Feb. 7, 1967 K. SEIDEL ETAL 3,302,440

EXTRUSION PRESSES, PARTICULARLY CABLE-SHEATHING PRESSES

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Fig. 1

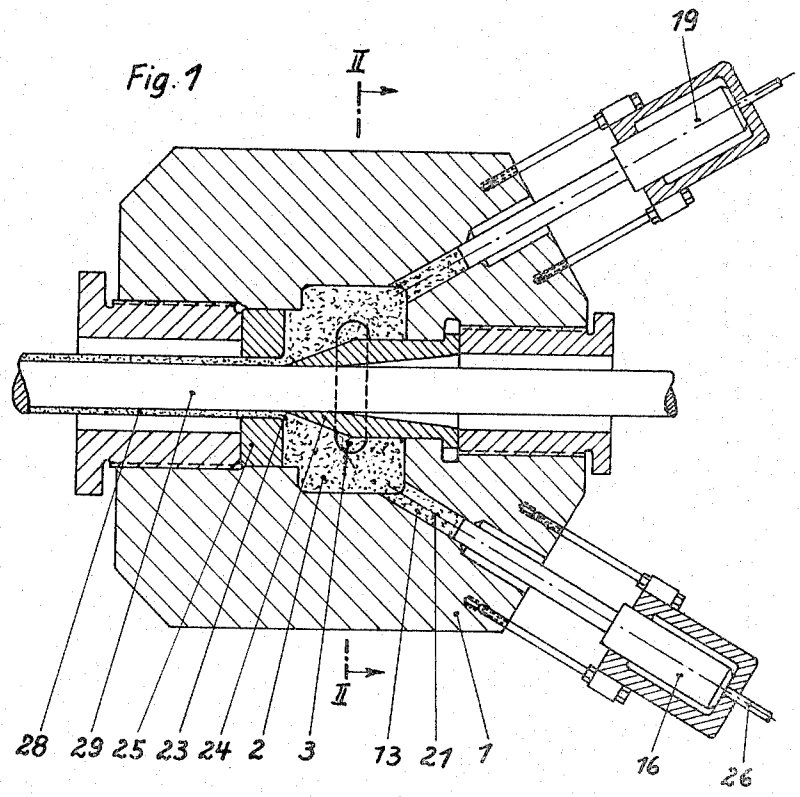
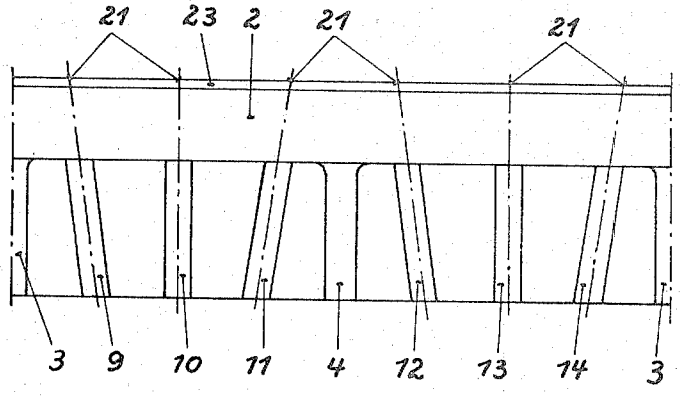


Fig. 3

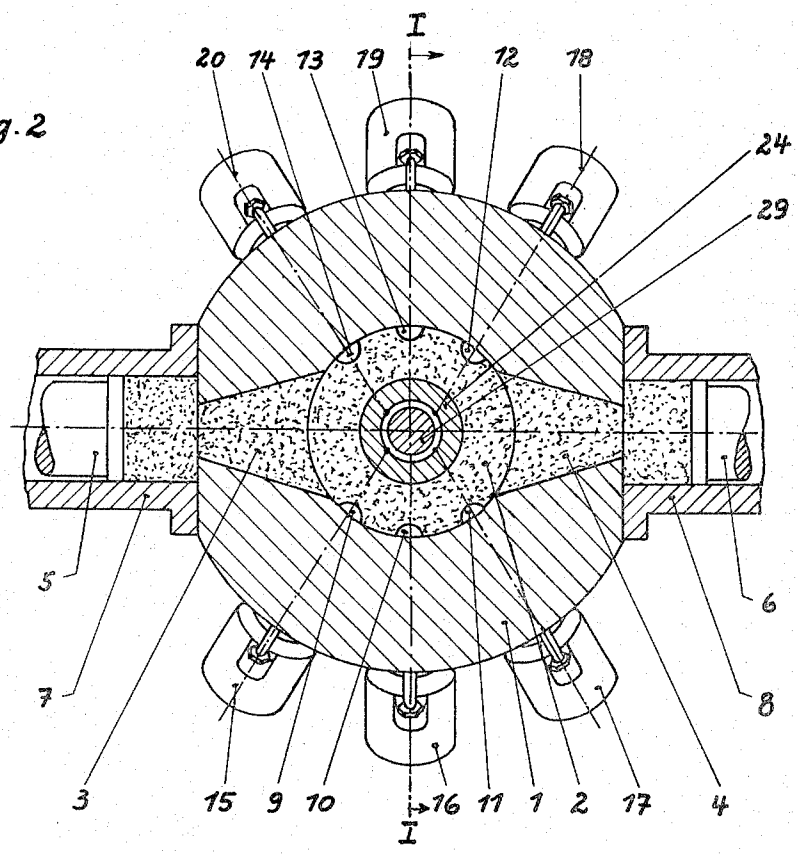


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Fig. 2



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EXTRUSION PRESSES, PARTICULARLY CABLE-SHEATHING PRESSES

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6 Claims. (Cl. 72—259)

This invention relates to an extrustion press, particularly a cable-sheathing press, of either the single-billet or the double-billet construction, with one or more auxiliary press rams, the extrusion-material spaces of which, known as storage spaces, are filled by extrusion material forced out of the main extrusion chamber during the main extrusion operation, and which maintains the extrusion operation, at a diminished extrusion speed, during the charging of the press with fresh billets. In known presses of this nature, particularly in the case of single-billet presses, the main press ram is perpendicular to the axis of passage of the cable, there being provided, between the container and the extrusion chamber, a supplementary stowage space, into which there open storage spaces, likewise arrangement transversely to the direction in which the cable is drawn through, and from there the extrusion material to be stored, supplied during the main extrusion operation, is received. As soon as the main extrusion stroke is completed, and the main container is being charged with a fresh billet, the extrusion material stored in the storage spaces is forced back, by means of the auxiliary rams located therein, into the stowage chamber, to maintain the extrusion operation, and from there is supplied to the extrusion chamber, through which the cable passes. During the charging of the container, the extrusion-material passage arranged between the latter and the stowage chamber must be shut off, in order that the extrusion material pushed back by the auxiliary rams into the stowage chamber may not flow back into the charging space of the main press ram, the container thereby interrupting the extrusion operation. Furthermore the auxiliary rams must be subjected to a relatively high pressure, in order that the resistances to flow in the direction of the die, conditioned by double change of direction of the extrusion material located in the storage spaces, may be overcome.

The object of this invention is to diminish the resistances to the flow of the extrusion material from the auxiliary rams towards the annular gap that forms the cable sheath, whilst keeping the resistances to the flow of the extrusion material from the auxiliary press rams towards the container as great as possible, so as to enable special shut-off members between the container and the main extrusion-material chamber to be dispersed with.

According to the invention this object is attained by the auxiliary ram or ram supplying the stored extrusion material to the sheath-forming annular gap without any substantial change of direction.

The storage spaces of the auxiliary rams preferably open directly into the main extrusion- material chamber, the axes of the auxiliary rams and of their storage spaces pointing in the direction of the annular gap. By this special arrangement of the auxiliary press rams, besides the merely immaterial change of direction, associated therewith, of the flow of extrusion material, the distance between the auxiliary press rams and the annular gap is also restricted to a minimum, and in this way the resistances to the flow of the extrusion material are additionally kept small. This has the advantage not only that the auxiliary press rams need only be provided, for the maintenance of the extrusion operation with a low

pressure, but also that the risk of the extrusion material flowing back out of the extrusion chamber in the direction of the container or containers during the charging thereof with fresh extrusion material is largely prevented, and therefore that special shut-off members between the container and the main extrusion-material chamber are unnecessary.

The reflux of the extrusion material into the containers is furthermore rendered difficult because the direction of flow of extrusion material between the auxiliary rams and the annular gap is substantially rectilinear and is also short, and therefore causes but little resistance, whereas in order to be displaced by the auxiliary rams in the direction of the main rams, the extrusion material would have to be deflected at least at right angles, and would thereby be exposed to increased resistances to flow. Furthermore the extrusion material delivered by the main extrusion operation from the main extrusion ram into the extrusion-material passages leading to the main extrusion-material chamber would have to flow back in exactly the opposite direction, which would likewise occasionly enhance resistances to flow. By the arrangement of the auxiliary press rams according to the invention, the resistances to flow between the latter and the annular gap, and thereby the specific pressures requiring to be applied to the extrusion material by the auxiliary press rams for the maintenance of the extrusion operation with a diminished speed of outflow, are too small to effect an appreciable or inadmissible large reflux of the extrusion material into the container or containers by overcoming the resistances to flow in the direction towards the latter. Special shut-off members between the main extrustion-material chamber and the receiver are accordingly not required.

In a further development of the invention the auxiliary rams are so arranged on the press head that forms the main extrusion-material chamber and the extrusion-material supply passages that their storage spaces do not open into the main extrusion-material chamber in the immediate neighborhood of the mouths of the extrusion-material supply passages. When more than two auxiliary rams are provided, therefore, the mounths of the storage spaces into the main extrusion-material chamber admit of being distributed in a non-uniformly manner around the periphery of this chamber. In order however to obtain broadly uniform pressure conditions at the annular gap, the auxiliary rams are arranged at such angles to one another that their axes, when produced, meet the annular gap at equal distances from one another.

The distribution of pressure is here further improved if, when arranged a plurality of auxiliary press rams, an even number of the same is provided.

Finally, a further comparative moderation of the distribution of pressure can be obtained by regulating the auxiliary press rams independently of one another. In this case, however, auxiliary press rams that are opposite to one another are preferably coupled together for joint regulation.

Those parts of a cable-sheathing press of the double-billet construction that are requisite for the further elucidation of the invention are illustrated in principle in the accompanying drawings, in which:

FIGURE 1 shows a section on the line I—I, in FIGURE 2;

FIGURE 2 a section on the line II—II in FIGURE 1; and

FIGURE 3 a development of the main extrusion chamber, with the supply passages, opening into the latter, of the main and auxiliary press rams.

In FIGURES 1 and 2, the press head is denoted by 1, and the main extrusion chamber formed by the latter

is denoted by 2. Into the main extrusion chamber open the two extrusion material supply passages 3 and 4 of the main extrusion rams 5 and 6, with the containers 7 and 8, and also the storage spaces 9, 10, 11, 12, 13 and 14 of the auxiliary press rams 15, 16, 17, 18, 19 and 20, the axes of the supply passages 3 and 4 being perpendicular to the axis of the die 25 through which the material is to be extruded, and the axes 21 of the storage spaces of the auxiliary press rams pointing approximately in the direction of the annular gap 23, formed by the mandrel 24 and the die 25. From FIGURE 2 it will be seen that the six storage spaces of the auxiliary press rams are located outside the immediate mouth region of the extrusion-material supply passages 3 and 4.

Since the distance between the mouth positions of the storage spaces 9 and 14, as well as that between the mouth positions 11 and 12, is greater than the distance between the mouth positions of the storage spaces 9 and 10 or 10 and 11 on one side, and between 12 and 13 or 13 and 14 on the other side, for the comparative moderation of the pressure conditions at the annular gap in FIGURE 2, the auxiliary press rams enter the press head at such an angle that their axes 21 (FIGURE 1), when produced, meet the annular gap 23 with the same distance from one another (FIGURE 2).

The controlling of the auxiliary press rams is effected by means of control pipes 26. Owing to the symmetrical arrangement of the six auxiliary press rams, those marked 15, 17, 18 and 20 can be coupled together, for joint regulation; and so can the auxiliary press rams 16 and 19.

The extrusion operation proceeds as follows: while the main press rams 5 and 6 supply the extrusion material through the extrusion-material supply passages 3 and 4 to the main extrusion-material chamber 2, and from there force it through the annular gap 23 for the formation of the sheath 28 for the cable 29 passing through, extrusion material flows at the same time from the main extrusion-material chamber into the storage spaces 9 to 14, and fills these, at the same time displacing the auxiliary press rams outwards into their initial position. As soon as the main extrusion stroke is finished the auxiliary press rams 15 to 20 are supplied with pressure, whereupon these press the extrusion material stored in the storage spaces back into the main extrusion-material chamber for the purpose of maintaining the extrusion operation. During this time the recharging of the main extrusion cylinders with fresh extrusion material takes place. As soon as this charging operation is completed, and the main extrusion rams are again supplied with pressure fluid, for the purpose so carrying on the main extrusion operation at an increased speed of extrusion, the auxiliary press rams are relieved of pressure, so that by the extrusion material displaced into the storage spaces the auxiliary press rams are pressed back again into their initial position.

Since the auxiliary press rams supply the stored extrusion material to the annular gap that forms the sheath without any material change of direction, and merely have to maintain the movement of the already flowing extrusion material, there are only slight resistances to flow to be overcome. A displacement the extrusion material into the supply passages 3 and 4 and from there into the containers 7 and 8, would however require at least one change of direction of the extrusion material through 90°; and since the extrusion material tends to follow the line of least resistance, an appreciable reflux of the extrusion material into the containers during the auxiliary extrusion operation does not take place, so that special shut-off members in the extrusion-material supply passages, that

is, between the main extrusion-material chamber and the containers, are not required.

We claim:

1. A continuous extrusion press, comprising: a main extrusion chamber, at least one container in permanently open communication with the main extrusion chamber, a supply passage, perpendicular to the axis of extrusion, from the container to the main extrusion chamber, a main press ram for supplying extrusion material from the container through the supply passage to the main extrusion chamber, a die through which material can be extruded from the main extrusion chamber, at least one tubular storage space in open communication with the main storage chamber, and an auxiliary press ram reciprocable in the said tubular storage space, so that the main press ram, during its working stroke, impels extrusion material from the main extrusion chamber partly through the die and partly into the tubular storage space, thus repelling the auxiliary press ram, whereas during the withdrawal of the main press ram, the auxiliary press ram returns extrusion material from the tubular storage space to the main extrusion chamber and thereby impels material from the main extrusion chamber into the die, the path of the extrusion material from the point where it leaves the tubular extrusion space to the point where it enters the die being substantially straight.

2. A continuous extrusion press as claimed in claim 1, the axis of the auxiliary ram and its storage space pointing towards the die.

3. A continuous extrusion press as claimed in claim 1, the tubular storage space opening into the main extrusion chamber outside the immediate vicinity of the mouth of the passage by which the main extrusion ram supplies material to the main extrusion chamber.

4. A continuous extrusion press as claimed in claim 2, comprising a plurality of tubular storage spaces in open communication with the main extrusion chamber, and a corresponding number of auxiliary press rams reciprocable therein, the axes of the auxiliary press rams and storage spaces all pointing toward the die, and being angularly spaced apart in such a way that the said axes, when produced, meet the die at equal distances apart.

5. A continuous extrusion press as claimed in claim 1, comprising a plurality of tubular storage spaces in open communication with the main extrusion chamber, and a corresponding number of auxiliary press rams, and the press further comprising means for regulating the auxiliary press rams independently of one another.

6. A continuous extrusion press as claimed in claim 4, the number of tubular storage spaces and of auxiliary press rams being an even number, and the press further comprising means for regulating the auxiliary press rams, the regulating means for those auxiliary press rams that are opposite to one another being coupled together for joint actuation.

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