No. 677,121. Patented June 25, 1901.

J. DONOVAN.

DIE.

(Application filed May 21, 1900.)

(No Model.)

Fig. 1.

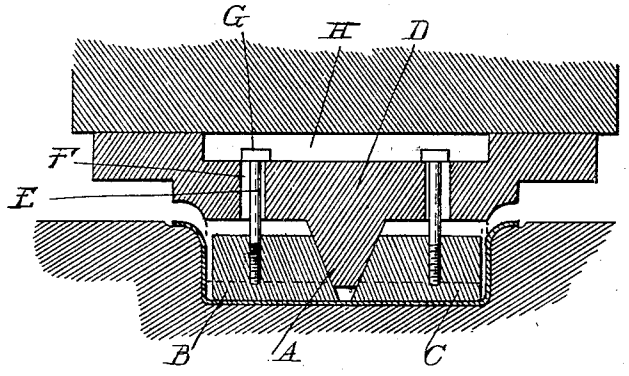
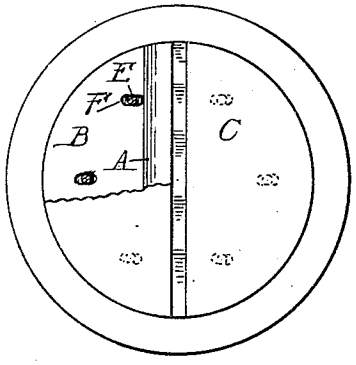


Fig. 2.



Witnesses
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UNITED STATES PATENT OFFICE.

JAMES DONOVAN, OF THREE RIVERS, MICHIGAN.

DIE.

SPECIFICATION forming part of Letters Patent No. 677,121, dated June 25, 1901.

Application filed May 21, 1900. Serial No. 17,450. (No model.)

To all whom it may concern:

Be it known that I, JAMES DONOVAN, a citizen of the United States, residing at Three Rivers, in the county of St. Joseph and State of Michigan, have invented certain new and useful Improvements in Dies, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates to dies for forming sheet metal, and more particularly to those used for forming cylindrical bodies.

It is the object of the invention to obtain a construction in which the male die will automatically relieve itself, so that it can be readily withdrawn from the formed cylinder.

The invention consists in the construction hereinafter described and claimed.

In the drawings, Figure 1 is a longitudinal section through the male and female dies, and Fig. 2 is a bottom plan view of the male die.

In the formation of cylindrical bodies by dies from heated metallic plates difficulty is experienced in withdrawing the male die from the work. This is for the reason that the contraction of the sheet metal due to its cooling in contact with the metal of the die will so firmly clamp it to said die as to be nearly impossible to remove it. In the construction shown in the drawings this objection is overcome by forming the male die of a plurality of segments, comprising a central section A of wedge shape cross-section and side sections B and C bearing against said wedge and having complementary inclined faces. The central section A is preferably formed integral with the head D, which may be secured to the reciprocating plunger of the press. The sections B and C are suspended from this head, preferably by means of the bolts E, which pass through slotted apertures F in said head. At their upper ends these bolts are provided with heads or flanges G, adapted to engage with the lower face of a recess H, formed in the head D. The bolts are of sufficient length to permit the sections B and C to drop away from the head D when the heads G of said bolts are resting on the bottom of the recess.

With the construction described the sections B and C will normally hang in a position which permits of their approaching each other, so as to reduce the diameter of the die from its working size. As soon, however, as the descent of the plunger presses the lower face of the sections B and C against the work, which latter is arranged above the female die, said sections will be forced upward, causing the central wedge A to spread them until the die assumes its maximum diameter. In the return stroke of the plunger the sections B and C will be first held from movement by the clamping of the work thereon; but the central wedge-shaped section A is free to be withdrawn, and this will relieve the side pressure upon the sections B and C and permit them to be withdrawn.

Although a die has been shown and described which is intended especially for the formation of cylindrical bodies, it is not desired to limit the invention to this precise construction, as it is evident that such a die might be employed to equal advantage for forming square or polygonal bodies having parallel sides.

What I claim as my invention is—

1. A male die comprising a plurality of sections having a wedge engagement with each other, said sections being adapted to form, when operating upon the work, complementary portions of a continuous surface, and to automatically collapse in withdrawing.

2. The combination with a female die, of a complementary collapsible male die, comprising a reciprocating head, fixed and movable die-sections carried thereby forming complementary portions of a continuous external forming-surface and having oppositely-inclined abutting surfaces, said movable section being adapted to be held to its seat by the pressure of the work while operating thereon, and to drop away from said seat to reduce the diameter of said die when said head is withdrawn.

3. The combination with a cylindrical female die, of a complementary cylindrical male die comprising a head, a central wedge-shaped section fixed thereto, sections upon opposite sides of said central section forming complementary portions of a continuous external forming-surface and means for attaching said side sections to said head permitting of a limited longitudinal movement upon said wedge-

shaped section whereby the diameter of the die is contracted upon the withdrawal of the head.

4. The combination with a cylindrical female die, of a complementary cylindrical male die comprising a head, a central wedge-shaped die-segment fixed thereto, segments upon opposite sides of said central segment forming complementary portions of a continuous external forming-surface, and headed bolts for loosely suspending said side segments from the head engaging slotted bearings in the latter and having a limited longitudinal movement thereon for the purpose described.

5. A male die comprising a head, a wedge-shaped central section depending therefrom, side sections having inclined surfaces abutting against the sides of said wedge-shaped section and flat upper surfaces for bearing against said head, said central and side sections forming complementary portions of an external continuous cylindrical forming-surface, and connections between said side sections and head permitting of a limited longitudinal and lateral movement in relation thereto.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES DONOVAN.

Witnesses:

JAMES WHITTEMORE,

M. B. O'DOGHERTY.