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MACHINE FOR DRAWING TUBULAR ARTICLES.

APPLICATION FILED NOV. 18, 1907.

906,878. Patented Dec. 15, 1908.

2 SHEETS—SHEET 1.

Fig. 1.

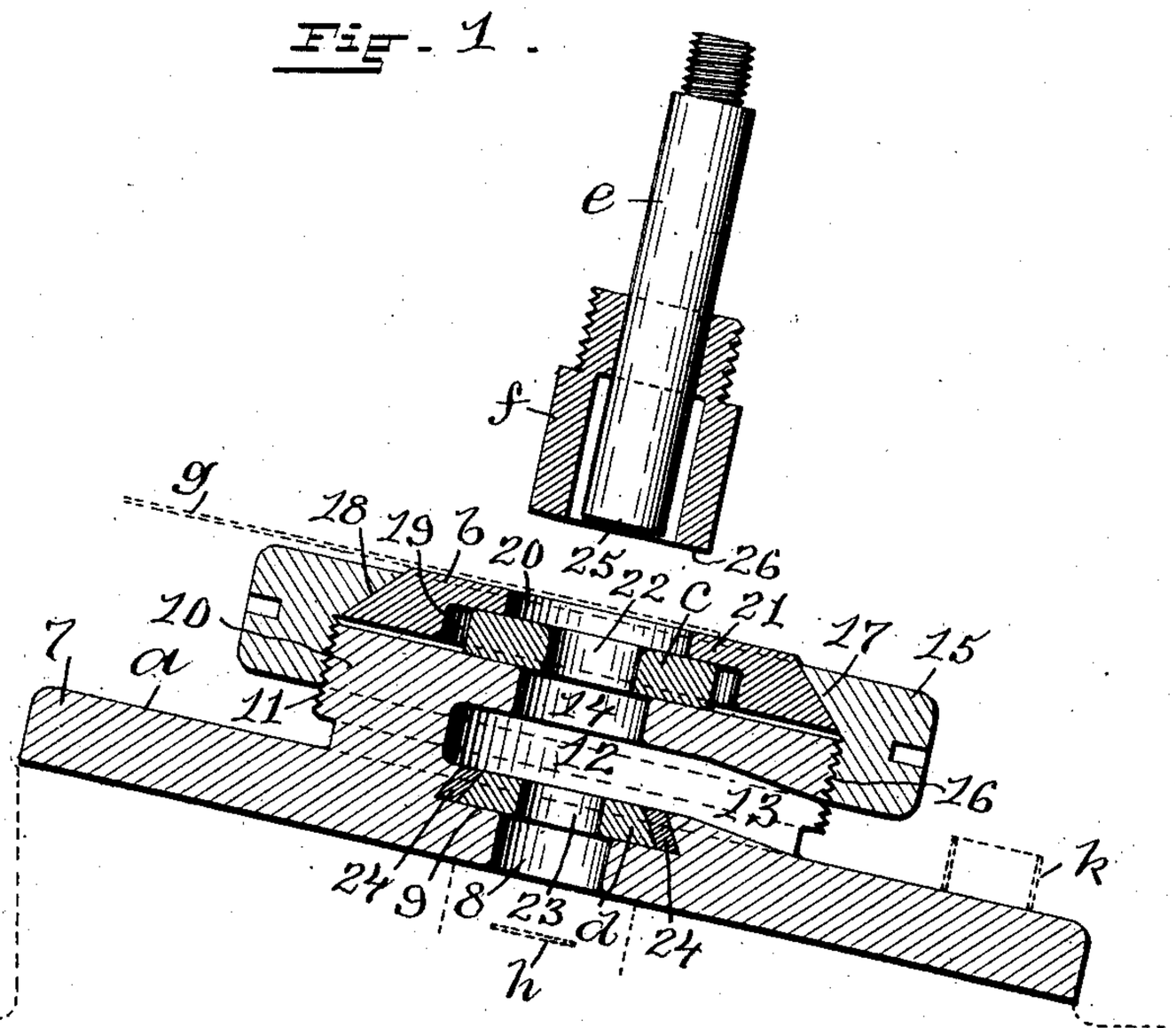

Fig. 2.

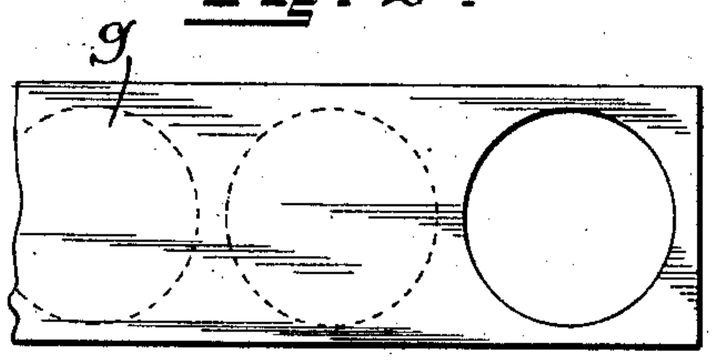

Fig. 3.

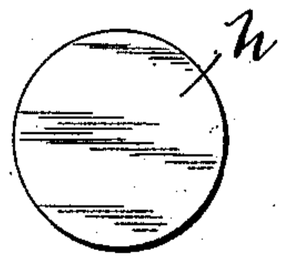

Fig. 4.

Fig. 5.

Fig. 6.

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2 SHEETS—SHEET 2.

Fig. 7.

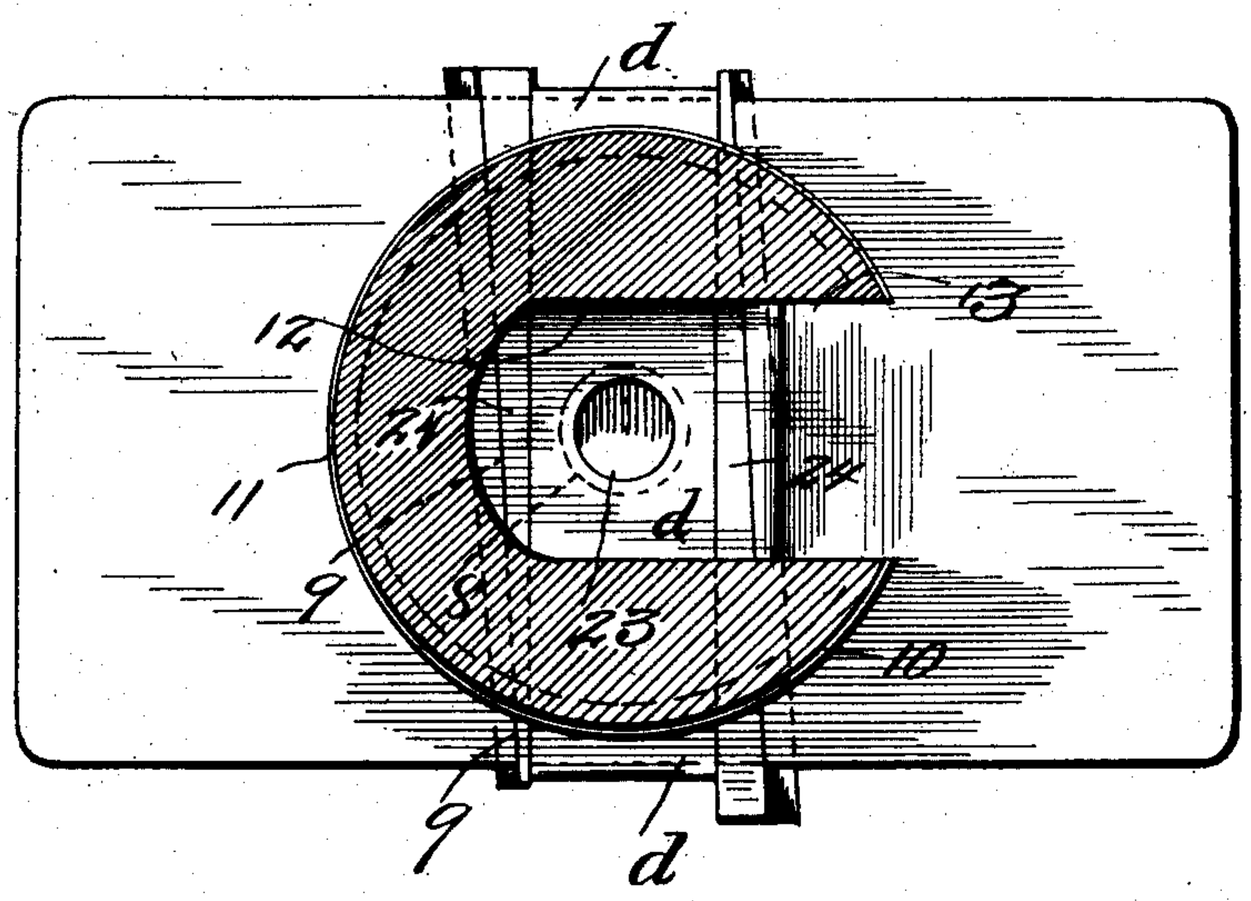
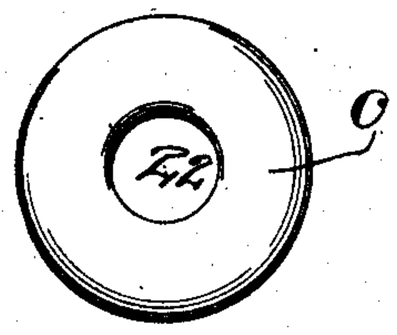


Fig. 8.



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UNITED STATES PATENT OFFICE.

ISABEL HARVEY, OF TAUNTON, MASSACHUSETTS, ADMINISTRATRIX OF JOHN H. HARVEY, DECEASED.

MACHINE FOR DRAWING TUBULAR ARTICLES.

No. 906,878. Specification of Letters Patent. Patented Dec. 15, 1908.

Application filed November 18, 1907. Serial No. 402,603.

To all whom it may concern:

Be it known that JOHN H. HARVEY, deceased, (ISABEL HARVEY, administratrix, residing at Taunton, county of Bristol, and State of Massachusetts,) did invent a new and useful Improvement in Machines for Drawing Tubular Articles, of which the following is a specification.

This invention has reference to an improvement in machines for making tubular articles and more particularly to an improvement in dies for machines for drawing ferrules or similar tubular articles from sheet metal.

The object of this invention is to improve the construction of dies for drawing ferrules or similar tubular articles from sheet metal, whereby the production of the ferrules or similar articles is increased and the cost of manufacturing the same reduced.

The invention consists in the peculiar and novel construction of a set of dies and plungers adapted to cut a blank from a strip of sheet metal, cup the blank and cut the bottom out of the cupped blank, thereby forming a finished ferrule, all in one downward movement of the plungers, said dies and plungers having details of construction, as will be more fully set forth hereinafter and claimed.

Figure 1 is a vertical sectional view through the dies and plungers, showing the plungers in the raised position, and a strip of sheet metal stock, the cut-out bottom and a finished ferrule in broken lines. Fig. 2 is a face view of the sheet metal stock, showing a blank cut from the same. Fig. 3 is a face view of the sheet metal blank. Fig. 4 is a sectional view taken centrally through the sheet metal blank. Fig. 5 is a sectional view of the cupped blank. Fig. 6 is a sectional view of the finished ferrule. Fig. 7 is a horizontal section of Fig. 1, taken centrally through the chamber 12, and Fig. 8, is a top plan view of the cup-forming die plate *c*, showing the same detached.

In the drawings, *a* indicates a fixed die holder, *b* a blank cutting die plate, *c* a cup-forming die plate, *d* a bottom cutting die plate, *e* a cup forming and bottom cutting plunger, *f* a concentric blank cutting plunger, *g* a strip of sheet metal stock, *h* a blank, *i* a cupped blank and *k* a finished ferrule. The dies and plungers are set at an angle, as shown in Fig. 1, relative to the bed of the machine, for a purpose as will be hereinafter described.

The die holder *a* is constructed to have a base 7 in which is a central hole 8 and a transverse beveled edged channeled seat 9 which extends across the die holder and in which seat the bottom cutting die plate *d* is secured, a raised circular boss 10 formed concentric with the central hole 8 and having a screw-threaded periphery 11, a central chamber 12, from which an opening 13 extends outward through the periphery of the boss, and a central hole 14 which extends down from the upper face of the boss to the central chamber 12. A clamping ring 15 having the internal screw-threaded portion 16 and the internal beveled circular lip 17 is screwed onto the screw-threaded boss 10, as shown in Fig. 1.

The blank cutting die plate *b* has a circular beveled edge 18 shaped to fit under the beveled lip 17 of the clamping ring 15, a circular recess 19 in the bottom and a concentric circular hole 20 which extends from the top of the plate down to the recess 19 forming an internal annular lip 21. The upper edge of the circular hole 20 forms the cutting edge of the plate.

The cup forming die plate *c* is circular in form and has the circular central hole 22, the upper edge of which is rounded. This die plate *c* is clamped between the top of the boss 10 and the annular lip 21 on the die plate *b*, as shown in Fig. 1.

The bottom cutting die plate *d* has beveled edges and a circular central hole 23, the upper edge of which forms the cutting edge of the plate. This die plate *d* is held in the transverse channeled seat 9 by the keys 24 24, as shown in Figs. 1 and 7.

The cup forming and bottom cutting plunger *e* has the flat end 25, the circular edge of which forms the cutting edge of the plunger. This plunger *e* has a sliding fit in the hole 23 in the die plate *d*, is slightly smaller than the hole 22 in the die plate *c*, the difference being equal to twice the thickness of the sheet metal stock *g*, and is given a reciprocating motion through the die plates *b*, *c* and *d*.

The blank cutting plunger *f* is in the form of a sleeve having a sliding fit on the plunger *e* and a flat end 26, the circular outer edge of which forms the cutting edge of the plunger. This plunger *f* has a sliding fit in the hole 20 in the die plate *b* and is given an independent

reciprocating motion into the hole 20 in the die plate *b*.

In the operation of the dies the strip of sheet metal stock *g* is fed over the blank cutting die plate *b*, as shown in broken lines in Fig. 1. The blank cutting plunger *f* moves downward into the circular hole 20 in the die plate *b*, thereby cutting out the circular blank *h*, as shown in Figs. 3 and 4. The cup forming and bottom cutting plunger *e* now moves downward and forces the blank *h* through the cup-forming die plate *c*, thereby cupping the blank, as shown in Fig. 5. A further downward movement of the plunger *e* brings the cupped blank *i* against the bottom cutting die plate *d* and cuts the bottom from the cupped blank, forming the finished ferrule *k*, as shown in Fig. 6. The bottom is forced through the hole 23 in the die plate *d* and falls through the hole 8 in the base of the die holder *a*, as shown in broken lines in Fig. 1. On the upward movement of the plunger *e* the ferrule *h* expands or a slight side play in the plunger *e* causes the ferrule to catch on the underside of the die plate *c*, whereby the ferrule is drawn off the end of the plunger *e*, drops into the chamber 12 and (through the die holder *a* being set at an angle) slides out through the opening 13 in the die holder, as shown in broken lines in Fig. 1. The plunger *g* now returns to its original position, and these operations, which are continuous, may be repeated indefinitely.

Having fully described the invention, what is claimed as new, and desired to be secured by Letters Patent, is

1. In a machine of the type set forth, a die holder formed of a base provided with an opening and a channeled seat the opposite side edges of which are beveled, a bottom cutting die plate having its opposite side edges beveled and secured in said channeled seat and formed with a central hole, a raised circular boss carried by said base and being exteriorly threaded, said boss being formed with a central enlarged chamber having an opening extending outwardly therefrom terminating on the upper face of the base and further being formed with a central hole leading into said chamber, a cup forming die plate on the upper face of the boss having a central hole, a blank cutting die having a central hole, and formed with a beveled periphery and with an inwardly extending lip which seats on the top of said blank cutting die, said holes of the die plates, said hole of the boss, and said hole of the blank cutting die being arranged in axial alinement a clamping ring threaded into engagement with said boss and having a beveled lip to engage the beveled periphery of said blank cutting die, and plunger means reciprocating through said holes of the die plates, said hole of the boss, and said hole of the blank cutting die to cut the blank, form the cup and cut the bottom from the cup.

2. In combination with a die holder formed with a base, a threaded boss extended up from said base, a bottom cutting die carried by said base, a cup forming die disposed on top of said boss, a blank cutting die having a part engaging on top of said cup forming die, and a clamping ring threaded into engagement with said boss and having a part engaging said blank cutting die to secure the same and simultaneously therewith said cup forming die to said boss, said dies being arranged in axial alinement with plunger means reciprocating through said dies to cut the blank, form the cup, and cut the bottom from the latter.

3. In combination with a die holder, formed with a base, a boss carried by said base, a bottom cutting die on the base, a cup forming die on the boss, a blank cutting die on said cup forming die, and means secured to said boss for simultaneously securing each of said two last named dies in position, said dies being arranged in axial alinement with plunger means reciprocating through said dies to cut the blank, form the cup, and cut the bottom from the latter.

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

ISABEL HARVEY,
Administratrix of John H. Harvey, deceased.

Witnesses:
ADA E. HAGERTY,
J. A. MILLER.