

V. PUC.
DIES FOR PUNCHING SMALL METAL PARTS.
APPLICATION FILED FEB. 4, 1920.

1,415,477.

Patented May 9, 1922.

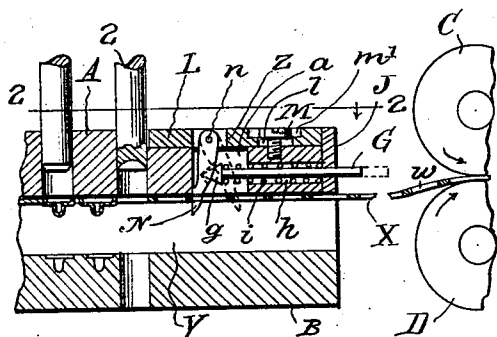


Fig. 1.

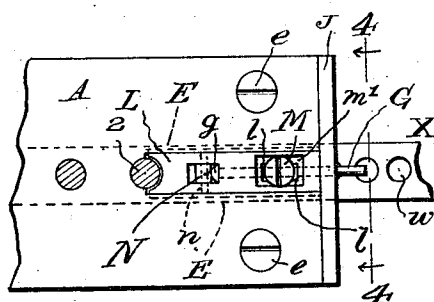


Fig. 2.

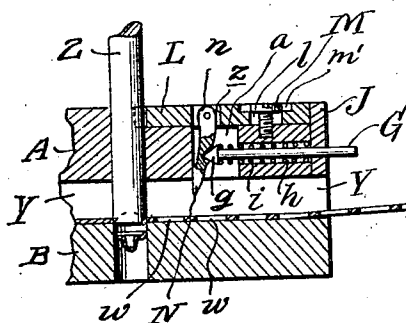


Fig. 3.

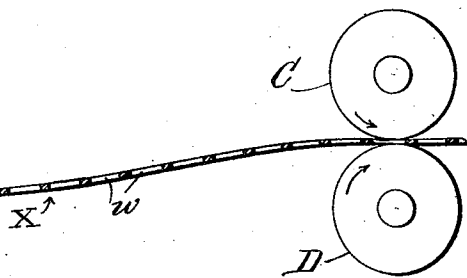
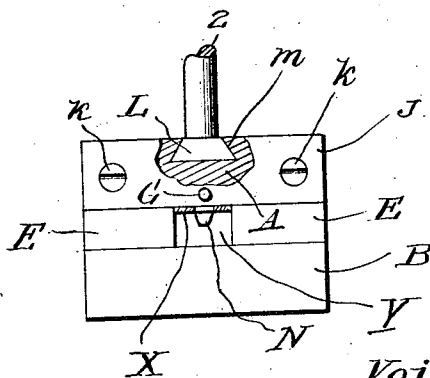


Fig. 4.



Inventor

Vojtěch Puc

By his Attorneys

Baldwin Wright

UNITED STATES PATENT OFFICE.

VOJTĚCH PUC, OF PRAGUE-VINOHRADY, BOHEMIA.

DIES FOR PUNCHING SMALL METAL PARTS.

1,415,477.

Specification of Letters Patent.

Patented May 9, 1922.

Application filed February 4, 1920. Serial No. 356,115.

To all whom it may concern:

Be it known that I, VOJTĚCH PUC, a citizen of the Republic of Czecho-Slovakia, residing at Prague-Vinohrady, in Bohemia, have invented certain new and useful Improvements in Dies for Punching Small Metal Parts, of which the following is a specification.

This invention relates particularly to machines for making small metal parts or articles, in which a strip or ribbon of metal is advanced step by step between forming or drawing dies which by successive operations give shape to the articles and then separate them from the strip. In such machines it is of prime importance that the step-by-step movement of the strip shall be performed with absolute regularity or accuracy in order that the dies may properly operate on the partially formed articles and in order that they may be properly separated from the strip.

According to my invention, I provide improved devices for obtaining regularity or accuracy in the feed or advance of the metal between the dies, and while my improvements are especially designed for use in connection with a machine for making metal buttons I wish it understood that they may be used in machines of other kinds for producing other articles.

In the drawings:—

Figure 1 shows a longitudinal section of so much of a machine for making small metal parts or articles as is necessary to illustrate my improvements.

Figure 2 shows a section through the punches on the line 2—2 of Figure 1.

Figure 3 shows a longitudinal section of the delivery end of the machine, showing some of the parts in different positions from those shown in Figure 1.

Figure 4 is a section on the line 4—4 of Figure 2 and shows an elevation of the delivery end of the machine.

The machine illustrated is designed to form small metal parts or articles in a metal strip or ribbon X by means of upper and lower dies A and B which have a clear space Y between them through which the strip or ribbon of metal is advanced step-by-step in any suitable way, as by rollers C and D which may be actuated intermittently in any suitable or well-known way.

The lower dies are formed in a metal bar

or block and are in the form of suitably shaped recesses or matrices.

The upper die comprises a metal bar or block having vertical openings through it in which punches operate above the matrices in the lower die. The bars A and B are held a suitable distance apart by longitudinally arranged strips of metal E to provide the clear space Y for the passage of the metal strip or ribbon X. The parts A, B and E are secured together by screws *e*.

The punches and matrices are so formed, as is usual, to gradually press or draw the metal into suitable shape to produce the small metal articles desired.

As the manner in which the parts or articles are produced forms no part of my present invention, only a few of the punches are illustrated.

By the time the strip reaches the punch 2, the article is formed and the punch 2 cuts it from the strip and forms holes *w* in the strip.

It is not possible to advance the metal strip between the dies by ordinary feed rollers with sufficient regularity unless some special means be provided for ensuring accuracy and various devices have heretofore been employed for this purpose. My improvements consist in novel and highly efficient devices for accomplishing the desired result.

At the delivery end of the machine the bar A is formed with a recess or chamber *a* into which projects a pin G having a headed or pointed end *g*. The pin G operates in a hole *h* in the block A and in this hole or bore is arranged a coiled spring *i* which, at its inner end, presses against the head *g* of the pin and at its rear end it presses against a plate J which closes the hole *h* and is detachably secured to the bar A by screws *k*. A plate L is arranged to slide to a limited extent in a recess *m* above the recess *a*, which former recess is closed at its rear end by the plate J, above referred to. The front end of the plate L is recessed, as most clearly shown in Figure 2, so that this end of the plate may partially surround the punch 2. The plate L is formed with a recess *l* through which the shank of a screw M extends, said screw being attached to the bar A in the manner clearly indicated. The head of the screw M operates in a re-

cess m' in the plate L. When the screw is tightened the plate is held firmly in position in the bar A. By loosening the screw the plate may be adjusted to a limited extent longitudinally of the bar and then held in its adjusted position. The plate L carries a pawl or pivoted finger N, the upper end of which is pivoted at n to the plate L and the lower end of which extends into the space Y to a small extent beyond the inner or lower face of the bar A. This pawl or finger is engaged by the spring-pressed pin G, which latter operates to press the pawl or finger forwards, the forward movement of the finger being limited by the front wall of the recess a , as clearly indicated in Figure 1. The rearward movement of the pawl is limited by the shoulder z of the plate L, in the manner indicated by dotted lines in Figure 1.

By removing the plate J and the screw M the plate L and the pawl connected therewith may be detached from the dies for purposes of repair or replacement and the headed pin G and the spring i may be also removed and replaced if desired.

In the operation of the machine the metal strip or ribbon X is moved between upper and lower dies by the feed rolls C and D which are operated intermittently. At each step the punches descend and press the metal strip against the lower die and give shape to the blanks in the strip. When the dies have descended to their full extent the metal strip will lie in the position shown in Figure 3, which figure also shows how one completed article is separated from the strip and in this way a hole is made in the strip. Figure 3 shows a series of holes w thus formed in the strip. When the punches rise they will carry with them the metal strip inasmuch as the metal adheres to the punches. It will of course be understood that when the punches thus rise with the strip they engage properly the blanks in the strip which are properly spaced. As the strip rises and when the pawl or pivoted finger N is in the position shown in Fig. 1 and also in Fig. 2, said finger will enter a hole w in the strip immediately below it, so that it will engage the strip in the manner indicated in Figure 1, which is the feeding position of the strip. If, now, the feed rolls be actuated to advance the strip, the strip will move only to an extent limited by the movement of the pawl; that is, until the pawl strikes the shoulder z of the plate L, in the manner indicated by dotted lines in Figure 1. This position of the strip is maintained until the punches again descend, engage the metal strip at the proper places, and continue the operation in the usual way. While the metal strip is being pressed downwards by the punches, the spring finger is disengaged from the strip and is moved for-

ward to engaging position by the spring-pressed pin G. After this the operations are repeated indefinitely.

As is well understood, the metal strip or ribbon is usually of great or indefinite length and is taken from a reel. When commencing the operation the front portion of the strip is passed through the machine by hand with sufficient care to properly form a series of blanks. After the proper number of blanks have been formed and one or more holes w are produced in the strip to receive the pawl N, the entire operation may be performed automatically.

I claim as my invention:—

1. In a machine for forming small metal parts or articles from a strip of metal, the combination with means for punching the strip, for raising and lowering it and for advancing it step-by-step, of a pivotally mounted finger adapted to engage the strip when raised and to be moved thereby, and means for limiting the movement of said finger.

2. In a machine for forming small metal parts or articles from a strip of metal, the combination with means for raising and lowering the strip, for punching the strip and for advancing it step by step, of a spring-pressed finger adapted to engage the strip, when raised and to be moved thereby, and means for limiting the movement of said finger.

3. In a machine for forming small metal parts or articles from a strip of metal, the combination with means for punching the strip, for raising and lowering the strip and for advancing it step by step, of a pivoted spring-pressed finger adapted to engage the strip and to be moved thereby when raised, and means for limiting the movement of said finger.

4. In a machine for forming small metal parts or articles from a strip of metal, the combination with means for punching the strip, for raising and lowering it and for advancing it step by step, of a pivotally mounted finger adapted to engage the strip, means for limiting the movement of said finger, and means for shifting the pivot of the finger in a direction parallel with the advance movement of the strip.

5. In a machine for forming small metal parts or articles from a strip of metal, the combination with upper and lower dies with a space between them for the passage of the strip, of means for raising the strip from the lower die through the space to the upper die and for lowering the strip from the upper die to the lower die, means for advancing the strip step by step, a finger projecting into said space and adapted to engage the strip when raised, and to be moved thereby and means for limiting the movement of the finger.

6. In a machine for forming small metal parts or articles from a strip of metal, the combination with upper and lower dies with a space between them for the passage of the strip, of means for raising and lowering the strip between the dies, means for advancing the strip step by step, a pivotally mounted spring-pressed finger which projects into said space and is adapted to engage the strip and to be moved thereby, and means for adjusting the position of the finger longitudinally of the strip.

7. In a machine for forming small metal parts or articles from a strip of metal and for detaching them therefrom, the combination with upper and lower dies which give shape to the articles and detach the completed articles from the strip and which have a clear space between them for the passage of the strip, means for advancing the strip step by step in said space, a pivoted spring-pressed finger depending from the upper die and adapted to extend into a hole cut in the strip by the operation of the dies and to

be moved thereby, and means for limiting the movement of the finger while advancing with the strip.

8. In a machine for forming small metal parts or articles from a strip of metal and for detaching them therefrom, the combination with upper and lower dies which give shape to the articles and detach the completed articles therefrom and which have a clear space between them for the passage of the strip, means for advancing the strip step by step in said space, a pivoted spring-pressed finger depending from the upper die and adapted to extend into a hole cut in the strip by the operation of the dies and to be moved thereby, means for limiting the movement of the finger while advancing with the strip, and means for limiting the movement of the finger when returned by the spring.

In testimony whereof, I have hereunto subscribed my name.

VOJTĚCH PUC.