R. D. CONNOR AND R. P. SLINGER.

APPARATUS FOR SETTING THE DIES OF WIRE DRAWING MACHINES.

APPLICATION FILED JUNE 2, 1919.

1,367,686. Patented Feb. 8, 1921.

5 SHEETS—SHEET 1.

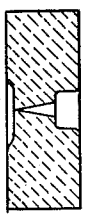


Fig. 8.

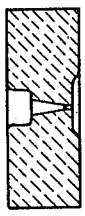


Fig. 9.

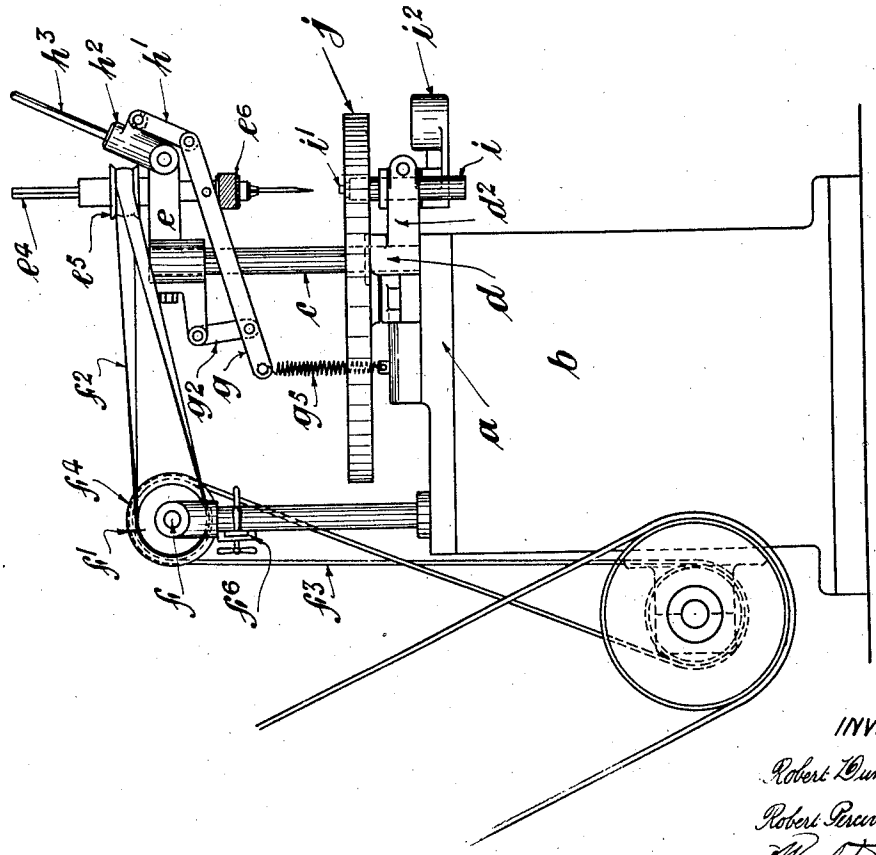


Fig. 1.

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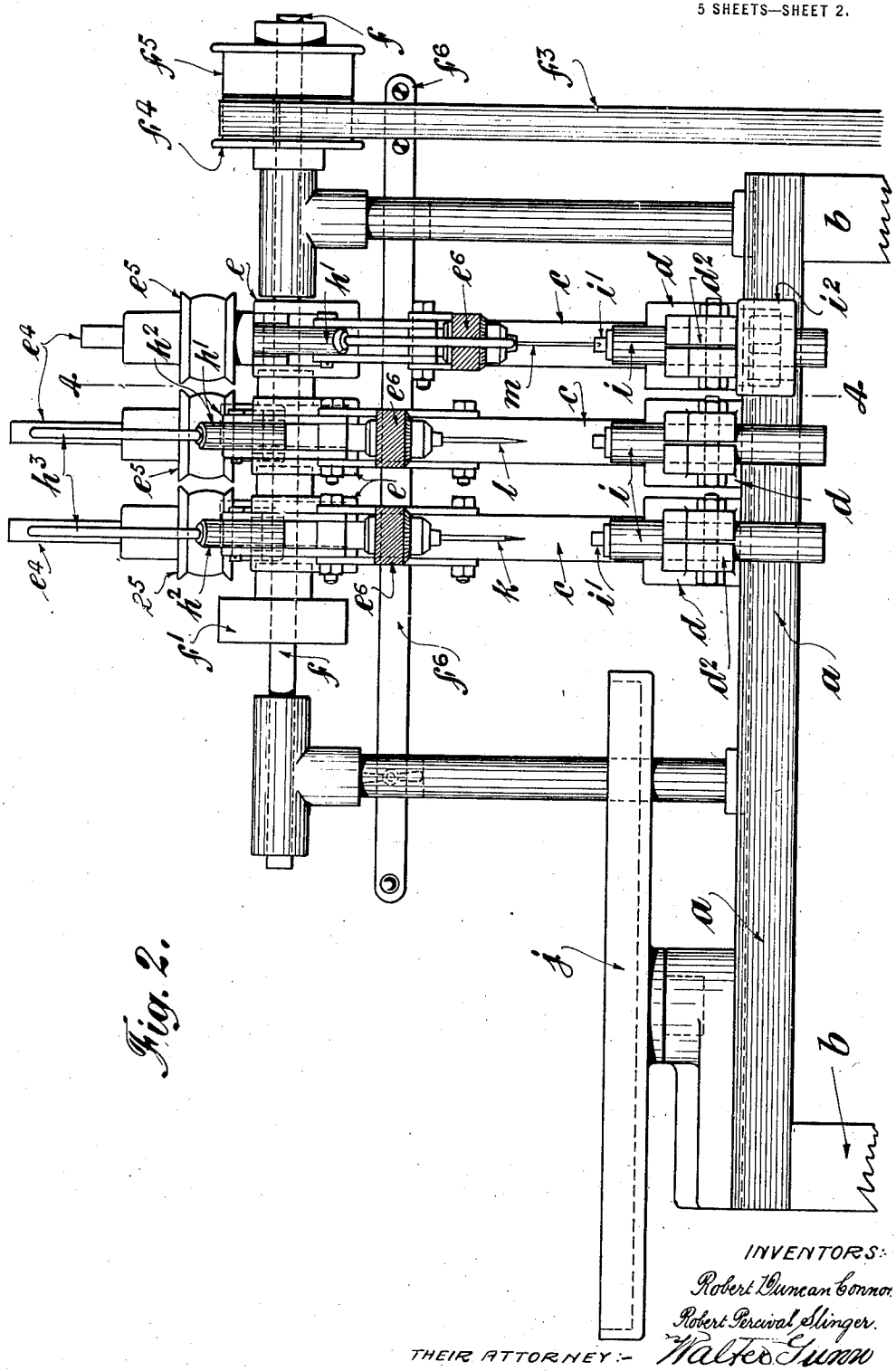


Fig. 2.

INVENTORS:
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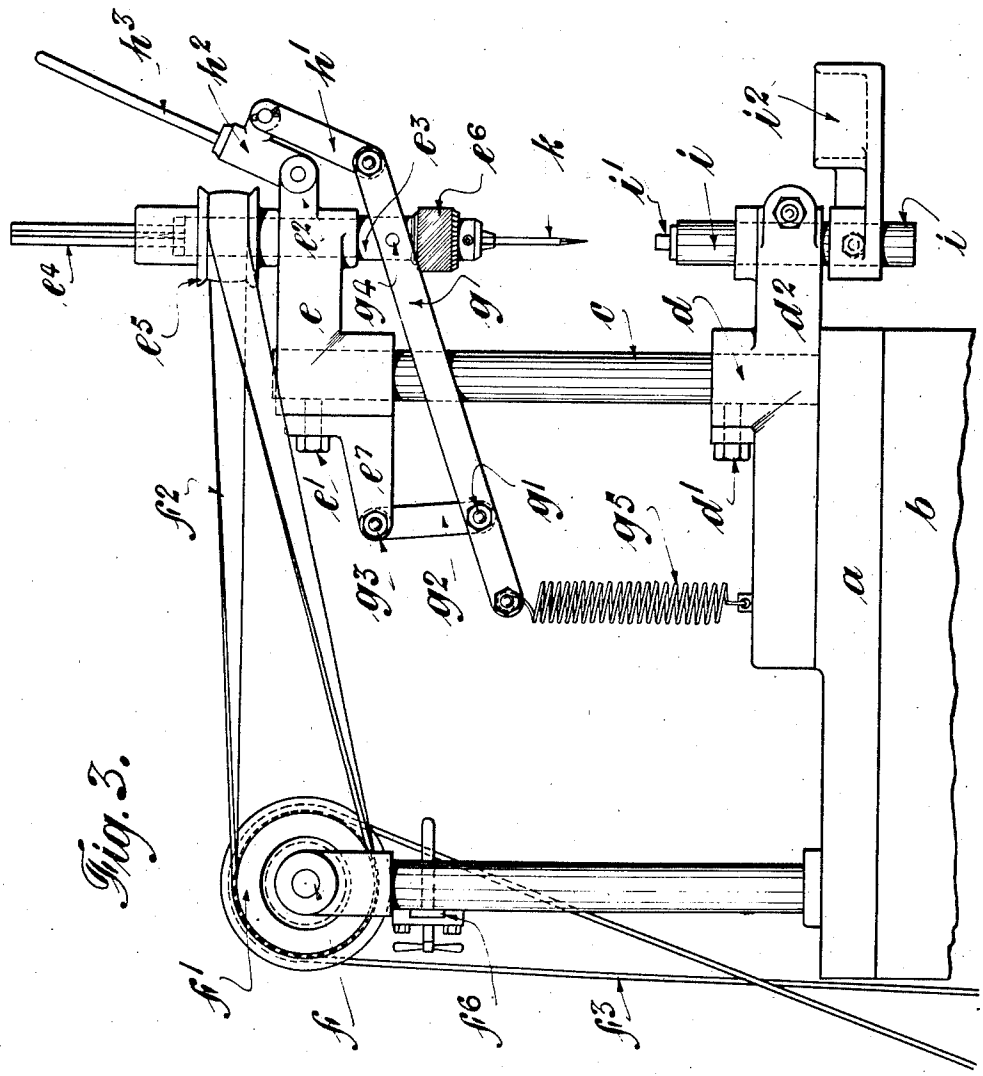


Fig. 3.

INVENTORS:-

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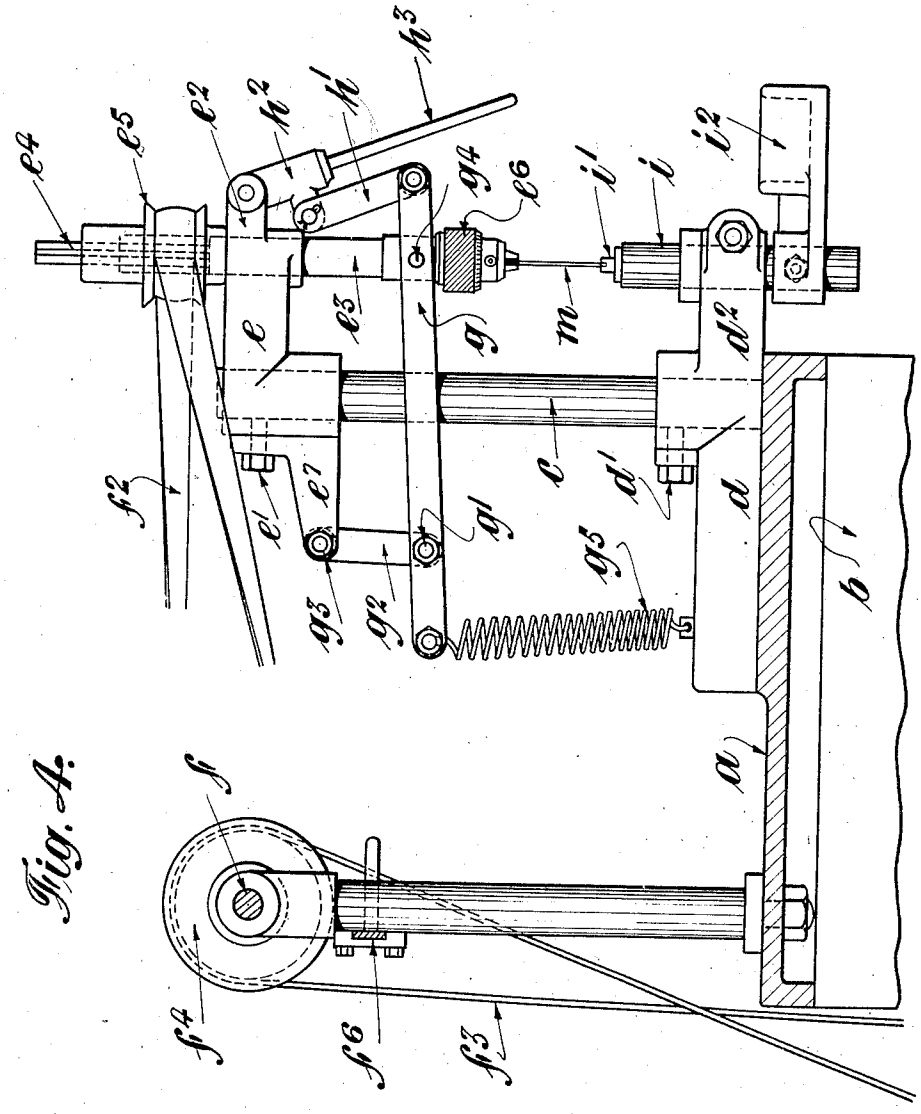


Fig. 4.

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5 SHEETS—SHEET 5.

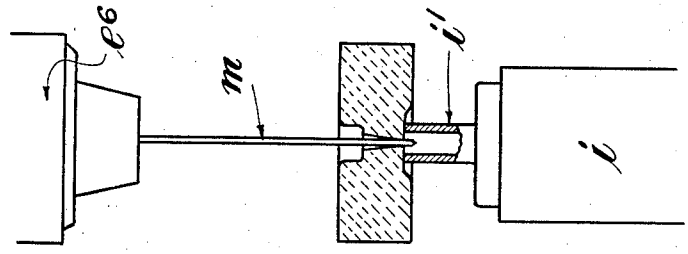


Fig. 7.

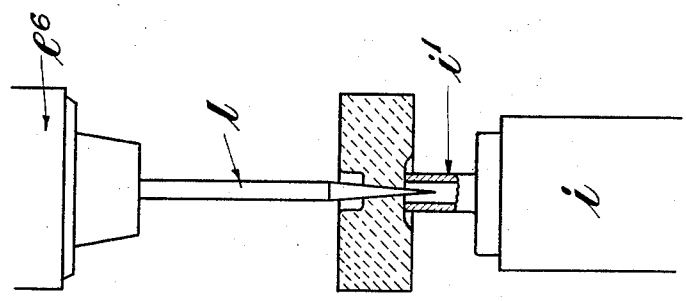


Fig. 6.

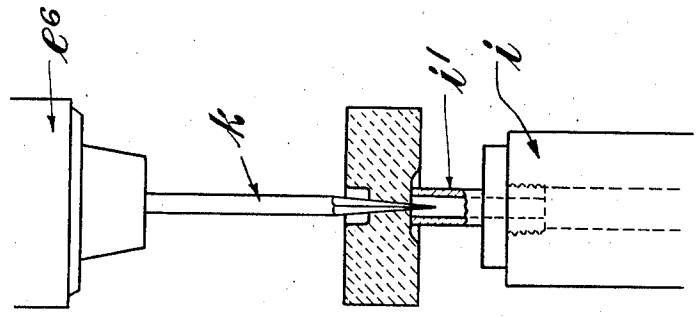


Fig. 5.

INVENTORS:-

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UNITED STATES PATENT OFFICE.

ROBERT DUNCAN CONNOR AND ROBERT PERCIVAL SLINGER, OF MANCHESTER, ENGLAND.

APPARATUS FOR SETTING THE DIES OF WIRE-DRAWING MACHINES.

1,367,686. Specification of Letters Patent. Patented Feb. 8, 1921.

Application filed June 2, 1919. Serial No. 301,308.

To all whom it may concern:

Be it known that we, ROBERT DUNCAN CONNOR and ROBERT PERCIVAL SLINGER, both subjects of the King of Great Britain and Ireland, and residents of Manchester, England, have invented new or Improved Apparatus for Setting the Dies of Wire-Drawing Machines, of which the following is a specification.

The die of a wire drawing machine usually consists of a small rectangular block of steel with a tapered and trumpet shaped hole through the center of the block, the narrower end of the hole being of the gage to which the wire has to be drawn. The die sometimes consists of a plate with a series of holes. In order to keep the die, or die plate in proper working order, it is necessary to periodically reset the hole or holes, *i. e.*, partly close the hole, or holes, and reform it, or them, to the required shape and size.

The object of this invention is to provide improved apparatus for effecting the setting of wire drawing dies for all sizes of wire, so that the setting may be done quickly and positively, the correctness of the setting for dies in all stages of use depending upon the preliminary adjustment of the machine and not upon the operator's judgment, or skill in practice, and in which the die is self-alining so that there is no liability for the setting tools to be broken in use even when setting the finest gages.

The invention will be described with reference to the accompanying drawings wherein:—

Figure 1 is an end elevation, and

Fig. 2 a part front elevation (to a larger scale) of a machine constructed according to the invention.

Fig. 3 is a detail view of the top half of Fig. 1 also drawn to a larger scale.

Fig. 4 is a view similar to Fig. 3 taken on the line 4, 4 of Fig. 2, and showing the tool in its lowermost position.

Figs. 5 to 7 illustrate to a larger scale, the lower ends of the several tools, the die support (partly in section) for each tool, and in each case a die under treatment, the die being in section.

Fig. 8 illustrates a die (in section) after being hammered up and before being set, while Fig. 9 illustrates the same die after being set.

Referring to the drawings, the machine therein shown consists of a cast iron table or bed part a having end supports b, b. Upon the table or bed part a are three uprights c, c, c carried by the brackets d, d, d connected to said table, the uprights c being secured in sockets in the brackets d by means of the set screws d'.

A further set of brackets e, e, e are secured to the uprights c, one at the top of each, by means of the set screws e'. Each bracket e is extended forwardly and bored at e^2 to receive the tubular sliding member e^3 in which is located the rotating spindle e^4 driven from the cross shaft f through the pulleys f', e^5 and belt f^2, the pulley e^5 being keyed to the spindle e^4. Each spindle e^4 is provided with a tool holder or chuck e^6 and said spindles are raised and lowered by means of the lever g pivoted at g' to a link g^2 which is pivotally connected at g^3 to an extension e^7 of the bracket e, the lever g being pivotally connected at g^4 to the tubular member e^3. The spindles e^4 are normally retained in the raised position by means of the springs g^5 but are lowered by means of the toggle links h', h^2, a handle h^3 being provided for manipulating purposes.

A forward extension of each bracket d is formed as a clamp d^2 to receive a rod or tube i in the top end of which is screwed the tubular die support i' and upon the lower end of which can be clamped a box i^2 to hold lubricant. A rotating table j is provided on the table a to hold the dies in a handy position for the operator. The cross shaft f is driven from any convenient source of power by means of the belt f^3 which is thrown on to the fast or loose pulley f^4, f^5 by means of the belt fork and rod f^6.

Within each tool holder e^6 is carried the particular tool for a particular stage of the setting of the die, such tools k l and m being shown more clearly in Figs. 5 to 7. The downward movement of the tools is limited by the toggle links h', h^2 and the die support i' constitutes a stop for holding the die face in the correct position relatively to the limit of movement of the tool, said stop being adjustable by adjusting the height of the bar i in the clamp d^2.

The procedure in setting a die, according to this invention, is as follows:—First, the die, after being hammered to close the narrow end of the hole, see Fig. 8, is placed

(with the narrow end of the hole downward) upon the first support i', see Fig. 5. The tool k, which is of the nature of a reamer, is then lowered into and through the die, until the toggles h', h^2 assume the straight line position and stop the further downward movement of the tool by which time the required amount of metal has been removed, and the hole in the die brought to the required size for this stage of the setting. After raising the tool the die is transferred to the next suppot i' when the tool l is lowered, see Fig. 6. Such tool is a plain round tapered tool, and is intended to burnish the inner face of the die, and thereby also harden it and also slightly enlarge the hole. After thus hardening the inner face of the die, the die is transferred to the next support i' when the next tool m is lowered, such tool consisting of a hardened and tempered steel wire which serves as a gage for setting the narrowest part of the hole, see Fig. 7. With this last named operation the sharp edges at the entrance of the hole are burnished down and the corners made practically rectangular. The die is then ready for use.

Owing to the die supports i' being comparatively small in diameter and tubular, they support the die at points near to and concentric with the hole in the die. In this way, the supports, in conjunction with the fixed predetermined distance the tools move down, regulate the extent to which said tools enter the die and insure that the narrow end of the hole in the die shall always be the correct diameter for the intended gage of wire to be drawn, no matter what the depth of the sinking in the face of the die may be.

The invention is applicable to the setting of dies for all gages of wire, *i. e.*, from the largest to the smallest. The method of setting a die or die plate, herein described allows of the correct diameter of hole being positively obtained at one operation, whereas with the ordinary method of setting by hand it often happens that, when punching the hole, too much metal is removed and the die has to be rehammered, and again punched, one or more times, before the correct diameter of hole is obtained. Further, the operator has to be an expert to do the setting by hand. By using the machine herein described an unskilled person can do the setting.

In thus obtaining accurate setting of the dies, the correct weight or output of wire is assured, and by enabling the setting to be done by unskilled persons in a minimum of time a considerable saving in the cost of production may be effected.

What we claim is:—

1. A machine for setting wire drawing dies, or die plates comprising a support, uprights carried by the supports rotating spindles slidably mounted on the uprights, tool holders at the bottom of the spindles reamering, burnishing and setting tools in the respective tool holders, toggle links through which the tools are lowered to a given extent, a tubular stop to receive and maintain the die with the die face at a fixed point relatively to the respective tool, substantially as described.

2. A machine for setting wire drawing dies, or die plates, comprising, in combination, a reamering tool and burnishing tool mounted in operating elements each comprising a tool spindle rotatably and slidably mounted on a stand, a pivoted lever connected to the spindle, a spring at one end of said lever and hand operated toggle links at the other end, together with tubular die supports and clamps to adjustably position said supports, substantially as described.

3. A machine for setting wire drawing dies, or die plates, comprising in combination reamering, burnishing and setting tools mounted in operating elements, each comprising a tool spindle rotatably and slidably mounted on a stand, a pivoted lever connected to the spindle, a spring at one end of said lever and hand operated toggle links at the other end together with tubular die supports and clamps to adjustably position, said supports, substantially as described.

In witness whereof we have hereunto set our hands in the presence of two witnesses.

ROBERT DUNCAN CONNOR.
ROBERT PERCIVAL SLINGER.

Witnesses:
FREDERICK J. MEREDITH,
HY. JUNCA.