Jan. 8, 1929. 1,698,458

A. SIMONS

METHOD OF POLISHING WIRE DRAWING DIES AND APPARATUS THEREFOR

Filed Nov. 17, 1925

Fig. 1

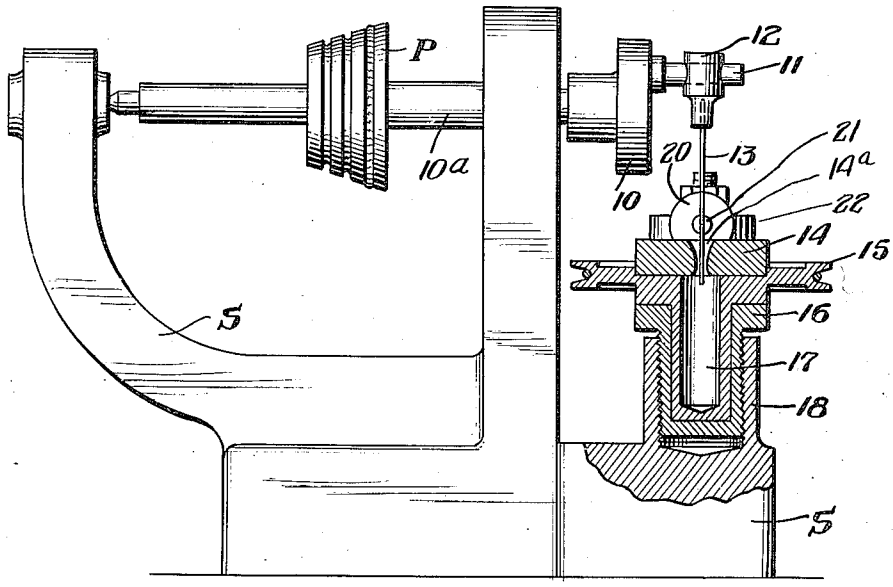



Fig. 3

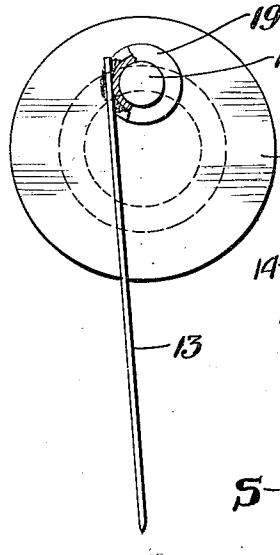
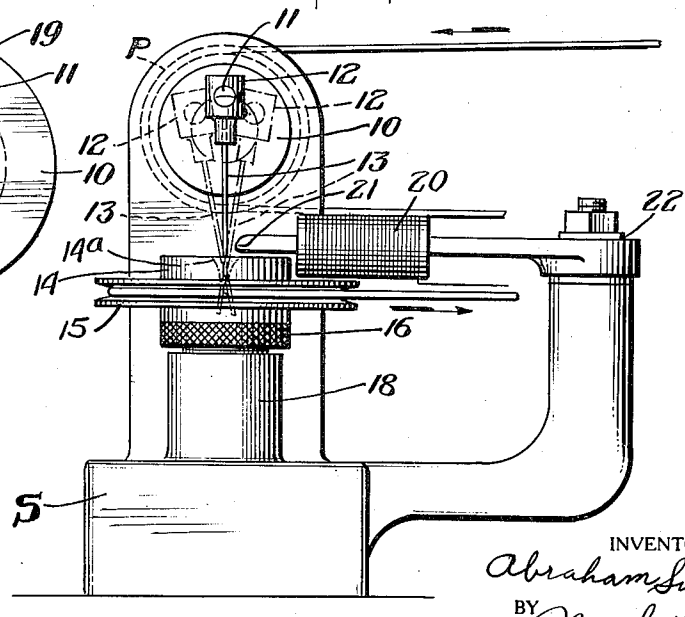



Fig. 2




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# UNITED STATES PATENT OFFICE.

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## METHOD OF POLISHING WIRE-DRAWING DIES AND APPARATUS THEREFOR.

Application filed November 17, 1925. Serial No. 69,561.

My invention relates to a new and improved method for polishing wire drawing dies, a new and improved apparatus for polishing said dies, and a new and improved die itself.

One of the objects of my invention is to provide a new and improved method for polishing wire drawing dies, and particularly diamond dies of this type, whereby an improved inner polished surface can be secured with a minimum of time and expense.

Another object of my invention is to provide a method of this character whereby the entire inner wall of the bore of the die will be polished with absolute uniformity.

Another object of my invention is to provide a mechanism whereby a diamond die can be polished very rapidly and with a minimum of expense.

Another object of my invention is to provide a die of this type and particularly a diamond die which will have a uniformly polished inner bore throughout.

Other objects of my invention will be set forth in the following description and drawings, it being understood that the above general statement of the objects of my invention is intended to generally illustrate the same and not to limit it in any manner.

Fig. 1 is a side elevation partially in section of one of the mechanisms which may be used for carrying out my invention.

Fig. 2 is a front view.

Fig. 3 is a detail view partially in section.

In polishing wire drawing dies heretofore, it has been customary to revolve the die in a suitable holder and hold a steel needle against the inner wall of the bore of the die, or else the needle was rotated so as to rub against the inner wall of the bore. In both cases the bore of the die was given what may be termed a circumferential polishing action so that ridges and irregularities were formed in the bore of the die and this had an injurious effect upon the quality of the wire.

According to my invention, the polishing action is substantially parallel to the axis of the bore of the die, the lateral pressure of the polishing needle against the bore of the die being only just sufficient to enable the polishing action to be efficiently performed.

For example, in the embodiment shown herein, a shaft $10^a$ is mounted in a base S. The shaft $10^a$ is provided with a series of pulleys P which can be connected to a driving pulley by means of a suitable belt so that the shaft $10^a$ can be driven at any suitable speed. A disc 10 is connected to the shaft $10^a$ and the crank pin 11 is connected to the disc 10 in any suitable manner.

The holder 12 for the thin polishing needle is mounted in any suitable manner upon the crank pin 11 so that when the shaft $10^a$ is actuated, the polishing needle 13, which is made of any suitable steel, is rapidly moved up and down and is also given a lateral movement.

This construction alone would provide a polishing action superior to that heretofore used, but I have found that in addition it is desirable to exert a more positive lateral pressure upon the wall of the bore, during the polishing operation. This is accomplished by means of an ordinary electromagnet 20 having a core 21 which is connected to a bracket of the base S by means of a nut 22. The magnetic attraction of the magnetized core 21 is sufficient to exert a constant lateral force upon the polishing needle. Hence, when the die 14, which is mounted in a revoluble holder, is turned around its axis while the polishing needle 13 is given a substantially vertical movement in the manner before mentioned, an efficient polishing action is very rapidly secured.

The revoluble holder 15 for the die 14 is mounted in a bearing member 16 which is connected by means of suitable threading to the internally threaded extension 18 of the base S. The holder 15 is turned by means of a suitable belt. An important feature of my invention is that the bearing 16 is vertically adjustable so that the polishing action of the needle 13 can be mainly exerted by various portions thereof. It is obvious that the upper part of the polishing needle 13 has a greater lateral movement than the bottom part thereof, and a valuable adjustment is provided by this means.

The polishing needle 13 has a thickness which is only slightly less than the smallest diameter of the bore of the die 14. Hence, its movement is substantially in an axial direction with sufficient of a lateral component and a lateral pressure, the pressure being caused by the magnetic force to exert a positive polishing action upon the revolv-

ing die. I have illustrated the die 14 in a conventional manner, but this may be a die of any suitable type such as a diamond die or the like.

In the embodiment shown in Fig. 3, I have shown the needle 13 connected to the side of a holder 19 which is mounted upon the crank pin 11. The needle 13 in this embodiment can be connected to the holder 19 by solder or the like.

I have shown a preferred embodiment of my invention, but it is clear that numerous changes and omissions could be made without departing from its spirit.

I claim:—

1. In a mechanism for polishing the wall of the bore of a wire drawing die, a polishing pin, a holder therefor, means adapted to reciprocate said holder in a direction having a component parallel to the axis of the said die, means adapted to exert a continuous lateral force on the said polishing pin, and means adapted to simultaneously turn the said die.

2. A mechanism according to claim 1 in which said polishing needle is made of paramagnetic material and in which the said lateral force is provided by means of a magnet located laterally to the said needle.

3. In a mechanism for polishing the wall of the bore of a wire drawing die, the combination of a revoluble die holder adapted to hold the die, a shaft mounted above said holder and having a crank pin connected thereto, a polishing pin, a pin holder for the said polishing pin and mounted upon the said crank pin, the said pin extending into the bore of the die in all positions of its holder, and means adapted to adjustably hold the said holder for the said die so that the said holder can be moved towards and away from the said shaft.

In testimony whereof I affix my signature.

ABRAHAM SIMONS.