April 28, 1931. F. SINGER 1,802,843

PROCESS FOR PRODUCING CLOSED END TUBULAR BODIES

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Fig. 1

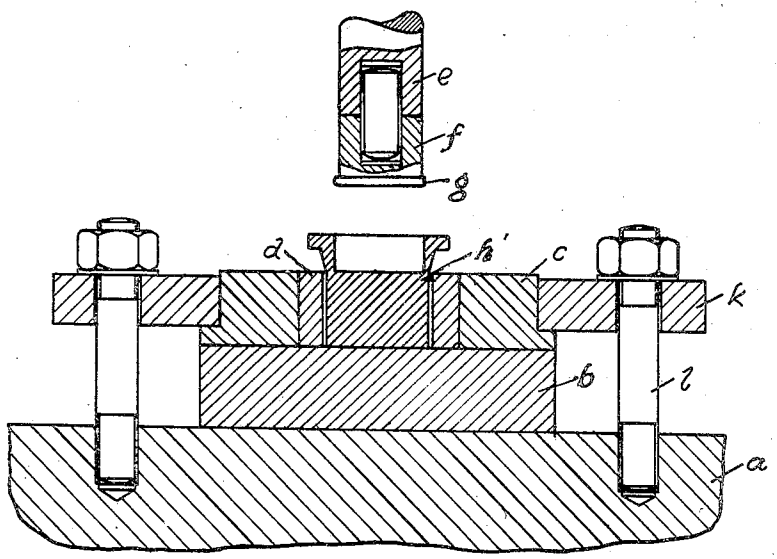
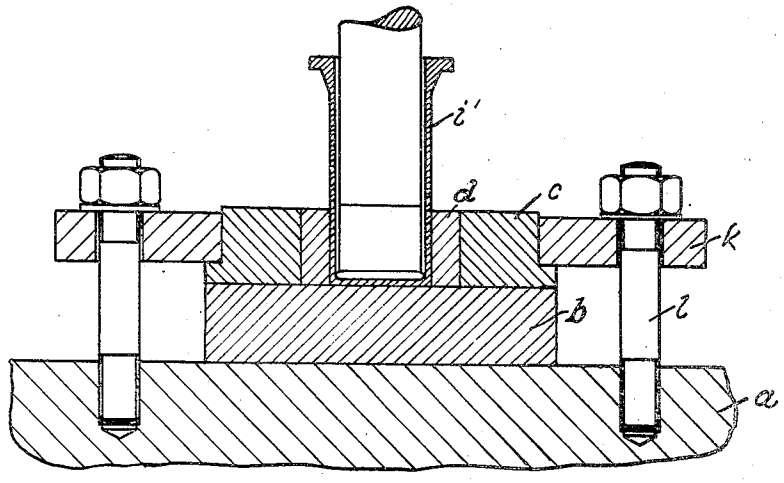


Fig. 2



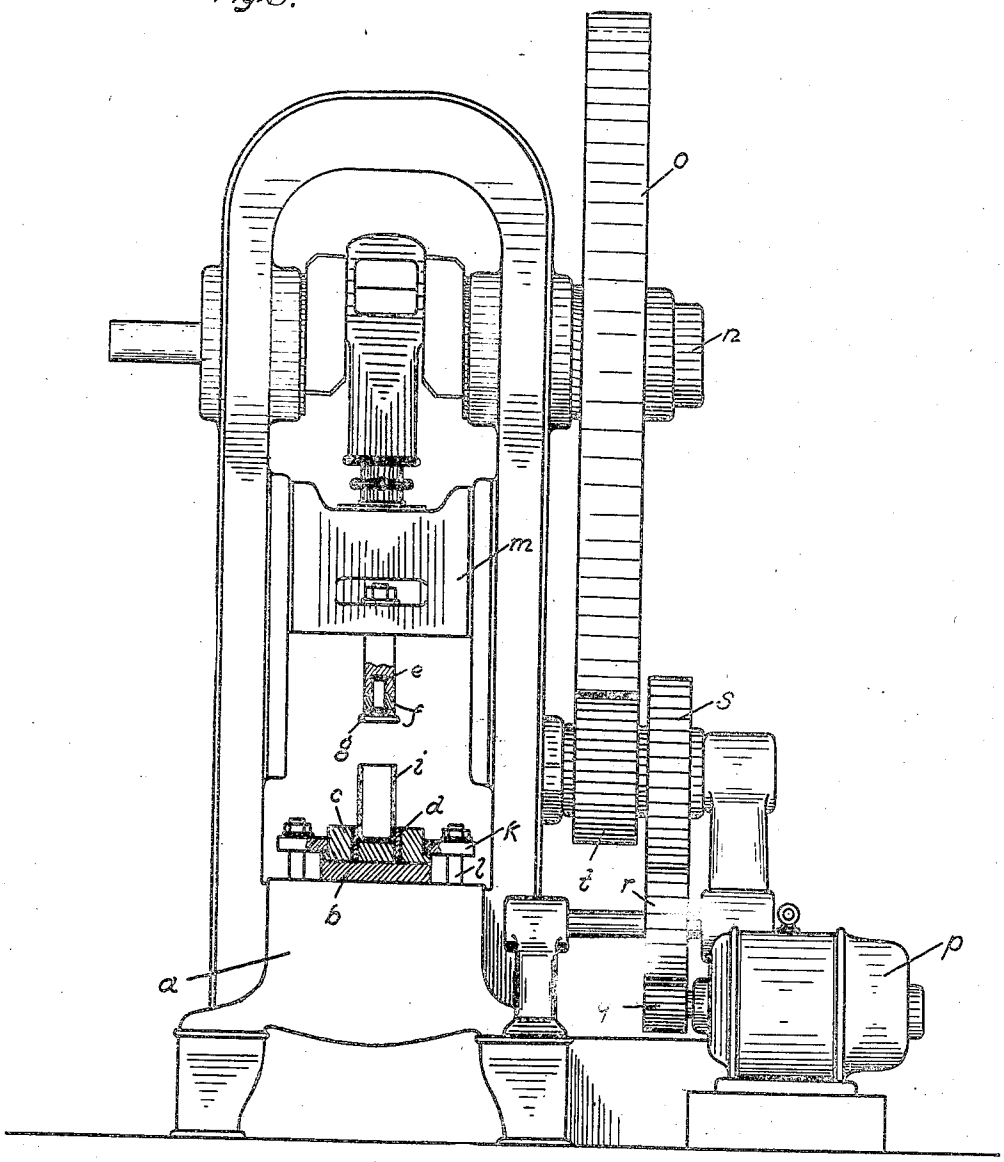
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Fig. 3.



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UNITED STATES PATENT OFFICE

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PROCESS FOR PRODUCING CLOSED-END TUBULAR BODIES

Application filed October 10, 1927, Serial No. 225,376, and in Germany June 12, 1926.

My invention pertains to processes for producing closed end tubular bodies having reinforcements or enlargements at the open ends thereof, and has as its object to provide a method by which such articles, of a high quality, may be made more easily, quickly and economically than has heretofore been possible.

In carrying out my invention, I provide preliminarily a blank which is formed, at one end, with a reinforcement of any desired shape,—as, for instance, with a flange, cone, or the like,—and then extrude such blank so that the reinforcement is around the open end of the extruded article.

In order that my invention may be fully understood, I have described the same more specifically below in connection with the accompanying drawings, in which:

Fig. 1 is an axial section through the extruding tool with the metal blank, having the desired reinforcement thereon, to be extruded in place therein;

Fig. 2 shows the same parts after the extrusion has been completed; and

Fig. 3 is an illustration of a press adapted for effecting the extrusion operation.

Referring to said drawings, *a* is the bed plate of a crank press of the geared or plain type. Onto this plate is clamped, by means of the clamping ring *k* and the screws *l*, the lower part of the tool which comprises the hardened steel-plate *b*, the die *c*, and bushing *d*. *e* denotes the punch, the lower part *f* of which is attached to the plunger *m* of the press (Fig. 3). A cog-wheel *o* which is affixed to the crank shaft *n* is driven by a direct current adjustable speed motor *p* by the intermediary of a change-speed gear *q*, *r*, *s*, *t*. Said motor makes about 1260 revolutions in a minute in either direction, but when the punch *e* bears upon the blank *h* to be extruded and the pressing resistance becomes active, also four current-guards become active in correspondence with the increase of the pressure and reduce the speed of the motor down to 336 revolutions per minute, the turning moment increasing in the same proportion.

The method is carried through in this way, that first the bottom part of the tool and the punch is preheated appropriately with a gas-burner, whereafter the punch and that member of the tool which is to receive the metal piece to be extruded is coated with a mixture of graphite and oil. The blank hot steel or other metal to be extruded, having thereon the reinforcement to be described below, is withdrawn from the furnace, quickly freed from the adhering scale and instantly placed into the die. Immediately thereafter the motor is started by the push-button control, the punch is forced into the blank and this latter is extruded between the punch and the bushing, as shown in Fig. 2. The extruding process having been effected, the punch with the hollow body thereon is withdrawn from the matrix and the hollow body stripped off the punch by known means.

The blank *h* to be extruded is provided with a preliminarily formed flange reinforced by a conical transition member, the whole being, however, integral, as shown in Fig. 1. Hollow bodies which are to have a flange of this or similar shape, that is to say, with a reinforcement, cannot be made by providing the bushing at its upper end with a corresponding enlargement, except when the flange is to be very small, in that the extruded metal tends very little to expand laterally so as to fill up said enlargement of the matrix. If the flange, especially with a conical or similar section, as shown, is to be comparatively large it must be forged preliminarily and the flange bearing end of the metal piece must project over the bushing, as in Fig. 1. The formation of the flange may form a separate working step, the metal piece being, of course, sufficiently hot, but the formation of the flange and thereafter the extrusion of the metal piece may be carried through in the same press and with the same die, there being then used, however, two punches, one for the forging phase, and the other for the extruding phase.

By the above described method, it is possible to produce closed end tubular bodies and hollow vessels, having reinforcements at the open ends thereof, from steel and other

metals and alloys, very easily and economically and of a superior quality.

I claim:

The method of manufacturing closed end tubular articles and hollow metal bodies provided with a reinforcement of any desired shape at the open end, consisting in the steps of first forging said end so as to provide the respective hollow body thereby with the reinforcement, and then extruding the thus prepared body.

In testimony whereof I have affixed my signature.

FRITZ SINGER.