, residing at Berlin, in the Kingdom of Prussia, German Empire, have invented certain new and useful Improvements in Dental Boring Apparatus, (patented in Germany March 4, 1891, No. 60,956,) of which the following is a full, clear, and exact specification, reference being had to the accompanying drawings, of which—

Figure 1 is an elevation of our improved apparatus, partly in section. Fig. 2 is a central sectional elevation of the front part of the same, showing the bit in locked position. Fig. 3 is a cross-sectional plan of the same, taken on the line  $x-x$  of Fig. 2. Fig. 4 represents the bit employed in our improved apparatus.

Our invention relates to drills of the kind used by dentists for boring holes in teeth to be filled and consists first in constructing the handle or stock into which the bit is inserted of two parts hinged together in such way, that the same may form any angle within a wide range and may be locked in any position by means of a particular and simple locking device.

Our invention also consists in arranging an appropriate sliding rod at or near the mentioned hinge joint whereby the casing is kept closed, whatever the angle formed by the front part of the stock may be, said rod being constructed in such manner, that it may readily be drawn back in order to lay open for inspection the gear placed inside the casing near said hinge.

Our invention consists, finally, in a device for easily inserting and removing the bits, and for effectively preventing the same from slipping out of the stock.

In order that our improvements may be clearly understood, we will proceed to describe them with reference to the accompanying drawings, in which like parts are denoted by like letters.

The drill consists of two parts hinged to one another at  $h$ ; the front part  $f$  is constructed for receiving the bit. The rear part  $r$  forming the handle by which the instru-

ment is held, is composed of the hollow casing,  $c$ , which contains the tube  $t$ , in which rotates the spindle  $o$ , having at one end, outside the casing  $c$ , a pulley  $p$  or any other suitable means for rotating said spindle  $o$ , and at the other end the toothed wheel  $w$ , the teeth whereof are cut in a peculiar way, to be seen in Fig. 2. The toothed wheel  $w$  engages with a second toothed wheel  $w'$  secured to the tube or sleeve  $s$  inclosed in the front part  $f$  of the stock. It will be seen that the edges of the teeth of one wheel form a convex, and those of the other wheel a concave surface, so that they always remain in contact in any position.

The part  $s$  instead of being a sleeve in its whole length, as described and shown in Fig. 2, may also be formed with a solid end portion, on which the wheel  $w'$  is mounted.

The hinge-joint is shown in Figs. 1 and 2; the parts  $c$  and  $f$  are pivoted to one another on two pins  $i$ , in the plane in which the wheels  $w$   $w'$  engage with one another. The movement can only take place in the direction as in Fig. 1, and the range of the same is an angle of about one hundred and twenty degrees, though it may be wider, if preferred.

In order to secure the front part  $f$  in its position, a small plate or cover  $l$  is hinged to the same at  $h'$ , and again at  $h^2$  to an elastic strap  $a$ , through which passes a screw  $e$ ; the latter is inserted into the casing  $c$  through a slot and the point of the screw is of larger diameter than the breadth of the slot. In order however to allow the insertion of the screw, a portion of said slot, where the screw does not pass when the instrument is in working order, is made wider. The adjoining faces of strap  $a$  and casing  $c$  are provided with corrugations; thus when the latter are pressed into one another by screwing on the nut  $n$ , limited in its course by the disk  $d$  secured to the screw  $e$ , the part  $f$  is held perfectly firm in the position it occupies in regard to the casing  $c$ . The cover  $l$  is made of such a form as to fit closely over the casing  $c$  and the part  $f$  during the movement of the latter.

On the side of the casing  $c$  opposite the strap  $a$  there is fixed a small tube  $u$  into which



fits a rod  $o'$ , which is, by means of a spring  $u'$  placed inside the tube  $u$ , kept in contact with the part  $f$ , and thereby closes any interstices that might arise while the said front part is turning. The better to insure the closing of such interstices, the edges of part  $f$  and rod  $o'$  which come into contact are rounded off. The front portion of said rod may however easily be drawn back with the nail of the thumb, and then the gear arranged inside the casing  $c$  becomes visible through a suitable opening in the same, usually closed by the broad forward end of rod  $o'$ . The toothed wheels may therefore readily be cleaned.

We will now describe the bit and in what manner the same is secured to the front part  $f$ . The bit  $b$  (Fig. 4) is cylindrical in its middle and tapered toward its forward end, as usual; but the rear end of the same has a semicircular section, and at the very place where this section begins, a notch  $m$  is provided in the same. Now, in the part  $f$  there are inclosed the sleeves  $s$ , already mentioned, and  $s'$ ; the latter is pressed forward by a spring  $g$ , placed in a recess or sleeve  $s$  and bears against the end of part  $f$ , in which a lateral notch  $k$  is cut out, for a purpose presently to be stated. The bore in the front end of part  $f$  is just wide enough to allow for the entrance of bit  $b$ . The sleeve  $s'$  receives the bit  $b$ , which bears upon the semicircular bottom of the former, when inserted into the same, but may pass freely through said bottom, when turned on its axis by ninety degrees. The sleeve  $s$  has two holes  $z$  in line with one another, but not diametrically opposite, and the sleeve  $s'$  has two corresponding slots  $z'$ , extending half its length or less; a pin  $v$  is passed through said holes and openings and also through a ring  $c'$  fitting round sleeve  $s$ , thus serving to cause both sleeves to rotate together, yet allowing a longitudinal displacement of sleeve  $s'$ . The pin  $v$  is provided with a flat portion inside the sleeve  $s'$  and that portion is placed in a diameter of said sleeve, so that the semicircular section of bit  $b$  may just fit into the space left beside the pin  $v$ . The function of this part of the device only needs explanation, as those described first will be easily understood. The bit  $b$  is inserted through the forward end of part  $f$  into sleeve  $s'$ ; the semicircular end of said bit will generally knock against the pin  $v$ . Now the bit is turned until it can pass beside said pin and then pushed in farther till it bears against the bottom of sleeve  $s'$ . In this position the notch  $m$  is not yet in line with the pin  $v$ , and the bit  $b$  therefore cannot be turned into sleeve  $s'$ . Now the bit  $b$  and with it sleeve  $s'$  are pushed in farther, and the movement being soon stopped by sleeve  $s$ , the notch  $m$  arrives in line with pin  $v$  and the bit  $b$  may be turned by about ninety degrees. As soon as this is effected, the semicircular end of bit  $b$  fits over the semicircular opening in the bottom of sleeve  $s'$ , and the latter is by the spring  $g$  driven back against the front

end of part  $f$ . Thus the bit  $b$  is perfectly secured in its position; it cannot turn independent of sleeve  $s'$ , because the ends of both fit closely into one another, and the pin  $v$  prevents any longitudinal displacement of the bit. Thus it will be seen that the bit  $b$  is locked in a double manner, first my means of the pin  $r$  engaging with the notch  $m$ , and secondly by the sleeve  $s'$ , fitting over the semicircular end portion of the bit  $b$  with the opening in its bottom.

In order to remove the bit, the same manipulations are performed in reverse order; first the sleeve  $s'$  is pressed down by inserting the thumb nail through the notch  $k$ , then the bit is given a turn and may be drawn out freely.

Having thus fully described the nature of our invention, what we desire to secure by Letters Patent of the United States is—

1. In a dental boring apparatus: the combination, with the hinged parts  $r f$  of the casing, of the cover  $l$  hinged to the front part  $f$ , the corrugated elastic strap  $a$ , engaging with corrugation  $s$  on the rear part  $r$ , the screw  $e$  and nut  $n$ , substantially as and for the purpose described.

2. In a dental boring apparatus: the combination, with the hinged parts  $r f$  of the casing, of the tube  $u$ , rod  $o'$ , having broad front end, and spring  $u'$ , substantially as and for the purpose described.

3. In a dental boring apparatus: the combination, with the bit  $b$ , having a semicircular end portion, and a notch  $m$ , of a sleeve  $s'$  inclosing the bit, and having two longitudinal slots  $z'$ , and a semicircular opening in the bottom, of the sleeve  $s$ , inclosing sleeve  $s'$ , having two lateral holes  $z$  and carrying the toothed wheel  $w'$ , of the collar  $c'$ , inclosing sleeve  $s$ , of the pin  $v$ , passing through collar  $c'$ , holes  $z$  and slots  $z'$ , and of the spring  $g$ , tending to thrust apart the sleeves  $s$  and  $s'$ , substantially as and for the purpose described.

4. In a dental boring apparatus: the combination, with the bit  $b$ , having a semicircular end portion, and a notch  $m$ , of the sleeve  $s'$  inclosing the bit, and having two longitudinal slots  $z'$ , and a semicircular opening in the bottom, of the sleeve  $s$ , inclosing sleeve  $s'$ , having two lateral holes  $z$  and carrying the toothed wheel  $w'$ , of the collar  $c'$ , inclosing sleeve  $s$ , of the pin  $v$ , passing through collar  $c'$ , holes  $z$  and slots  $z'$ , of the spring  $g$ , tending to thrust apart the sleeves  $s$  and  $s'$ , and the casing  $f$ , inclosing the sleeves  $s$  and  $s'$ , and provided with a notch  $k$ , substantially as and for the purpose described.

In testimony whereof we have signed this specification in the presence of two subscribing witnesses.

JAMES WEBER.  
HUGO HAMPEL.

Witnesses:

JOSEPH DAVIDSOHN,  
FR. SPERLING.