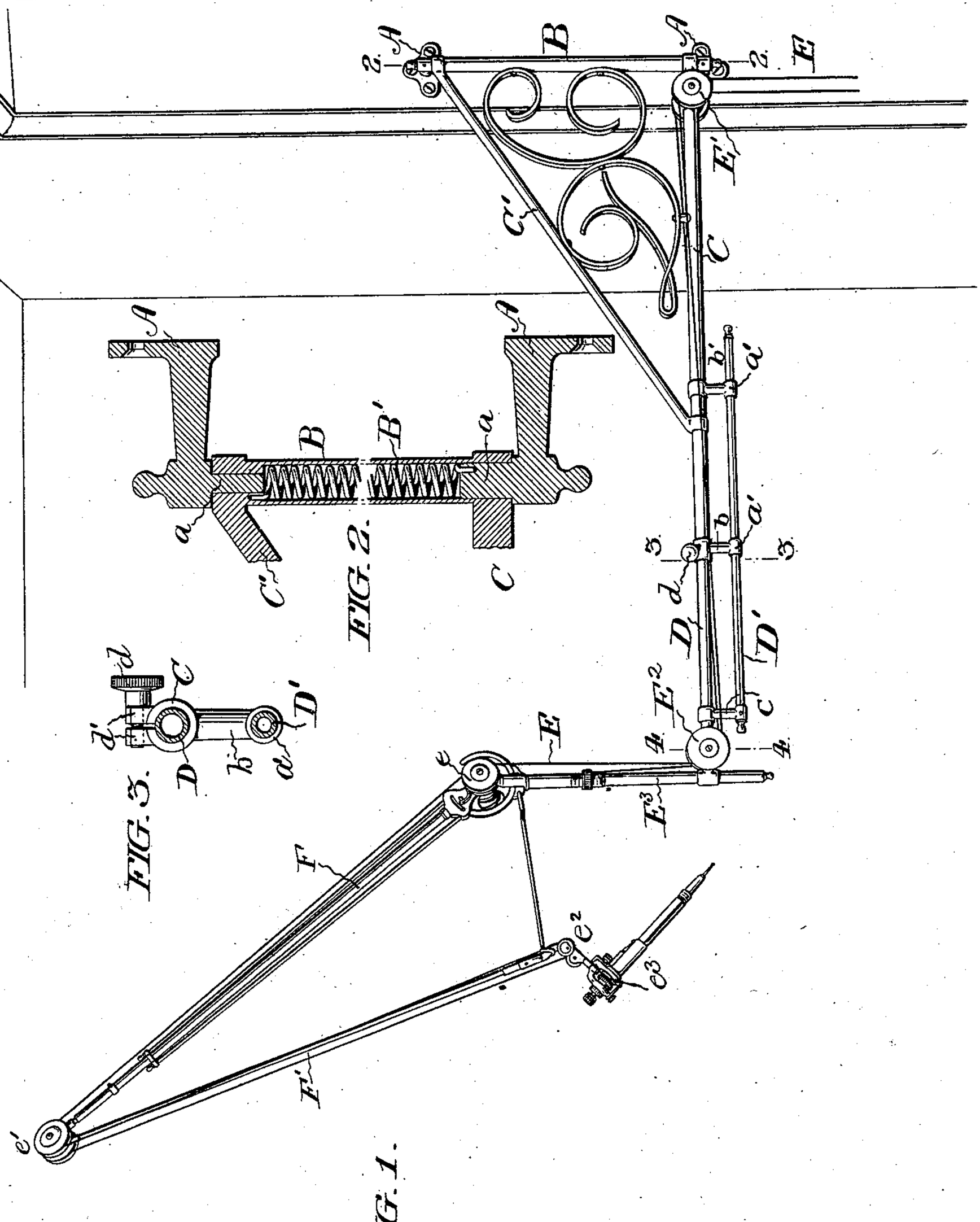
(No Model.) 2 Sheets—Sheet 1.

C. DORIOT.

DENTAL ENGINE.

No. 504,490. Patented Sept. 5, 1893.



WITNESSES:

Edwd. F. Simpson, Jr.

Emil Philips

INVENTOR

Constant Doriot

By Atty J. L. Peyton.

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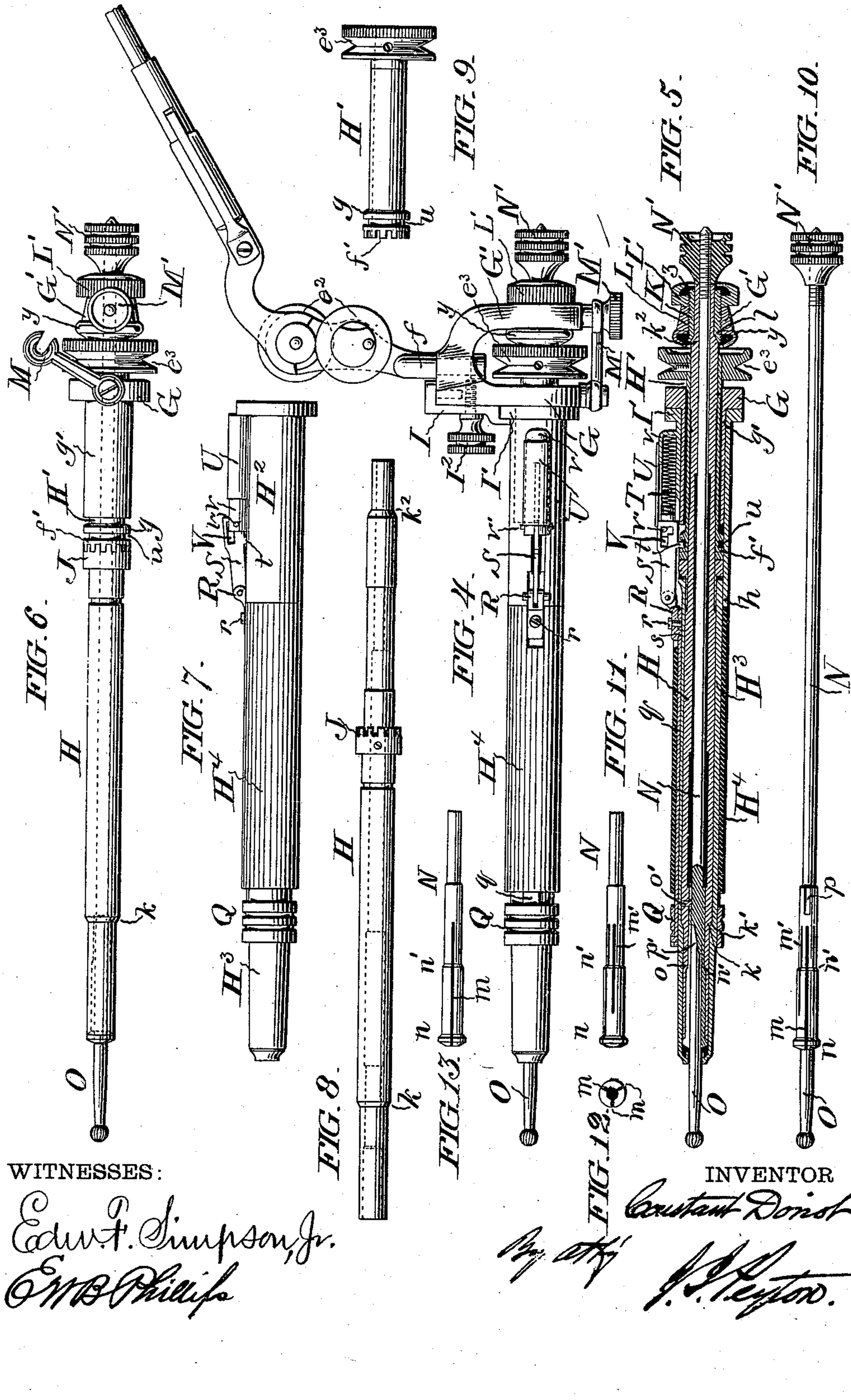

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UNITED STATES PATENT OFFICE.

CONSTANT DORIOT, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE S. S. WHITE DENTAL MANUFACTURING COMPANY, OF SAME PLACE.

DENTAL ENGINE.

SPECIFICATION forming part of Letters Patent No. 504,490, dated September 5, 1893.

Application filed March 11, 1893. Serial No. 465,600. (No model.)

To all whom it may concern:

Be it known that I, CONSTANT DORIOT, a citizen of the Republic of France, residing in the city and county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Dental Engines, of which the following is a specification.

My invention relates to certain improvements, as hereinafter claimed, in dental engines.

In the accompanying drawings Figure 1 is a view in perspective, on a smaller scale than the remaining figures, of an engine embodying my improvements. Fig. 2 is a section through parts on the line 2 of Fig. 1. Fig. 3 is a section on the line 3 of Fig. 1. Fig. 4 is a view showing the hand-piece, the wrist-joint section of the engine arm, and connecting parts. Fig. 5 is a view of parts most of which are in longitudinal central section. Fig. 6 is a view showing at a right angle to Fig. 4, the rotary spindle of the hand-piece, its pulley, the tool chuck, clutch devices, the hand-piece frame, and cord guard. Fig. 7 is a view showing the hand-piece casing and clutch-actuating devices for arresting the motion of the rotary spindle. Fig. 8 shows the rotary spindle and attached member of the stop-motion clutch. Fig. 9 shows the adjustable member of the stop-motion clutch, its attached sleeve and the pulley thereon. Fig. 10 shows the tool chuck detached. Fig. 11 is a view of a portion of the tool chuck; Fig. 12 an end view of the tool chuck; and Fig. 13 shows a portion of the tool chuck slightly modified.

Plates A A for attachment to a wall, window frame, &c., are provided, as usual with pivoting studs *a a* for a turning upright B, into the end bearings of which the studs project. This pivoted upright is shown as made tubular throughout, and, for a purpose farther on to be explained, has within it a coiled spring B′, one end of which—in this instance the upper end—is attached to the upright near its upper end, while the other end is secured to the top of the lower pivoting stud *a* near one edge thereof or at one side of its longitudinal axis.

The bracket arm is made in telescoping sections. The inner or main section C is tubular, is rigidly secured to the pivoted upright at the lower end thereof, and is provided with an inclined brace rod C′ rigidly connecting it with the upper end of the pivoted upright. The outer or sliding section of the bracket arm consists of two rigidly connected parallel rods D D′ the one sliding in the main section, and the other sliding in bearing sleeves *a′ a′* at the ends of short arms *b b′* projecting laterally to the main section to which they are rigidly secured. A cross arm *c* connects the two rods of the sliding section of the arm, and serves as a hand-hold in adjusting this section. The outer end of the main section is slotted and a screw *d* engaging lugs *d′ d′* of the arm at opposite sides of the slot serves to clamp the sliding section of the arm in its adjusted position. By the employment of the lateral arms *b b′* of the main section and the auxiliary rod D′ of the outer section engaging sleeves of these arms, a very strong construction is secured which effectually resists torsional strains. A driving cord E to which motion is imparted in suitable way, passes about pulleys E′ at the inner end of the bracket arm, and about pulleys E^2 at the outer end of the bracket arm. An upright standard E^3 is secured at the outer end of the bracket arm. The driving cord passes about pulleys *e* at the upper end of this standard, and next about pulleys *e′* at the outer end of the main or inner section F of a suitable engine arm having proper jointed connection with the upright standard E^3 so as to be capable of horizontal and vertical movement. The section F′ jointed to the main section, and the wrist joint section with its pulleys e^2 for the driving cord, complete the engine arm. The driving cord finally passes about the pulley e^3 of the hand-piece spindle.

The engine arm shown in the drawings, the manner of mounting it upon the standard, and the way of jointing together the wrist-joint section and the section F′ of the engine arm, are the same as shown and described in my application, Serial No. 464,407, for United States Letters Patent for improvements in dental engines, filed on or about March 2, 1893; but any suitable substitute for these parts may be employed.

It will be seen that when the engine is not in use, the spring B′ acting upon the piv-

oted upright B holds the engine and bracket out of the way against the wall or window frame; and that when the engine is to be used the force exerted by the spring to keep the parts in their normal positions may readily be overcome. As soon as the spring is allowed to act it automatically returns the parts to their normal positions.

The hand-piece frame is yoke-shaped, having two arms G G′, and has swiveling connection with the wrist-joint section of the engine arm by means of the pin *f* thereof which passes through a bearing opening in the frame and is shouldered above this opening and provided with a detachable collar below it.

The pulley e^3 by way of which the rotary spindle H is actuated is detachably secured to the rear end of a sleeve H′ which is adapted to slide endwise of the spindle, and at its forward end is provided with a clutch section *f′* near to which is an annular shoulder *g*. This sleeve H′ passes through a sleeve *g′* of the front arm G of the hand-piece frame and surrounds the spindle H.

The hand-piece casing, as shown, consists of three parts, the parts H^2 H^3 thereof being of different diameters rigidly connected at *h*, and a third part H^4 being of hard rubber, and surrounding the part H^3 for a portion of the length thereof. The construction of the hand-piece casing is such, it will be seen, that it is of greater internal diameter at its cylindrical rear portion than elsewhere, thus providing for the reception of the sliding clutch section and another clutch section for engaging therewith as soon to be explained. The hand-piece casing turns about the sleeve *g′* of the hand-piece frame, and the sliding locking piece I engages the shoulder I′ at the rear end of the hand-piece casing. The clamp screw I^2 serves to hold the locking piece in position to engage the hand-piece shoulder.

The rotary spindle H is provided with a clutch section J for engagement with the clutch section *f′* of the sleeve H′, and has a front inclined bearing shoulder *k* seating against an inclined bearing shoulder *k′* of the hand-piece casing, and a rear inclined bearing shoulder k^2 seating in the internally inclined bearing *l* of an adjusting sleeve K which is externally threaded and engages with the internally threaded bearing L of the rear arm G′ of the hand-piece frame. By adjusting the sleeve K the spindle may be properly held to its bearings. A jam-nut L′ holds the adjusting sleeve in its adjusted position.

A catch hook M pivoted to one arm of the hand-piece frame engages with a pin projecting from the other arm and is held by a clamp shown as formed by a screw nut M′. This hook serves as a cord guard, that is, prevents the cord from running off the pulley e^3; and also prevents the two arms of the frame from springing or spreading apart.

The tool chuck or holder N extends entirely through the rotary spindle, is threaded at its rear end which projects beyond the spindle, and provided with the clamping nut N′ seating against the rear end of the spindle. The chuck is split-ended and is provided with the usual inclined shoulder *n* at its end. In addition to the end shoulder and series of slots *m* extending to the front end of the chuck it is provided with a second inclined shoulder *n′* upon its slotted portion, and a second series of slots *m′*, alternating with those extending to its end. The slots of this second series do not extend to the end of the chuck, and they may extend farther toward the rear end of the chuck than do the end slots. After the shank of the tool O is inserted into the split end of the chuck the clamp nut N′ is adjusted to wedge the inclined shoulder *n* into the inclined end of the spindle and at the same time force the inclined shoulder *n′* against an inclined shoulder *o* of the spindle. In this way the tool shank is clamped at two points by the compression of the chuck, and very firmly gripped.

As shown in Fig. 13, instead of the two sets of slots in the tool chuck there may be used but one set of slots extending from the front end of the chuck backward a suitable distance, the second inclined shoulder *n′* being retained, as shown. A pin *o′* on the spindle and projecting inwardly enters a groove *p* in the chuck to prevent turning of the chuck in the spindle. The inclined inner end *p′* of the tool shank enters a correspondingly-inclined socket in the chuck and thus guards against the turning of the tool.

The "stop motion" devices by which to disconnect the spindle from its actuating pulley and thus throw it out of operation while the pulley continues to revolve, include besides the spindle-surrounding sleeve H′ and clutch *f′* J before described, means such as now to be explained. A sliding sleeve Q on the hand-piece casing near the nose thereof convenient to the finger of the operator is connected to the front end of a thin slide bar *q* working in a groove between the inner and outer parts H^3 and H^4 of the hand-piece casing. To the rear end of this slide bar is detachably secured a forked perforated lug R by means of a screw *r* and projection *s*. See Fig. 5. A clutch tripper S pivoted to this lug is provided with a lug *t* entering the annular groove *u* formed between the shoulder *g* and clutch section *f′* of the sliding pulley carrying sleeve H′ which surrounds the spindle. The end of this clutch tripper is acted upon by a coiled spring T in a housing on the hand-piece casing. This housing consists of an inner tube *v* slotted at top from its front end backward for a portion of its length and closed at rear, and an open-ended outer portion or cover U sliding on the inner tube so as to cover the slot therein or expose it for a portion of its length. A cross pin *v′* secured to the inner section of the housing passes through an angular slot V in the clutch

tripper. Normally the pressure of the spring holds the clutch sections engaged. When, however, it is desired to stop rotation of the tool while the spindle actuating pulley continues to revolve, the sliding sleeve is retracted, thus moving backward the clutch tripper, compressing the spring, and throwing the clutch section on the sliding sleeve H′ out of engagement with the clutch section on the spindle. To permit of the parts being disconnected, the housing cover is slid backward far enough to expose a sufficient length of the slot in the housing tube to admit of the tripper being lifted through the slot far enough to disengage it from the groove *u* between the collar and clutch section of the sliding sleeve. The angular slot in the tripper and the cross pin secured to the housing serve to limit upward movement of the tripper when the parts are to be disconnected, as well as limit the sliding movement of the tripper when actuated to throw the clutch sections out of engagement.

An oil guard washer *y* is provided between the arm G′ of the hand-piece frame and the pulley e^3, and surrounds the joint between the rotary spindle and one end of its adjusting sleeve; and the jam nut L′ of this adjusting sleeve has a like oil guard *z* on one of its faces, surrounding the joint between the other end of the adjusting sleeve and the spindle. See Fig. 5. It will be seen that oil thrown off from the rapidly revolving spindle is caught and held by the oil guards.

I do not herein claim any improvements set forth in my before mentioned application.

I claim as my invention—

1. The combination of the main section of the bracket arm provided with the lateral arms having bearing sleeves, and the telescoping section composed of united parallel arms one of which slides in said sleeves, substantially as and for the purpose set forth.

2. The combination of the hand-piece frame having the front and rear arms and the sleeve, the hand-piece casing turning about said sleeve, the rotary spindle, and the adjusting sleeve adjustable in the rear arm of the hand-piece frame substantially as set forth.

3. The combination of the two-armed hand-piece frame, the pivoted hook connecting the arms, and the clamp acting on the hook, substantially as and for the purpose set forth.

4. The combination of the hand-piece casing, the tubular rotary spindle therein provided with a shoulder (*o*) near its front end, the split ended tool chuck extending entirely through the spindle and threaded at its rear end and having the two inclined shoulders, one at its front end and the other at a point in rear thereof upon its split portion, and the clamp nut upon the rear end of the chuck and seating against the spindle to force the inclined shoulders of the chuck the one into the end of the spindle and the other against the inclined shoulder near the end thereof, substantially as set forth.

5. The combination, in a dental engine hand-piece, of the rotary spindle provided with one section of a clutch, the sliding sleeve directly to which rotary motion is imparted, provided with the other section of the clutch, the hand-piece casing having an inner part and an outer or surrounding part, the clutch tripper pivoted to swing into and out of engagement with the sliding clutch section, means for actuating the clutch tripper to disengage the clutch sections, said means comprising the slide bar working inside the outer part of the hand piece casing, and the spring acting on the tripper to normally hold the clutch sections engaged and to re-engage them after having been disengaged, substantially as set forth.

6. The combination, in a dental engine hand-piece, of the casing having the cylindrical rear portion of larger internal diameter than the remainder of the casing, the rotary spindle provided with one section of a clutch within said internally enlarged cylindrical rear portion of the casing, the sliding sleeve directly to which rotary motion is imparted, provided with the other section of the clutch within said cylindrical rear portion of the casing, the clutch tripper by way of which the clutch-carrying sliding sleeve is actuated to disengage the clutch sections, the slide bar to the rear end of which the clutch tripper is pivotally connected, means for actuating the slide bar, and the spring acting on the tripper to normally hold the clutch sections engaged and to re-engage them after having been disengaged, substantially as set forth.

7. The combination, in a dental engine hand-piece, of the rotary spindle provided with one section of a clutch, the sliding sleeve to which rotary motion is imparted, provided with the other section of the clutch, the pivoted clutch tripper provided with the angular slot, the spring acting on the tripper, the housing for the spring consisting of the slotted tube and the sliding cover, and the cross pin secured to the housing and passing through the slot in the clutch tripper, substantially as and for the purpose set forth.

In testimony whereof I have hereunto subscribed my name.

CONSTANT DORIOT.

Witnesses:
E. L. STARR,
HARRY R. BARBER.