May 1, 1956 T. A. LJUNGBERG 2,743,812

ARRANGEMENT TO BE USED FOR EXTRUSION OF METALS

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Fig.1

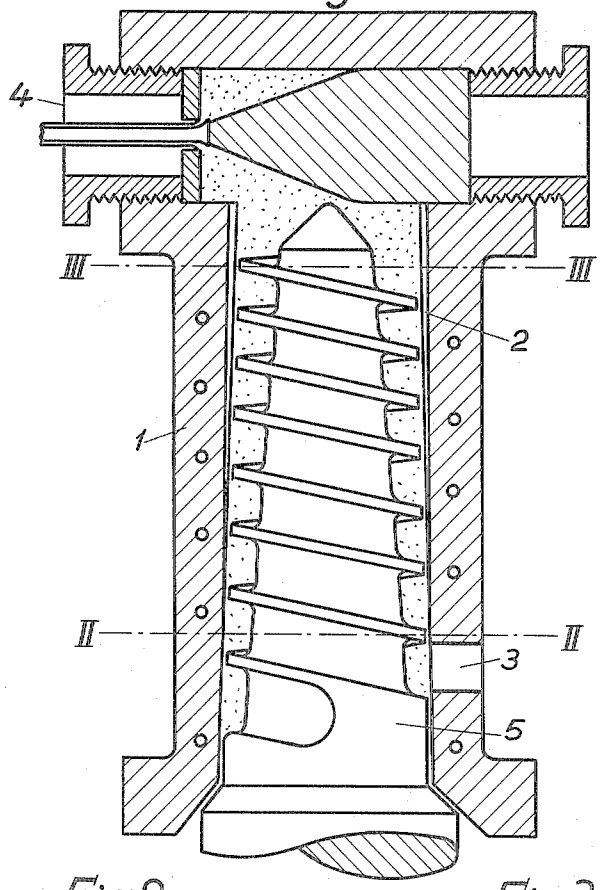


Fig.2

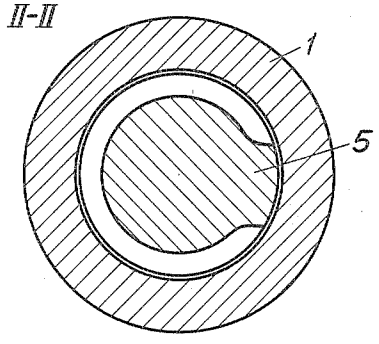
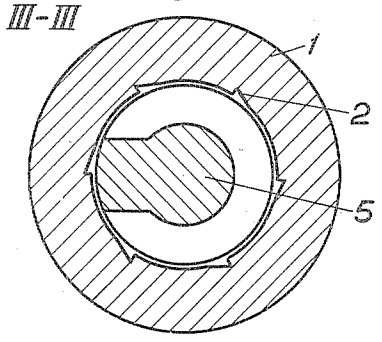


Fig.3



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ARRANGEMENT TO BE USED FOR EXTRUSION OF METALS

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3 Claims. (Cl. 207—4)

This invention refers to presses for continuous manufacture by extrusion of metallic articles such as tubes, cable coverings, rods, profiles etc., wherein the pressure necessary for extruding a tube, for instance, is obtained by means of a revolving screw in a cylindric screw casing. The metal, e. g. lead, is charged to the one end of the screw in a molten state and is cooled down into a solid mass, e. g. by means of arrangements for water cooling in the screw casing.

As the surface of friction of the screw is greater than that of the screw casing, special arrangements have to be made to prevent the metal from revolving in the same direction as the screw. One way for obtaining this effect is to arrange in the wall of the screw casing a thread, reversed threaded to the thread of the screw, another way is the arrangement with longitudinal grooves in the screw casing, which will give a similar effect.

In order to obtain a good theoretical production capacity for these continuous extrusion presses, it is desirable to make the depth of thread as large as possible. However, by this arrangement the surface of friction of the screw will be increased, and also the tendency of the lead filling the entire depth of the thread to revolve with the screw. If the forces in the layers between the lead in the thread of the screw and the lead which is retarded by the surface of the inner wall of the casing are too great, these two layers will be separated in two different zones, in one of which the lead will rotate with the screw, while in the other zone the lead is sticking to the wall of the casing. Unevennesses of the surface of the wall are also of a great disadvantage when the lead is scraped off from the wall of the casing, especially at the charging end. At this end the metal solidifies to begin within a very thin layer, which is scraped off continuously by the edges of the thread and is advanced to the colder lead which is filling the longitudinal grooves. This lead will act as a brake, due to the greater friction between two media, i. e. the lead advanced by the screw and the lead which is retained in the grooves of the casing wall. When the layer of the lead which is carried forward by the screw increases, this lead will finally catch the lead in the longitudinal grooves and carry it towards the outlet end. If this will not happen, the lead even there will again be separated into two zones, one zone with the lead sticking in the grooves, and another which will rotate with the screw without being fed forwards.

In accordance with the invention the restraining forces of friction between the metal filling the screw thread and the metal outside the edges of the thread are increased by making the screw casing tapered towards the outlet and by tapering the core of the screw in such a way that the volume enclosed by screw threads is steadily

increasing towards the outlet. Thus during the whole feeding process or during an essential part thereof the metal is pressed against continuously diminishing inner diameters of the screw casing. At the same time the friction between the metal and the core of the screw is reduced by means of steadily increasing the volume enclosed by the screw thread towards the outlet. The effect of deformation, which increases the pressure against the screw casing, thus decreases to the same extent the pressure against the screw core. The advantage of this arrangement is even that of intimate contact between the material advanced by the screw and the material which has the tendency to stick to the screw casing, so that greater plasticity in the boundary layer between the two materials will be obtained.

The inner wall of this screw casing can be provided with flutes or grooves at least in that part near to the outlet. These flutes or grooves might be made with increasing depth towards the outlet. Even a solution without any unevennesses of the casing wall will be possible.

In the accompanying drawing an embodiment of the invention is illustrated by way of example. Fig. 1 is a longitudinal section of a press, and Figures 2 and 3 are cross-sections of the press taken at the lines II—II and III—III of Fig. 1.

The inner wall of the screw casing 1 has the shape of frustrum of cone, and it is provided with longitudinal grooves 2, beginning after the inlet 3. The depth of these grooves increases towards the outlet 4. The screw 5 driven from a motor or by any other means has a larger diameter at the root than at the top, and the volume enclosed by the screw thread is increased in the direction towards the outlet by continuously reducing the diameter of the screw core. The advantage of a press according to this invention is greater production as compared with other known presses, due to the fact that larger circumferential speed of the screw and larger depth of screw thread are made possible by this invention.

I claim as my invention:

1. An extrusion press for the production of metal rods, tubes, core coverings and like articles, comprising a rotary extrusion screw thread externally tapered in the direction of movement of the extrusion metal, a stationary, tubular casing enclosing the screw thread and internally tapered in the same direction, and a core for the screw thread so tapered that the cross-sectional capacity of the space enclosed by said core and by adjacent parts of the screw thread and by the internal surface of the casing increases progressively in the direction of movement of the metal in the press.

2. An extrusion press according to claim 1, comprising internal longitudinal grooves in the surface of the casing in the vicinity of the outlet end of the press.

3. A screw press according to claim 2, in which the said axial grooves increase in depth towards the outlet end of the press while the surface of the casing is smooth at the inlet end of the press.

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