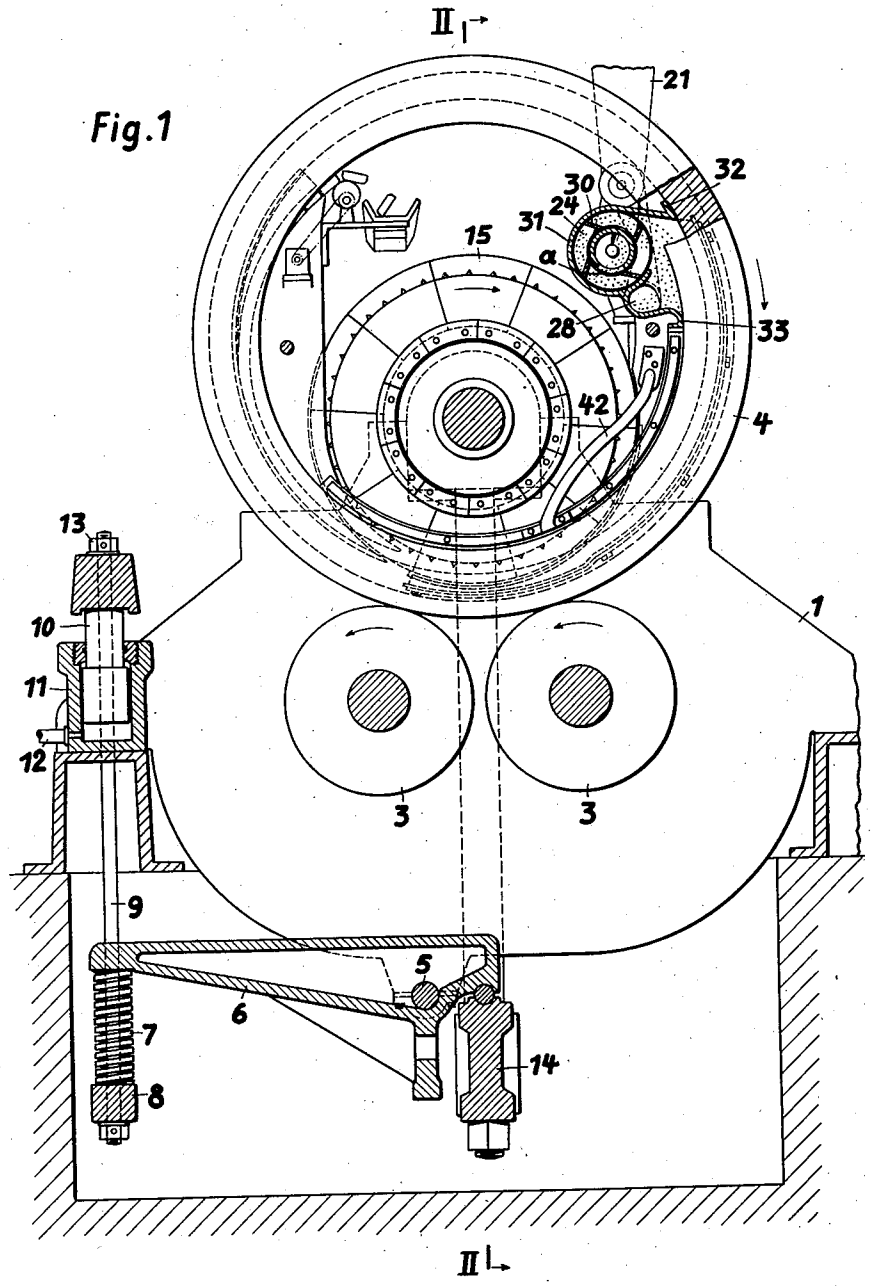
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RING TYPE ROLLER PRESS

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Fig.1



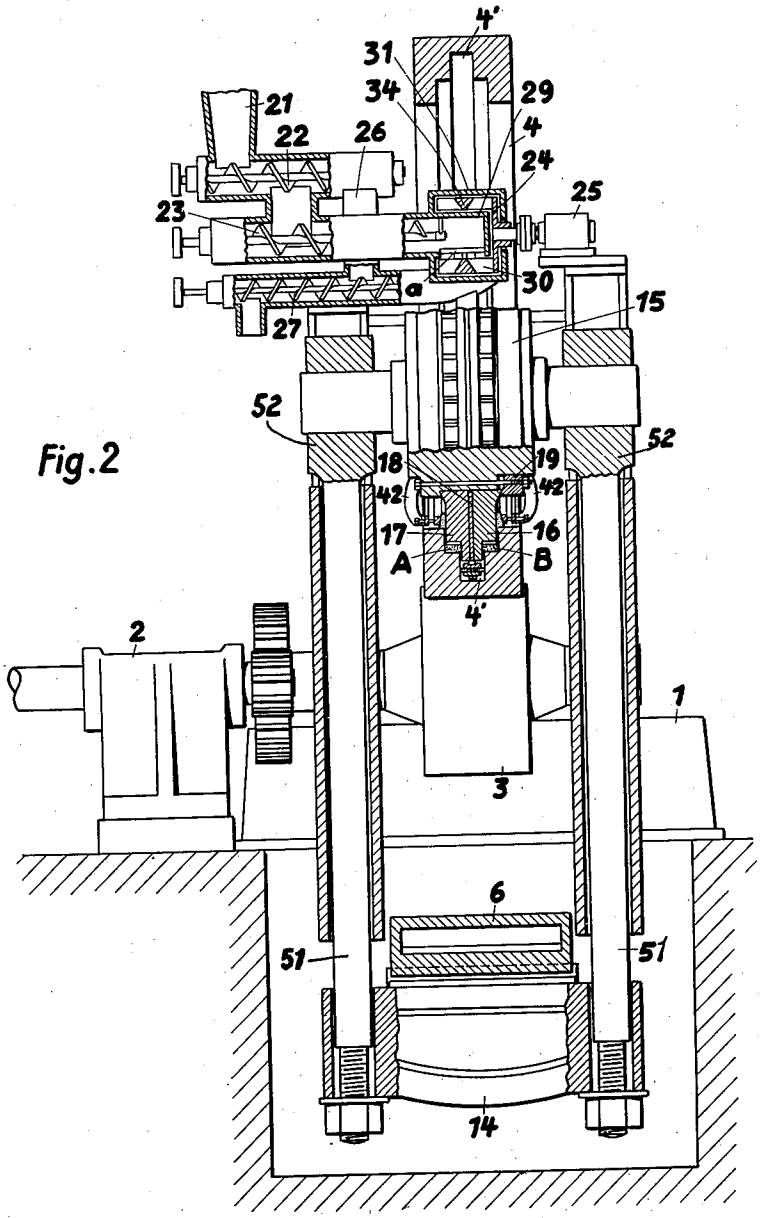
Inventor,
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His attorneys

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Fig. 2



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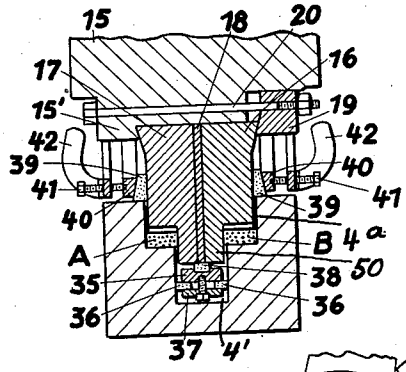
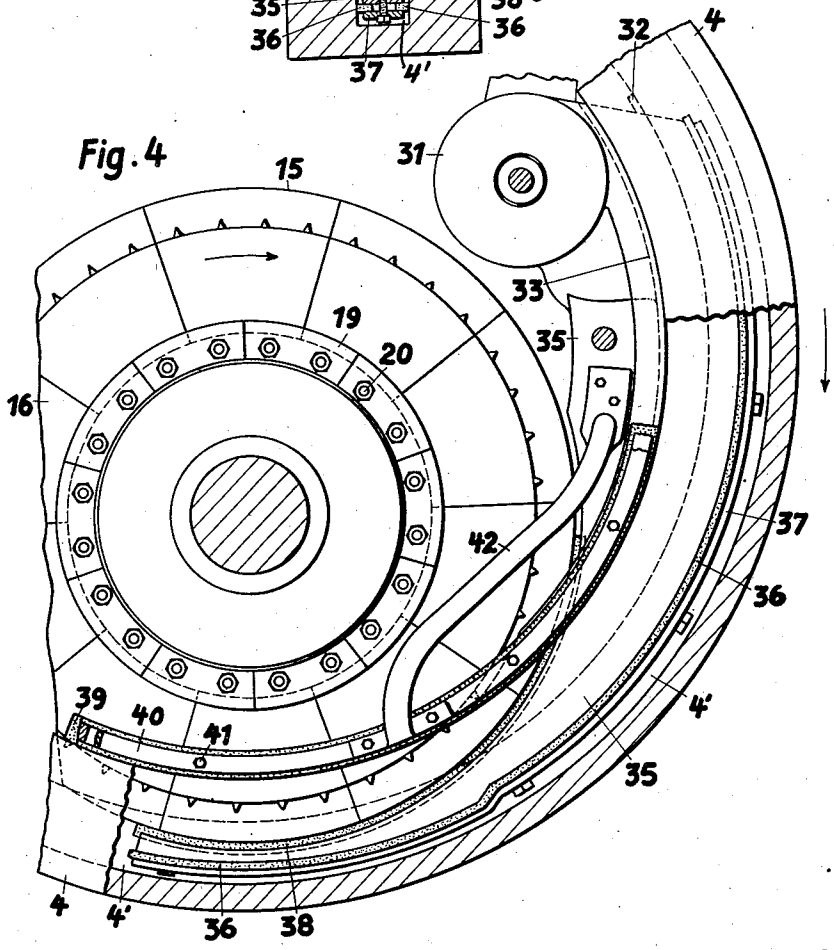


Fig. 3

Fig. 4



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Fig. 5

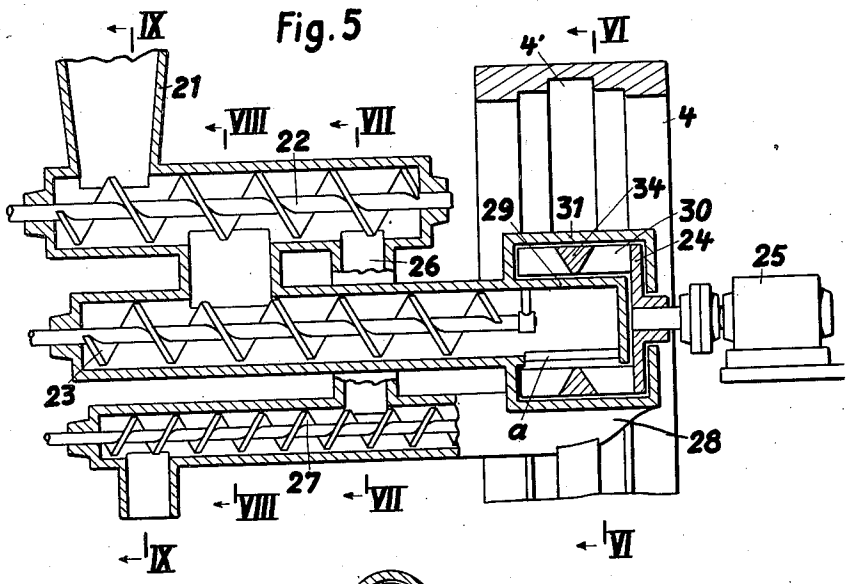


Fig. 7

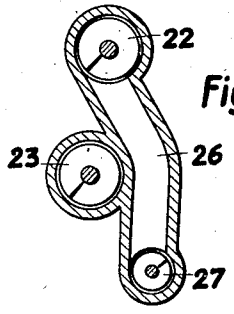
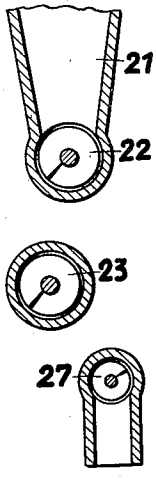


Fig. 9



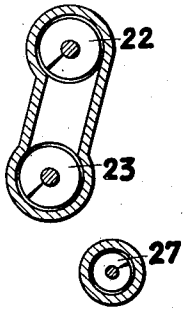
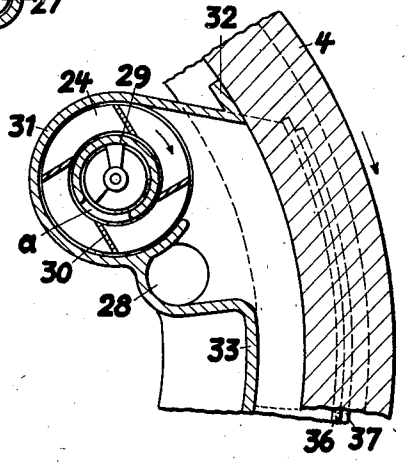


Fig. 8

Fig. 6



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2,219,592

UNITED STATES PATENT OFFICE

2,219,592

RING TYPE ROLLER PRESS

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Application July 23, 1937, Serial No. 155,172
In Germany May 27, 1936

6 Claims. (Cl. 25—21)

Ring type roller presses serve the purpose of producing an extraordinarily firm and compact rod from more or less finely divided material under high specific pressure. However, as in this method of pressing, both the pressure roller and the pressure ring are continuously moving in relation to one another, a complete packing between these two press components cannot be attained. The finely divided part of the material to be pressed forces its way through the narrow interstices that are present, and thus escapes being pressed and constantly widens the slits by frictional wear so that the quantity of material escaping unpressed is constantly, even if only slowly, increasing. Packing between the two parts that are moving with respect to one another is therefore necessary, which necessitates further great care where in addition the two parts are mounted displaceably relatively to one another, as is very often the case, e. g. in ring type roller presses of the kind in which one pressing member, either the press ring or the pressure roller, is elastically mounted in its bearings so as to be capable of giving way in the event of an overload.

According to the present invention all the slits located between the components of the ring roller press that move in relation to one another, between the feeding-in point of the material to be pressed into the pressure ring and the actual place of pressing, are fitted with packings. These packings are preferably adjustable in order that they can be tightened and re-adjusted to take up any wear that may occur. Further features will be apparent from the accompanying drawings and description of the invention.

In order that the said invention may be clearly understood and readily carried into effect, the same will now be described more fully with reference to the accompanying drawings, in which:

Figure 1 is an elevation, partly in section, of a ring roller press, constructed in accordance with the invention.

Figure 2 is a section along the line II—II of Fig. 1.

Figure 3 is a fragmentary radial section through the ring and roller at their point of closest approach.

Figure 4 is an enlarged fragmentary view, with parts broken away, of the ring and roller.

Figure 5 is an axial vertical section of the feed mechanism.

Figure 6 is a detail sectional view on the line VI—VI of Figure 5.

Figure 7 is a detail sectional view on the line VII—VII of Figure 5.

Figure 8 is a detail sectional view on the line VIII—VIII of Figure 5.

Figure 9 is a detail sectional view on the line IX—IX of Figure 5.

The direction of rotation of the rotating parts is indicated by arrows. The two rollers 3 which are carried in bearings in the frame of the press 1 and caused to rotate through the medium of the drive 2, carry the pressure ring 4, which is fitted internally with a rotating pressure groove 4^a in the bed of which a central "channel" 4' has been milled around its periphery.

On the pin 5 of the frame 1 is located a lever 6, one end of which is supported on the cross head 8 by means of springs 7, the cross head being connected to the piston 10 of the hydraulic pump 11 by means of the tension bars 9, the pump being fed with water under pressure through the pipe 12. The effective length of the tension bars 9 can be adjusted by means of nuts 13.

At the other end of the lever 6 the suspension 14 is attached, which includes bearing rods 51 formed into bearings 52 at their upper ends, in which the pressure roller 15 is rotatably mounted. The roller 15 carries on its cylindrical surface a peripheral undercut rib 15'. Two symmetrical segmental rings 16 and 17 and an intermediate segmental washer ring 18 are inserted between the undercut cap ring 19 (Figs. 3 and 4). The cap ring is screwed tight by bolts 20.

The rotating rib of the roller 15 formed by the rings 16 and 17 constitutes the pressing portion of the roller and meshes in the rotating groove 4^a of the pressure ring 4, the protruding central fin 50 fitting into the channel 4'. Two rods of material A and B, are pressed by the machine, in the two sides of the groove 4 separated by the central fin 50. If wear occurs on the adjacent surfaces of rings 16 and 17 or on the pressure ring 4, the rib on the pressure roller 15 can be widened by inserting a heavier washer 18, so as to take up the wear, if necessary, also refinishing slightly the worn surfaces.

The subdivision of the rings 16 and 17 forming the rib, the washer 18 and cap ring 19, into segments, affords the possibility of adjustment locally in the event of unequal wear and thus facilitates assembly and maintenance. The whole forming tool being in two parts also allows of easy adjustment, so that the packing media used can be relieved of the full working pressure.

The feeding-in of the material to the pressure point from the hopper 21 is effected by means of an upper screw 22 and a lower screw 23, which

feeds it to the centrifugal impeller 24. This impeller is located concentrically with the screw and is caused to rotate at high speed by a motor 25, the wheel flinging the material into the pressure groove in the pressure ring 4. The excess of material fed in by the screw 22 passes through the overflow 26 to the return screw 27 which latter also collects the material that has been flung by the wheel 24 into the pressure groove but not caught by the latter.

The number of revolutions of the screws 22 and 23 and of the centrifugal impeller 24 can be adjusted independently of one another. Thus if it is necessary to feed a greater quantity of material from the screw 23 to the impeller 24 in order to produce heavier briquette rods, it is possible to regulate the feed within wide limits without in any other way overloading the overflow 28.

This design of the feeding arrangement allows the material to be pressed to be fed to the centrifugal device with an excess, so that regulating can be effected already at this point. When heavier rods are to be produced this excess can be increased, whereby the capacity of the centrifugal impeller automatically increases and if necessary can be still further augmented by increasing the number of revolutions. The second overflow from the press form need not then be substantially altered and serves only the purpose of counteracting the slight irregularities occurring in working.

The blades 30 have been arranged on the impeller 24 in such a manner that they encircle the feed tube 29. The stationary casing 31 which surrounds the centrifugal impeller 24 meshes in the pressure groove of the pressure ring 4. Its outer periphery is cut away on this meshing part and the covers 32 and 33 are attached to these cut out edges. The former, 32, is located on the feed side of the pressure ring and fits on the bed of the pressure groove in the ring, whereas the cover 33 on the delivery side of the pressure ring closes in the pressure groove.

The blades 30 of the centrifugal impeller are inclined rearwardly in the direction of rotation in order to be able to fling the material with force. The feed pipe 29 is cut away at *a* in the part that is encircled by the blades, the outlet being directed downwardly and being located in the direction of rotation of the wheel 24 behind that part of the wall of the pipe 29 that is opposite the external cut away part of the casing 31 that lies between the covers 32 and 33 (see Fig. 6). The material to be pressed which is fed in axially through the feed pipe 29 falls through the outlet *a* in the housing 31, i. e. within reach of the blades 30. It is seized by the blades and flung into the part of the pressure groove that is covered by the cover 33. The blades are interconnected by a central circumferential rib 34. This rib 34 is of tapering form in cross section and is sharpened towards the axis of rotation whereas its external casing surface is of substantially the same width as the central fin 50 on the pressure roller 15.

The cover 33 which reaches to the pressure roller 15 and fits closely against it, carries a central rib 35, which is of the same width as the rib 34 of the centrifugal impeller 24, and also as the fin 50 of the pressure roller 15. This rib 35 engages in the channel 4' of the pressure ring 4 and extends therein beyond the pressure place, i. e. to the rear of the pressure roller. Between it and the ring 4 there is only a slight play on both sides into which space some material penetrates during working. In order to prevent this finely divided material from escaping through these crevices or slits packing strips 36 of felt or similar material are stretched around the rib 35. They are held in position and pressed tightly by the cover plate 37 which is screwed on the outside of the rib 35.

On the inside of the rib 35, a channel has been milled in that part that lies close up against the central fin of the pressure roller 15, and this channel carries a strip of felt 38. This strip of felt packs the slit between the pressure roller fin and the rib 35 and prevents dust from proceeding from the pressure channel A into the other pressure channel B or vice-versa.

In order to pack the external slits also between the cover 33 and the pressure ring 4 and between the latter and the pressure roller 15, strips 39 of packing material are inserted. The strips are pressed firmly by the segments 40 that cover them by tightening the bolts 41, which are located in the holders 42 provided on the cover 33.

According to the invention all packings are so arranged that they are not directly subject to the high pressures occurring in the press. On the contrary they are at all points located behind narrow slits in which the finely grained press material already acts as packing, so that the actual packing material provided merely has the task of preventing the conglomerating dust from escaping.

What I claim is:

1. In a ring rolling press, a ring having an internal groove containing a central deeper channel, a roller of smaller diameter than said ring having an annular pressing portion of slightly less width than said groove provided with a central fin of slightly less width than said channel, means for journalling said roller within said ring on an axis eccentric to said ring so that its pressing portion travels into said groove to a depth between the bottom and top of the groove and its fin into said channel, thereby forming a divided pressing space enclosed except for narrow slits between the lateral faces of said pressing portion and the sides of said groove, packing means bearing against the lateral faces of said pressing portion and the inner periphery of said ring to close said slits, and means for rotating said ring and said roller.

2. In a ring rolling press, a ring having an internal groove containing a central deeper channel, a roller of smaller diameter than said ring having an annular pressing portion of slightly less width than said groove provided with a central fin of slightly less width than said channel, means for journalling said roller within said ring on an axis eccentric to said ring so that its pressing portion travels into said groove to a depth between the bottom and top of the groove, and its fin into said channel, thereby forming a divided pressing space enclosed except for narrow slits between the lateral faces of said pressing portion and the sides of said groove, packing means bearing against the lateral faces of said pressing portion and the inner periphery of said ring to close said slits, feeding means comprising a casing bearing against the inner periphery of said ring at one side of said roller, thereby covering a portion of said groove, the interior of said casing being in communication with said groove and containing means for feeding material to be pressed into said groove, a partition

dividing the space within said casing and projecting through said groove into said channel, said partition extending circumferentially in said channel through the narrowest space between said roller and said ring and being shaped to conform to the periphery of the fin of said roller, and packing means between said partition and the fin of said roller.

3. In a ring rolling press, a ring having an internal groove containing a central deeper channel, a roller of smaller diameter than said ring having an annular pressing portion of slightly less width than said groove provided with a central fin of slightly less width than said channel, means for journalling said roller within said ring on an axis eccentric to said ring so that its pressing portion travels into said groove to a depth between the bottom and top of the groove, and its fin into said channel, thereby forming a divided pressing space enclosed except for narrow slits between the lateral faces of said pressing portions and the sides of said groove, packing means bearing against the lateral faces of said pressing portion and the inner periphery of said ring to close said slits, feeding means comprising a casing bearing against the inner periphery of said ring at one side of said roller, thereby covering a portion of said groove, the interior of said casing being in communication with said groove and containing means for feeding material to be pressed into said groove, a partition dividing the space within said casing and projecting through said groove into said channel, said partition extending circumferentially in said channel through the narrowest space between said roller and said ring and being shaped to conform to the periphery of the fin of said roller, and packing means extending laterally from said partition against the sides of said channel.

4. In a ring rolling press, a ring having an internal groove, a roller of smaller diameter than said ring having an annular pressing portion of slightly less width than said groove composed of detachable segmental blocks, means for journalling said roller within said ring on an axis eccentric to said ring so that its pressing portion travels into said groove, and means for rotating said ring and said roller.

5. In a ring rolling press, a ring having an internal groove containing a central deeper channel, a roller of smaller diameter than said ring having an annular pressing portion of slightly less width than said groove provided with a fin of slightly less width than said channel, means for journalling said roller within said ring on an axis eccentric to said ring so that its pressing portion travels into said groove thereby forming a divided pressing space between said roller and said ring, feeding means comprising a casing bearing against the inner periphery of said ring at one side of said roller, thereby covering a portion of said groove, the interior of said casing being in communication with said groove and containing a centrifugal impeller rotatable on an axis parallel to the axis of said ring and having blades adapted to throw the material into said grooves, the blades of said impeller being tied by a circumferential rib adapted to divide the stream of material thrown by said impeller, a partition aligned with said rib and extending through said groove into said channel to guide the material to the two divisions of said pressing space, and means for rotating said roller and said ring.

6. In a ring rolling press, a ring having an internal groove containing a central deeper channel, a roller of smaller diameter than said ring having an annular pressing portion of slightly less width than said groove provided with a central fin of slightly less width than said channel, means for journalling said roller within said ring on an axis eccentric to said ring so that its pressing portion travels into said groove to a depth between the bottom and top of the groove and its fin into said channel, thereby forming a divided pressing space enclosed except for narrow slits between the lateral faces of said pressing portion and the sides of said groove, the annular pressing portion of said roll being divided in a plane perpendicular to the axis of said roller and having a washer between the two parts formed by the division, and means for rotating said ring and said roller.

HEINRICH KÖHLER.