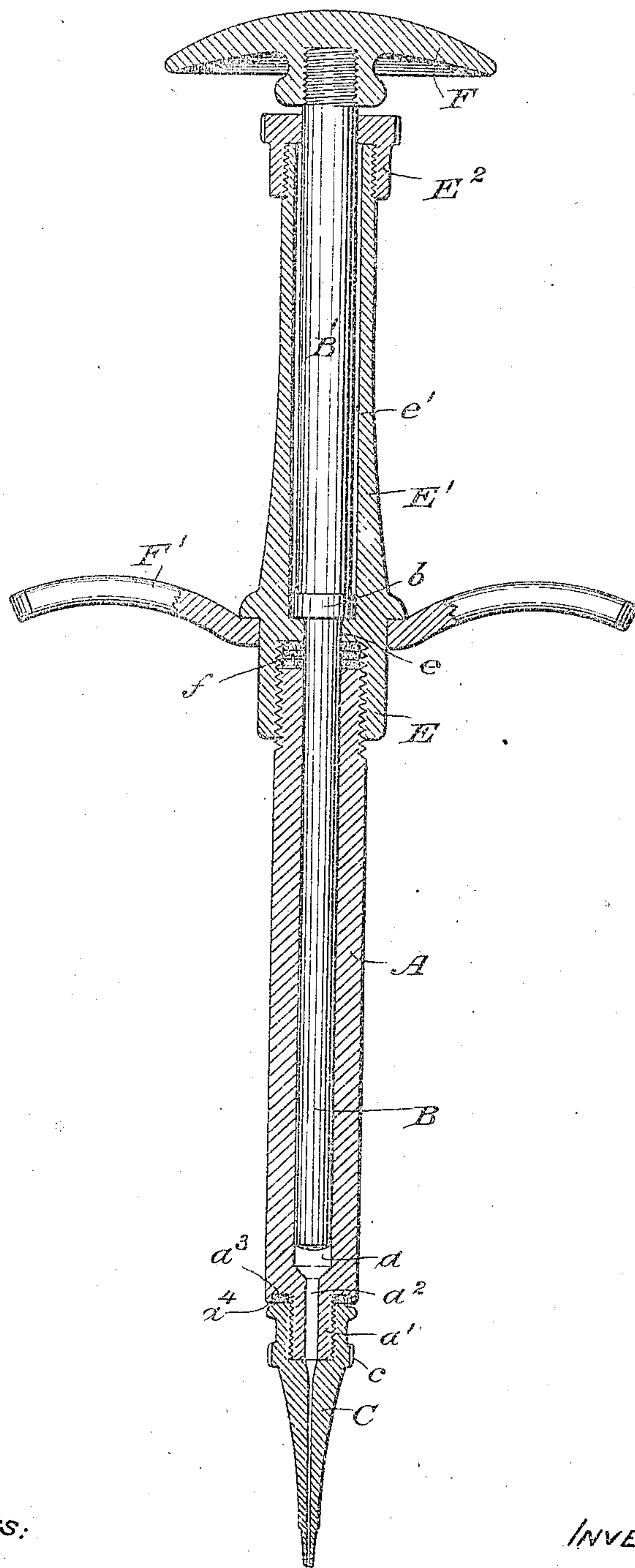


No. 827,693.

PATENTED JULY 31, 1906

F. W. KORB.  
HYPODERMIC SYRINGE.  
APPLICATION FILED JUNE 27, 1904



WITNESSES:

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# UNITED STATES PATENT OFFICE.

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## HYPODERMIC SYRINGE.

No. 827,693.

Specification of Letters Patent.

Patented July 31, 1906.

Application filed June 27, 1904. Serial No. 214,276.

*To all whom it may concern:*

Be it known that I, FREDERICK WM. KORB, a citizen of the United States, residing at Cleveland, Cuyahoga county, Ohio, have invented certain new and useful Improvements in Hypodermic Syringes, of which the following is a specification, that will enable those skilled in the art to which my invention pertains to make and use the same, reference being had to the accompanying drawing, which forms a part thereof.

My invention relates to hypodermic syringes adapted to be operated by direct pressure between the palm and fingers of the operator. Its objects are to produce a syringe in which very great pressure may be created on the liquid to be ejected from its barrel and to guide and protect the very small or slender piston-plunger against being sprung or bent in operation; and it consists of certain features and combinations of features, as will hereinafter be specifically set forth and claimed.

The drawing shows a central longitudinal section of my invention in the general form and construction of details now deemed most desirable by me; but changes not requiring the exercise of invention might be made therein by a skilful mechanic without departing from the spirit of my invention as set forth in the claims at the end of this specification.

My invention contemplates a form of syringe in which very great pressure may be produced on the liquid in the barrel by the direct gripping pressure of the operator's hand and without the intervention of power-levers, screws, or other such mechanisms intended to multiply the gripping pressure of the operator's hand.

Power-syringes are particularly desirable where cocaine or other obtundant or anesthetic liquids are to be forced into bones or into the dentin structures of teeth to deaden or stupefy the nerve centers. In such operations very minute portions only of the liquids—say a drop or two—are absorbed by the bone or dentin structures into which they are forced, and such quantity as is used is only a very small percentage of the capacity of an ordinary-sized hypodermic syringe, the barrels and pistons of which are usually

about five-sixteenths of an inch in diameter. This diameter, five-sixteenths of an inch, has an area of about one-thirteenth of a square inch, and if the grip of the operator's hand equals fifty pounds it would produce a pressure on the liquid of about six hundred and fifty pounds per square inch. Now if power mechanism is employed to aid the operator with a ratio or leverage of, say, four to one it would raise the pressure on the liquid to two thousand six hundred pounds per square inch.

With my invention I purpose producing very much greater pressures than this by the use of a syringe barrel and piston of very small diameter and reduced area. In practice I have found that a barrel and piston of one-eighth inch diameter and one and one-half inches stroke will discharge a many times greater quantity of the liquid than will be absorbed by the part into which it is forced, so that a syringe of this size has ample capacity for such operations. Now a piston-plunger of one-eighth inch diameter has an area of about  $1/81.5$  of a square inch, and if the operator's grip equals fifty pounds, as before, it would produce a piston-pressure on the liquid of four thousand and seventy-five pounds per square inch. A piston-plunger of such small diameter as one-eighth of an inch or less is not, however, sufficiently rigid if unsupported or unguided where it projects from the back end of the barrel to insure it against being sprung and bent in the strong grasp of the operator, and it is the purpose of my invention to produce a structure that will securely guard against such accidental bending of the piston and also to provide stops to limit the movement of the piston and prevent its being accidentally pulled entirely out of the barrel.

In the drawing I show on an enlarged scale a central longitudinal section of a syringe embodying my improvements.

The barrel A has a small longitudinal bore  $a$ , in which is fitted a small piston-plunger B.

The forward end of the barrel is formed with a small screwed nipple  $a'$ , having an aperture  $a^2$  smaller than the bore of the barrel, and on this nipple is screwed nozzle or needle point C, having a milled ledge  $c$ , and seating against a packing-washer  $a^3$ , of leather or



other suitable material, located in an annular recess in front face of the shoulder  $a^4$  on the barrel.

The rear end of the barrel is screw-threaded to receive a cap E, bored at  $e$  for the passage of the piston-plunger and inclosing packing-washers  $f$ , which it clamps against the end of the barrel. From the back of the cap E there is a tubular extension or guide-sleeve  $E'$ , bored, as at  $e'$ , considerably larger than the diameter of the barrel and piston-plunger. In this sleeve lies an extension  $B'$  of the piston-rod sufficiently large in diameter to guard against any chance of its being bent or sprung when drawn out of the sleeve and having a collar  $b$ , which fits the bore of the sleeve, as shown.

On the end of the sleeve is screwed a cap  $E^2$ , bored to fit the piston extension  $B'$ , this cap and the collar serving to guide the piston extension  $B'$  throughout its stroke and also to limit the stroke of the piston.

On the projecting end of the piston-rod is a palm-button  $F$ , and on the cap E, at a point relatively near the rear end of the cylindrical barrel and the mid-length of the device, is secured a cross-bar  $F'$ , suitably curved to be engaged by the fingers of the operator.

It will be observed that my syringe has the direct action of an ordinary syringe, that its small delicate piston-plunger is effectually protected and guided, that its movement is limited in both directions by the collar on the piston extension, and that the structure is compact and symmetrical, every feature of it being in alinement on the axis of the barrel and piston and without side projections of any kind except the finger-bar  $F'$ .

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

1. In a syringe, the combination of the cylindrical barrel, a piston-plunger fitted there-

in and having an extension of larger diameter than the piston portion, an extension from the barrel of less length than the enlarged portion of the piston-plunger and adapted to serve as a guide therefor, a palm-piece on the projecting extremity of the piston-piece and a cross-bar secured to the device relatively near the rear end of the cylindrical barrel.

2. In a syringe, the combination of the cylindrical barrel, a piston-plunger fitted therein and having an extension of larger diameter than the plunger portion with a collar at the inner end of said enlarged portion, an extension from the barrel of less length than the enlarged portion of the piston and adapted to serve as a guide therefor, stops in said barrel extension adapted to act upon the collar on the piston-piece, with a palm-piece on the projecting extremity of the piston-piece and a cross-bar secured on the device relatively near the rear end of the cylindrical barrel, substantially as described.

3. In a hypodermic syringe, the combination of the cylindrical barrel, a piston-plunger fitted in the barrel and having an enlarged extension provided with a collar, a tubular sleeve screwed upon the barrel with an inner wall apertured for the piston-plunger, and forming a packing-chamber, the bore of the sleeve adapted to receive the collar on the rod, a cap screwed upon the end of the sleeve and bored to fit the enlarged portion of the rod, with a palm-button on the end of the piston-rod and a cross finger-piece secured to the device near the rear end of the barrel; substantially as described.

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

FREDERICK WM. KORB.

Witnesses:

WM. A. SKINKLE,  
SAMUEL C. BLAKE.