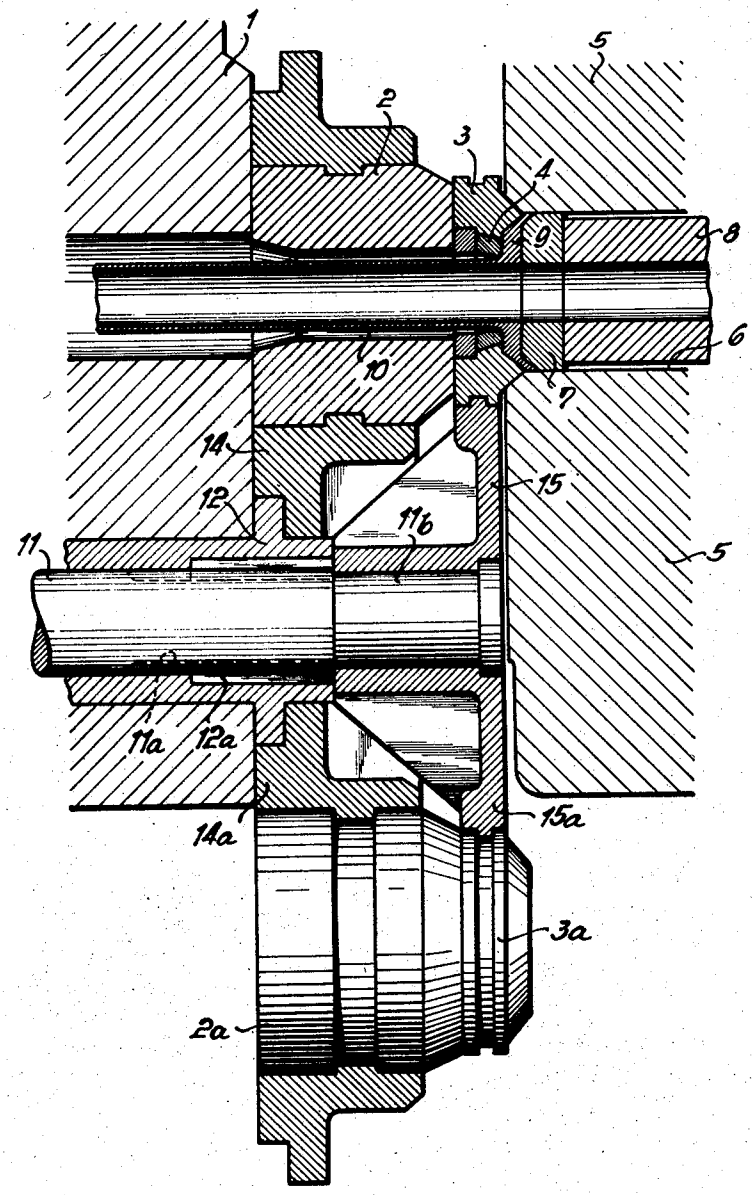
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TOOL ARRANGEMENT FOR SEVERING THE EXTRUDED PRODUCT IN DIRECTLY OPERATING EXTRUSION PRESSES

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FIG. 1



INVENTOR

P. Billen

By Glascock Downing & Sebold

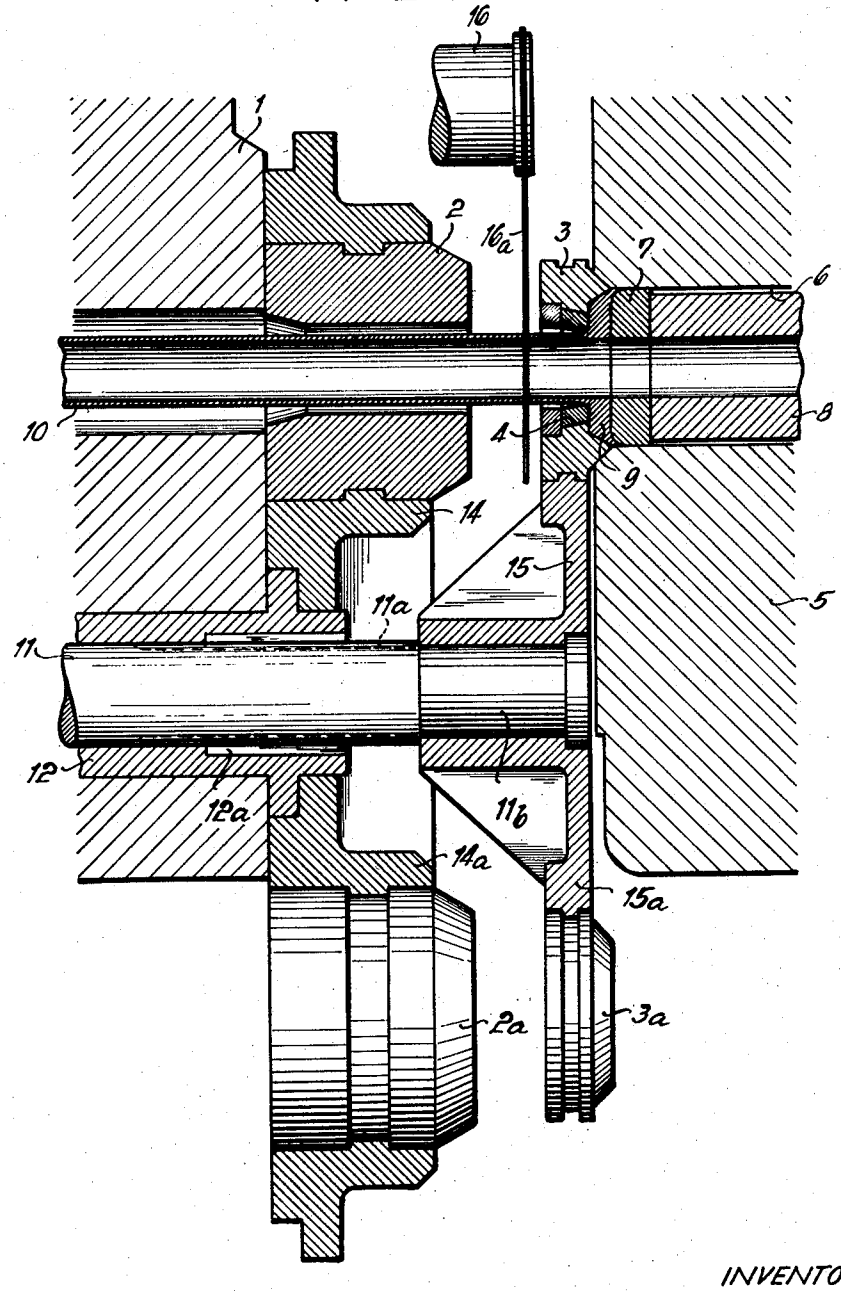
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TOOL ARRANGEMENT FOR SEVERING THE EXTRUDED PRODUCT IN DIRECTLY OPERATING EXTRUSION PRESSES

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FIG. 2



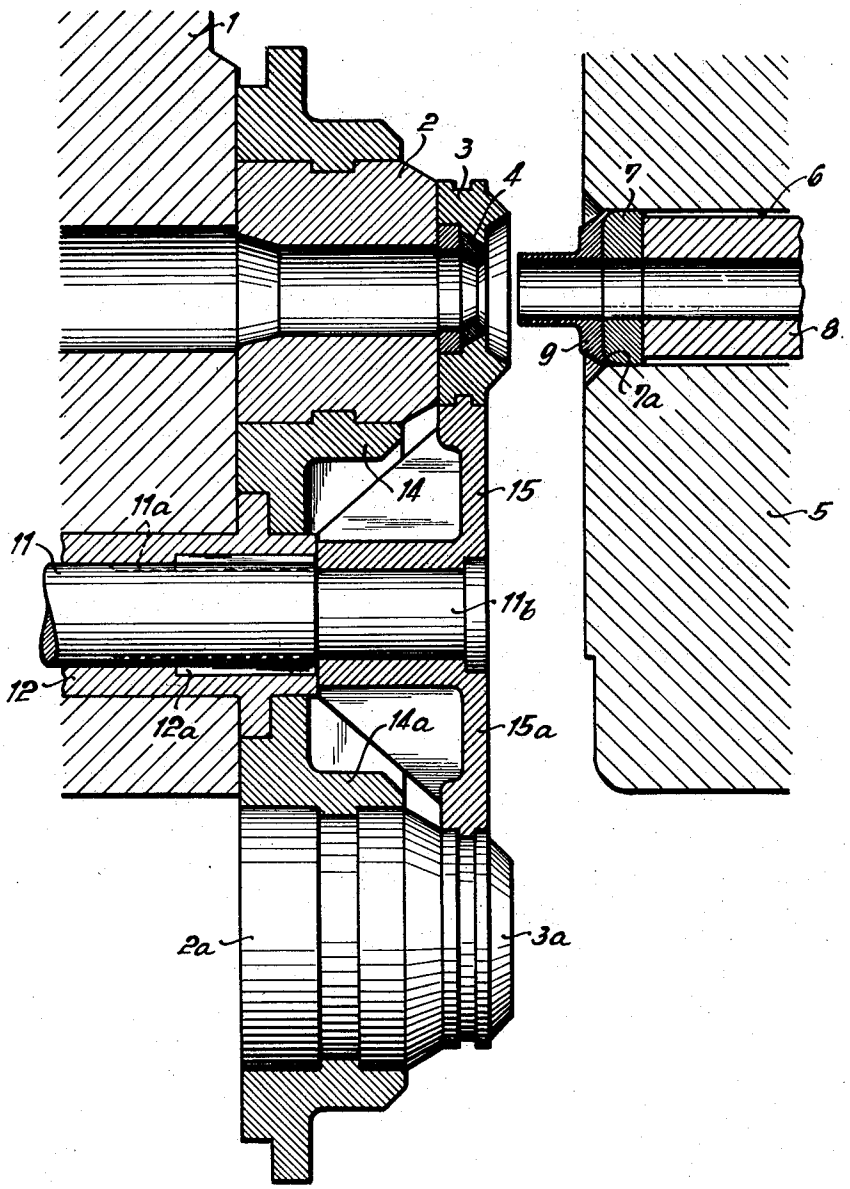
INVENTOR
P. Billen
By Glascock Downing Seebold
ATTYS.

July 28, 1959 P. BILLEN 2,896,782

TOOL ARRANGEMENT FOR SEVERING THE EXTRUDED PRODUCT IN DIRECTLY OPERATING EXTRUSION PRESSES

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FIG. 3



INVENTOR
P. Billen
By Glascock Downing & Seibold
ATTYS.

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TOOL ARRANGEMENT FOR SEVERING THE EXTRUDED PRODUCT IN DIRECTLY OPERATING EXTRUSION PRESSES

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FIG. 4

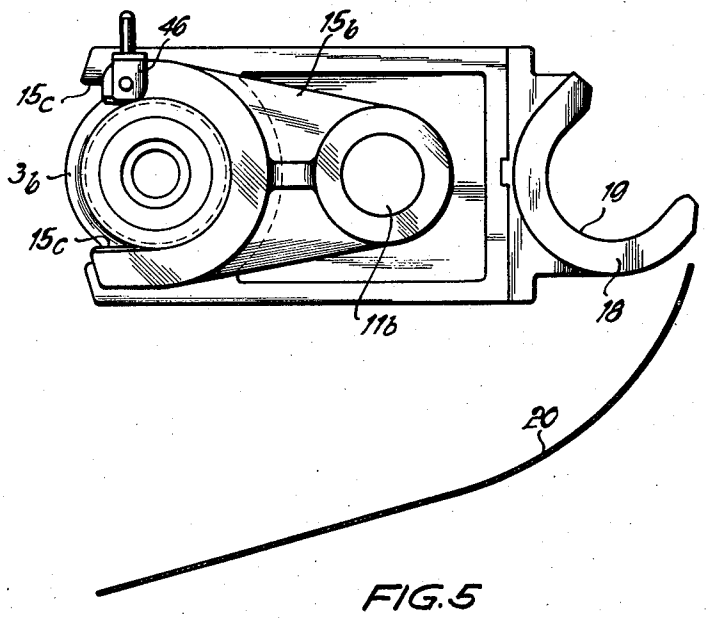
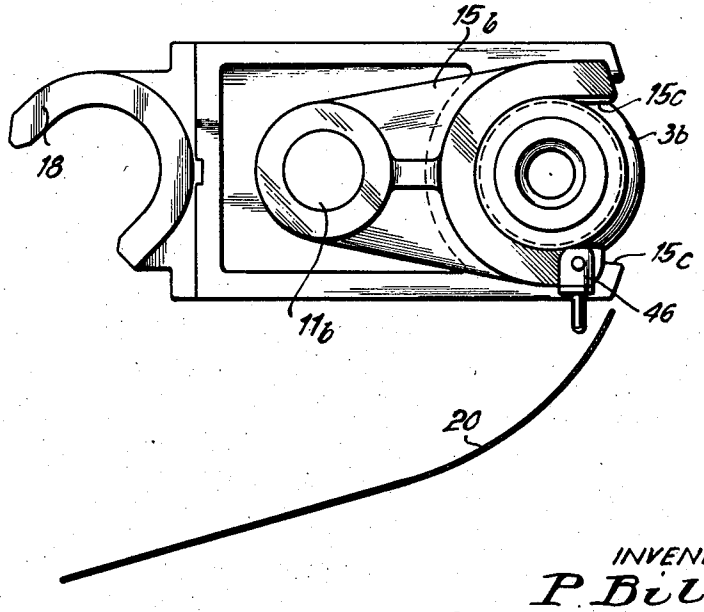


FIG. 5



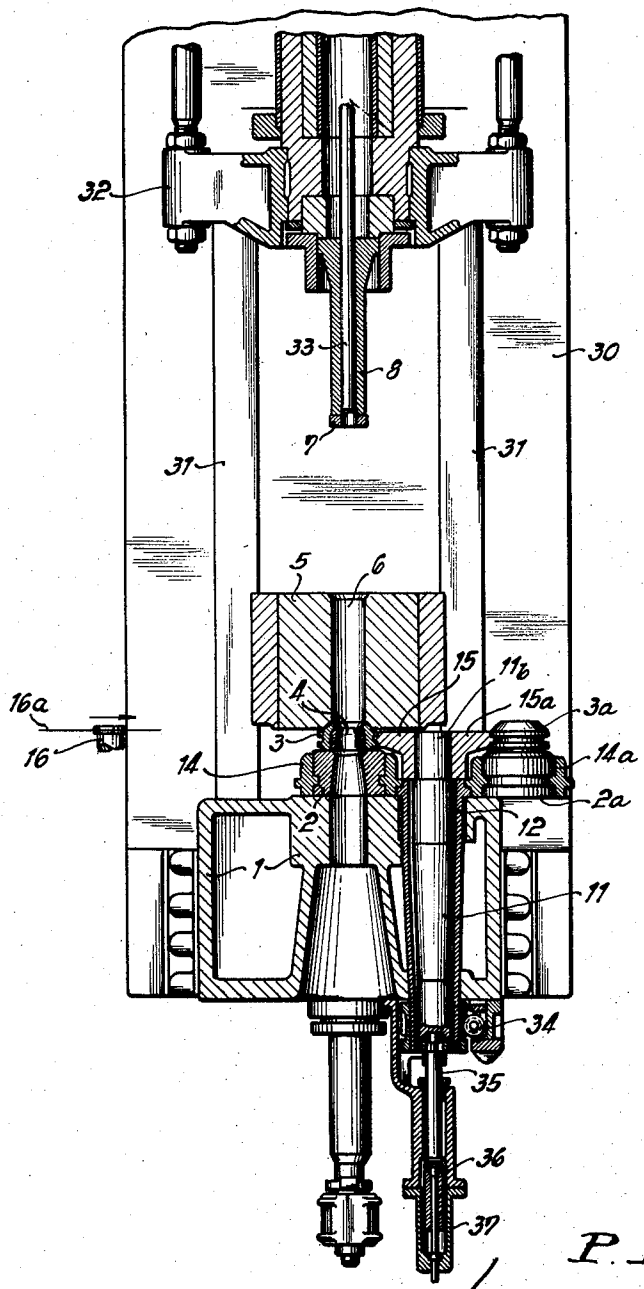
INVENTOR
P. Billen
By Glascock Downing & Seebold,
ATTYS.

July 28, 1959 P. BILLEN 2,896,782

TOOL ARRANGEMENT FOR SEVERING THE EXTRUDED PRODUCT IN DIRECTLY OPERATING EXTRUSION PRESSES

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FIG. 6



INVENTOR
P. Billen
By Glascock Downing & Seebold
ATTYS.

United States Patent Office 2,896,782 Patented July 28, 1959

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TOOL ARRANGEMENT FOR SEVERING THE EXTRUDED PRODUCT IN DIRECTLY OPERATING EXTRUSION PRESSES

Peter Billen, Leverkusen-Kuppersteg, Germany, assignor to Schloemann Aktiengesellschaft, Dusseldorf, Germany

Application April 16, 1956, Serial No. 578,245

Claims priority, application Germany April 16, 1955

3 Claims. (Cl. 207—1)

With directly operating extrusion presses it is known to use a tool arrangement wherein the matrix holder can be swung out of the operative position by means of a swingable arm adapted to pivot about an axis parallel to the axis of the press. In order to sever the extruded product from the remainder of the material the matrix holder is of knife-like construction so that as it pivots, sliding along the container, it can cut off or nip off the extruded product which has been formed. A severing operation of this kind cannot be carried out on steel owing to the latter's hardness and toughness. The knife-like edges would be blunted too quickly. Also, when severing in this manner, the ends of the pressed length are deformed, resulting in waste of the pressed product. Deformation is particularly extensive when pressing tubes, so that considerable lengths of the end portions of the extruded products are unusable and have to be cut off.

The object of the invention is to obviate these disadvantages. To this end, it proceeds from the initially mentioned state of the art, namely from a tool arrangement for severing the extruded product in directly operating extrusion presses, preferably such as are used for pressing steel tubes, whose matrix holder is adapted to be swung out of the operative position by means of a swingable arm pivotable about an axis parallel to the axis of the container bore. The invention consists in that the swingable arm is displaceable in the direction of pressing. The matrix holder is allowed to follow the container when the latter is withdrawn, so that the length of pressing between the matrix holder and the counter-support can be cut off. If the matrix holder is moved forwards again without the container, space is provided between the latter two for ejecting the pressing remnant.

Removing the hot pressing remnant separated from the extruded product proper and then ejecting it from the container, is an unpleasant operation. In order to facilitate this, a collector for the pressing remnant ejected from the container can be arranged to be pivotable about the axis of rotation of the matrix holder. The said collector expediently consists of a cup which collects the remnant after it has been severed and, after rotation through about 90°, lets it slide on to a chute or the like.

When steel is being pressed, it is often not possible to have non-stop operation, since the container has to be cleaned of the remnants of the lubricant used (glass or the like) between two pressing operations. Therefore the arrangement can be such, without impairing the working speed, that one of two arms rigidly connected together supports the collector and the other a matrix holder. The latter is expediently of U-shaped construction. The matrix is held therein by means of releasable pins or the like.

In order also to counter the danger that when the container is released from the matrix holder the pressing remnant would remain adhering to the container and not to the matrix holder, the front outer edge of the pressing disc is preferably bevelled off. The pressing remnant is

then located more securely in the container, so that the afore-mentioned danger is avoided.

Two constructional examples of the invention are illustrated in the drawings, wherein:

Figures 1, 2 and 3 show a tool arrangement according to the invention in three different working positions;

Figures 4 and 5 show another tool arrangement according to the invention, in two working positions; whilst

Figure 6 is a horizontal sectional view of a steel tube press showing the arrangement of the tools according to Figures 1 to 3.

In Figure 6, **30** designates the bed of a steel tube press. A container **5** is displaceable in the longitudinal direction of the press on horizontal slideways **31**. The means for displacing such containers are known and have not therefore been illustrated. The bore **6** of the container **5** serves to receive a heated steel ingot from which a tube is to be made by pressing. **8** designates a press ram which is fixed by means of a plurality of securing and pressure elements in a mobile crossbeam **32**, which can also be pushed forwards and backwards in the horizontal direction by known means on the slideway **31**. Longitudinally displaceable in the ram **8** is a mandrel **33**, which is pressed into the steel ingot after the ingot has been inserted in the bore **6**. Then the ram **8** is run into the bore **6** to press a tube in known manner, the material of the inserted steel block being forced out between the front end of the mandrel **33** and a matrix or die **4**. A steel tube **10** is thus produced, as shown in Figure 1. A counter-support **1**, which is fixedly arranged on the bed **30**, is used to take up, with the interposition of a pressure element **2**, the pressure which the ram **8** exerts on the matrix **4** by way of the steel ingot.

In Figure 1, **1** designates the counter-support of the press, against which bears the pressure element **2** which in turn serves as support for a matrix holder or die-holder **3** which carries the matrix **4**. The pressing disc **7** of the pressing ram **8** is longitudinally displaceable in the bore **6** of the container **5**. For the sake of greater clarity the mandrel **33** has not been shown in Figures 1 to 3. **9** designates a pressing remnant or discard which remains in the press after the production of a tube **10** has been concluded. It is still attached to the pressed tube **10**. Rotatable in the counter-support **1** is a hollow shaft **12**, which is situated parallel to the axis of the container bore. It receives a shaft **11** which is rotatable with said shaft **12** but not relatively thereto, and it carries the pressure element **2** on an arm or arm-like extension **14**. The hollow shaft **12** can be rotated by a worm gear **34** or the like (Figure 6). Mounted on the shaft **11**, whose end **11*b*** projects out of the hollow shaft **12**, are two arms **15** and **15*a*** which each carry a matrix holder, **3** and **3*a*** respectively. In corresponding fashion an arm **14*a*** carrying a second pressure element **2*a*** is arranged opposite the arm **14**. As Figure 6 shows, the shaft **11** can be displaced longitudinally by a piston rod **35** with piston **36**. This is brought about by admitting pressure fluid to one side or the other of the piston **36**, which is arranged in a cylinder **37**. The shaft **11** is not rotatable relatively to the hollow shaft **12**, since it has splines **11*a*** in which there engage keys **12*a*** which are mounted fast in the hollow shaft **12**. Whilst Figure 1 shows the position of the tools when the pressing operation has been completed, Figure 2 shows the container **5** in the retracted position. When it retracts it is followed by the arm **15**, which carries the matrix holder **3**. This is possible because the inner shaft **11** is displaced to the right whilst the hollow shaft **12** remains stationary. Upon this rearward movement of the container **5** the container has entrained the tube **10**. Between matrix holder **3** and pressure element **2** a gap is formed into which a saw **16** with saw blade **16*a*** can be introduced. The extruded pipe **10** is

severed from the remnant **9** by means of this saw blade. Figure 3 shows a further position which can be reached after the severed tube **10** is drawn away to the left (Figures 1–3). After the tube **10** is severed, the shaft **11** is displaced to the left, so that the matrix holder **3** is released from the remnant **9**. The two arms **14** and **15** are then rotated together to a certain extent so that adequate room is provided between container **5** and counter-support **1** for expulsion of the remnant **9** by means of the ram **8** and its pressing disc **7**. In order that the remnant **9** should not become detached from the pressing disc **7** when the matrix holder **3** is lifted away, the pressing disc may be bevelled slightly at its outer periphery.

After the pressing remnant has been removed, the arms **14** and **15** are turned until the pressure element **2***a* and the matrix holder **3***a* come into the operative position. The previously used tools **2** and **3** can then be cooled and cleaned whilst a new ingot is inserted in the container.

In Figures 4 and 5 a lever **15***b* one end of which carries the matrix holder **3***b*, is mounted on the shaft **11***b*. The said end is U-shaped so that the matrix can be pushed in between the two U-arms **15***c*. It is held in the pushed-in position by a pin **46** which can be released manually when the matrix has to be removed. But in this case the opposite end of the lever does not carry another matrix holder but a collector **18** which, in the position shown in Figure 4, forms a cup **19** which is open at an angle in the outward direction. After the container is retracted and the pressed tube severed, the said cup is swung towards the remnant, to collect the latter when it is pushed out. Then when the lever **15***b* is turned in the clockwise direction, the remnant slides with the pressing disc out of the cup on to a chute **20**, so that the said remnant is brought automatically out of the zone of operation of the press. After the lever **15***b* is turned through 180°, the lever takes up the position shown in Figure 5, wherein the matrix holder **3***b* is situated in the operative position.

I claim:

1. A tool arrangement for severing an extruded product from a discard in a direct-acting extrusion press, particularly in a press for the extrusion of steel tubes, comprising: a container formed with a cylindrical bore, this container being movable in the direction of extrusion, a pressing disc slidable in the container bore, a press ram

for impelling the pressing disc along the container bore, a rotatable and axially displaceable shaft parallel to the axis of the container bore, an arm mounted fast upon the shaft, a die-holder secured to the arm and adapted in one position to bear against the container co-axially with the container bore, an extrusion die mounted in the die-holder and adapted to be swung, by rotation of the shaft, into and out of a position in axial alignment with the container bore, the said shaft, arm, die-holder and die being adapted to move longitudinally with the container when the container is retracted, a counter-support adapted to take up the pressure exerted by the press ram through the pressing disc upon the material that is being extruded, and a saw adapted to be introduced between the counter-support and the die when the container is retracted from the counter-support and to sever the extruded product from the discard, leaving the discard still in the container.

2. A tool arrangement for severing an extruded product from a discard in a direct-acting extrusion press as claimed in claim 1, further comprising: a hollow shaft co-axially enclosing the axially displaceable shaft and rotatable therewith but not rotatable independently thereof, this hollow shaft not being axially displaceable, a radial arm mounted fast on the hollow shaft, and a pressure element secured to this radial arm and adapted to be interposed between the counter-support and the die-holder when the die is swung into alignment with the container bore.

3. A tool arrangement for severing an extruded product from a discard in a direct-acting extrusion press as claimed in claim 1, further comprising: a second arm, mounted fast upon the axially displaceable shaft diametrically opposite to the arm that carries the die-holder and substantially integral therewith, and a collector secured to this second arm and adapted to receive the discard when ejected.

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