Jan. 13, 1925 1,523,068

G. N. HEIN

INTRAOSSEUS SYRINGE AND NEEDLE

Filed Aug. 26, 1924

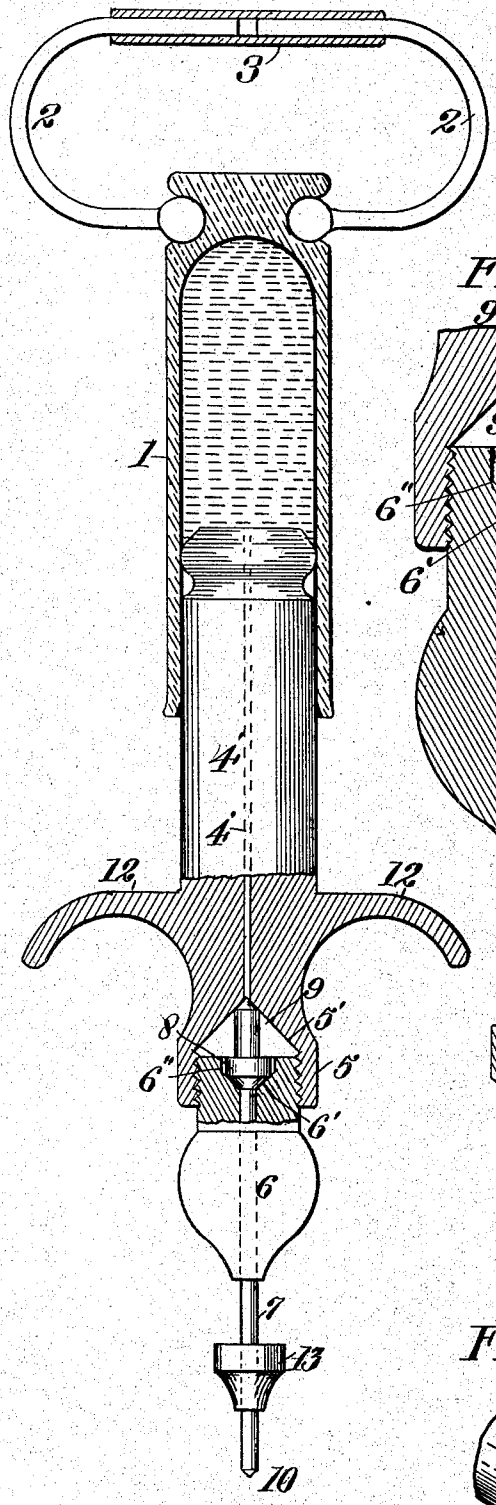


Fig. 1.

Fig. 2.

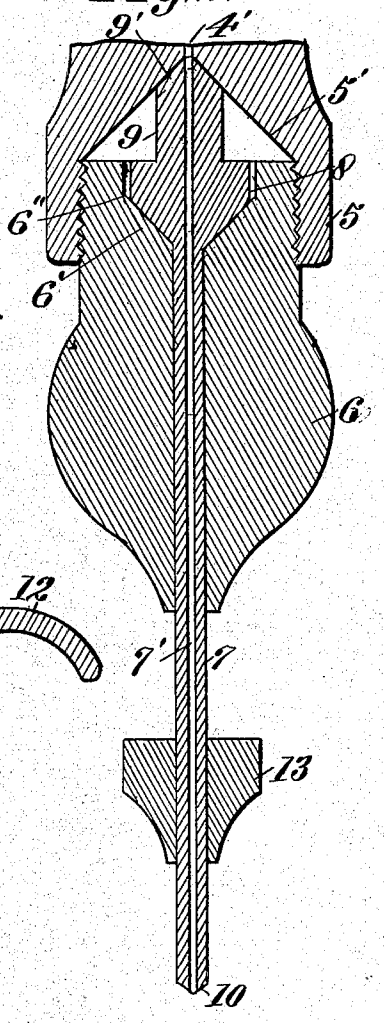


Fig. 3.

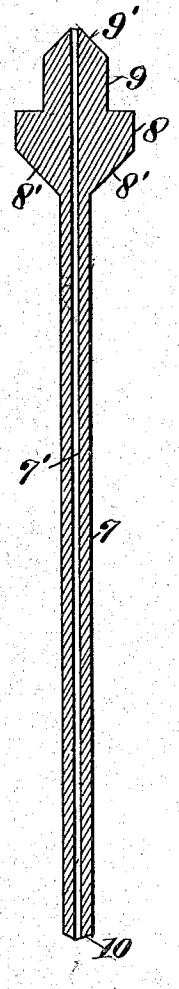
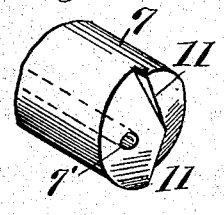


Fig. 4.



Inventor.
George N. Hein
By Harry A. Toulmin
Attorney.

Patented Jan. 13, 1925. 1,523,068

UNITED STATES PATENT OFFICE.

GEORGE N. HEIN, OF SAN FRANCISCO, CALIFORNIA.

INTRAOSSEOUS SYRINGE AND NEEDLE.

Application filed August 26, 1924. Serial No. 734,211.

To all whom it may concern:

Be it known that I, GEORGE N. HEIN, a citizen of the United States, residing at the city and county of San Francisco and State of California, have invented certain new and useful Improvements in Intraosseous Syringes and Needles, of which the following is a specification.

My invention relates to the class of surgical instruments and particularly to syringes and needles for injecting anæsthetic and other medicinal solutions, and withdrawing fluids from interior sources.

The general object of the invention is to provide an instrument adapted for the injection and withdrawal of fluids into and from the interior of bony tissues, with greater convenience and saving of time and energy than by present methods.

The attainment of this object and the nature of my invention will be fully disclosed in and by the following description, taken in connection with the accompanying drawings, it being understood that changes in details of form and construction may be made without departing from the principle and spirit of the invention as defined by the claims hereunto appended.

In the drawings:—

Fig. 1 is a longitudinal sectional view, partly in elevation, of my intraosseous syringe and needle.

Fig. 2 is a sectional view, enlarged, of the chuck and joint connection between the needle and piston.

Fig. 3 is an elevation, enlarged, of the needle.

Fig. 4 is a perspective view of the penetrating and boring point of the needle.

1 is the barrel of the syringe, to the end of which is fitted the hand clasp spring 2, provided with the sleeve 3 in which the opposing free ends of the clasp telescope to provide for necessary adjustment. 4 is piston of the syringe fitted within the barrel 1, the association being such as to provide for both linear and rotative relative movement.

The piston 4 has a through channel 4′, the forward end of which opens into the apex of the conical base 5′ of the bore of the internally threaded chuck-seat 5 formed on the piston end. 6 is the needle chuck fitted in the seat 5. The inner end of chuck is formed with seat socket 6″, the base of which is conical, as shown at 6′. 7 is the needle having the through channel 7′. The inner end of the needle is formed or provided with a bearing hub comprising a relatively large diameter front portion 8 with a conical front end 8′ and a reduced portion 9 with a conical rear end 9′. When the needle is fitted in the chuck and tightened up to the piston, the conical rear end 9′ bears against the conical base 5′ of the bore of the chuck-seat 5, while the conical front end 8′ bears against the conical base 6′ of the socket 6″ of the needle chuck 6, and in this fitting the continuity of the piston channel 4′ and the needle channel 7′ is preserved, while at the same time an effective wipe joint is formed by reason of the difference between the areas of the frictional surfaces 8′, 6′, and 9′, 5′, without any packing, and said joint having the further function of serving as a clutch to prevent the needle from having any movement on its axis independent of the axial rotation of the piston in the use of the instrument as will presently appear.

The needle is formed with a penetrating point 10 and in addition thereto said point is provided with drill cutters 11 of suitable form, preferably auger-like, as shown in Fig. 4, so that said needle has the dual capacity or function of penetration by linear pressure and boring by rotative axial movement. Carried by the piston 4 is the finger grip 12 to enable the operator to rotate it. Upon the needle 7 is a sliding sleeve 13, Fig. 3, to prevent outflow of solution while operating. The operation of instrument will be best understood and appreciated by comparison with present practise.

In dentistry there is a method of producing local anæsthesia known as intraosseous. This method, briefly, consists of first injecting a few drops of anæsthetic solution in the soft tissue overlying the bony tissue to be entered. A hole is then bored through the compact or outer layer of bone or of the alveolar process, until the spongy or inner portion of the bone is entered. Then the drill is removed and a suitable hypodermic syringe mounted with a blunt needle is used for injecting the anæsthetic solution into the cancellous portion of the bone surrounding the roots of the teeth and their nerve filaments. The nerves thus being bathed in the anæsthetic solution, immediately lose their power of conveying sensory impulses, mak-

ing it possible for the operator to work on the teeth and their investing tissues without producing discomfort to the patient.

In general bone surgery also, it becomes necessary at times to enter the bony tissue for aspirating pus, inflammatory serums, diseased marrow, etc. The above method is, however, cumbersome, taxes the skill of the average operator, loses time and is at the expense of nervous energy to both operator and patient.

In contrast with this method, it will be seen that but one operation is necessary with my appliance to penetrate and inject the solution into the bony tissue instead of two operations as in common practice. The operator, after the ordinary preliminary injection of the anæsthetic solution into the soft tissue overlying the bony tissue, enters the present instrument, and by simultaneously linearly pressing forward the solution-holding barrel 1, and with his fingers, by means of the grip 12, rotating the piston 4 and the needle it carries, advances the needle boringly into the bony tissue while injecting the solution. In this operation, the needle, as heretofore mentioned, due to the wiping joint surfaces described, has no tendency to rotation independently of the rotation of the piston.

I claim:—

1. A surgical instrument for the described purpose comprising a syringe member; and a hypodermic needle member in communicative connection with said syringe member, said needle member having a point adapted for penetrative boring.

2. A surgical instrument for the described purpose comprising a syringe member; a hypodermic needle member having a point adapted for penetrative boring; and means for associating said members in communicative connection adapting them for relative rotation.

3. A surgical instrument for the described purpose, comprising a syringe barrel; a channeled piston slidably and rotatively fitted to said barrel and a hypodermic needle communicatively associated and rotatable with said piston, said needle having a point adapted for penetrative boring.

4. A surgical instrument for the described purpose, comprising a syringe barrel; a channeled piston slidably and rotatively fitted to said barrel; means on said piston for rotating it; and a hypodermic needle communicatively associated and rotatable with said piston, said needle having a point adapted for penetrative boring.

5. A surgical instrument for the described purpose, comprising a syringe barrel; a channeled piston slidably and rotatively fitted to said barrel, said piston having its outer end formed with a chuck-seat having a conical base into which the channel of the piston opens; a chuck fitted in the chuck-seat and having its inner end formed with a socket having a conical base; and a hypodermic needle fitted in said chuck, the inner end of said needle having a bearing with a concal forward end of relatively large area contacting with the conical base of the chuck-socket and with a conical rear end of relatively small area contacting with the conical base of the chuck-seat, and said needle having a point adapted for penetrative boring.

In testimony whereof I have signed my name to this specification.

GEORGE N. HEIN.