Dec. 7, 1965 H. SCHNIER 3,221,368

HOT BRIQUETTING ROLLER PRESS

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Fig.1

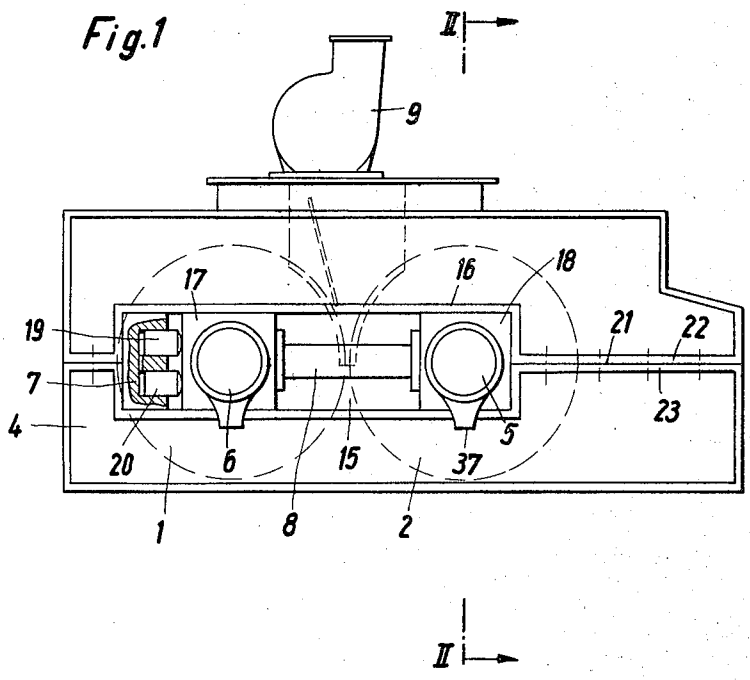

Fig.2

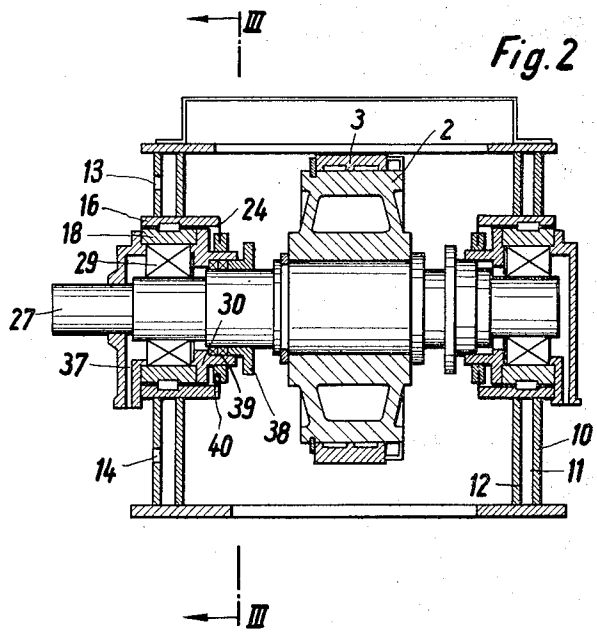

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Fig.3

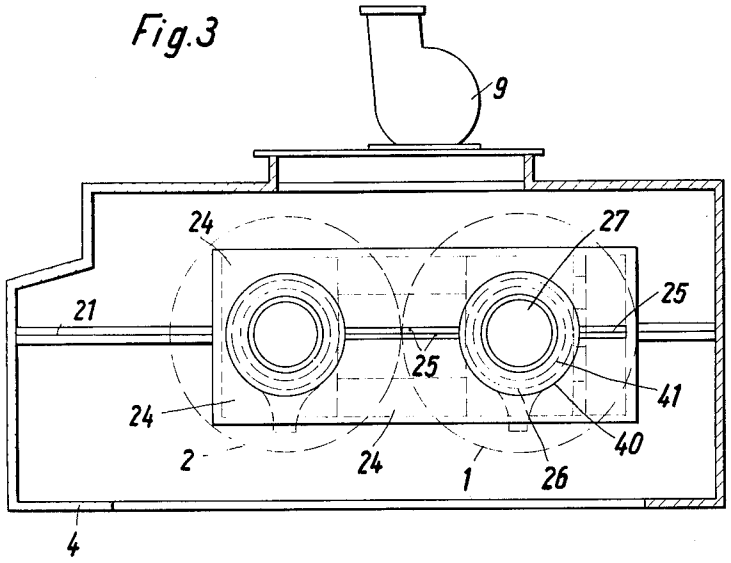

Fig.5

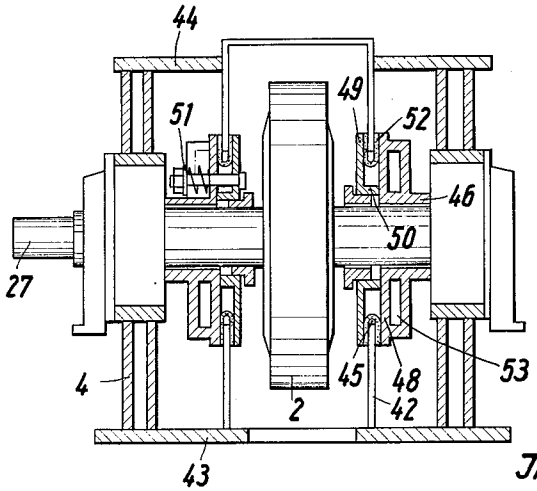

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Fig. 4

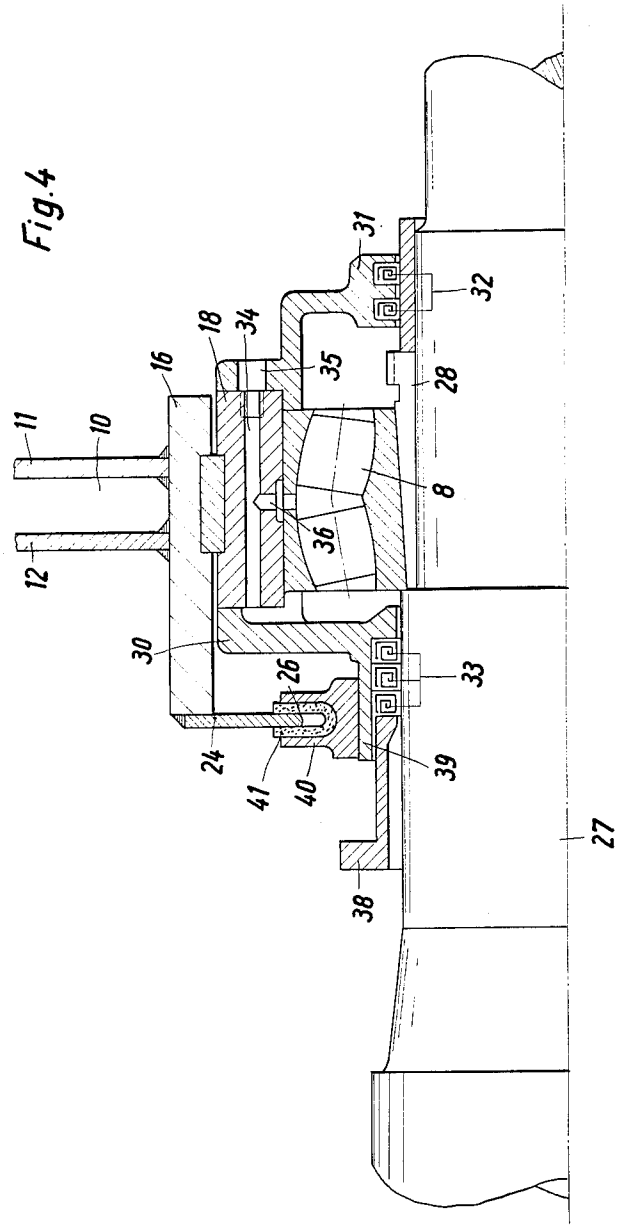

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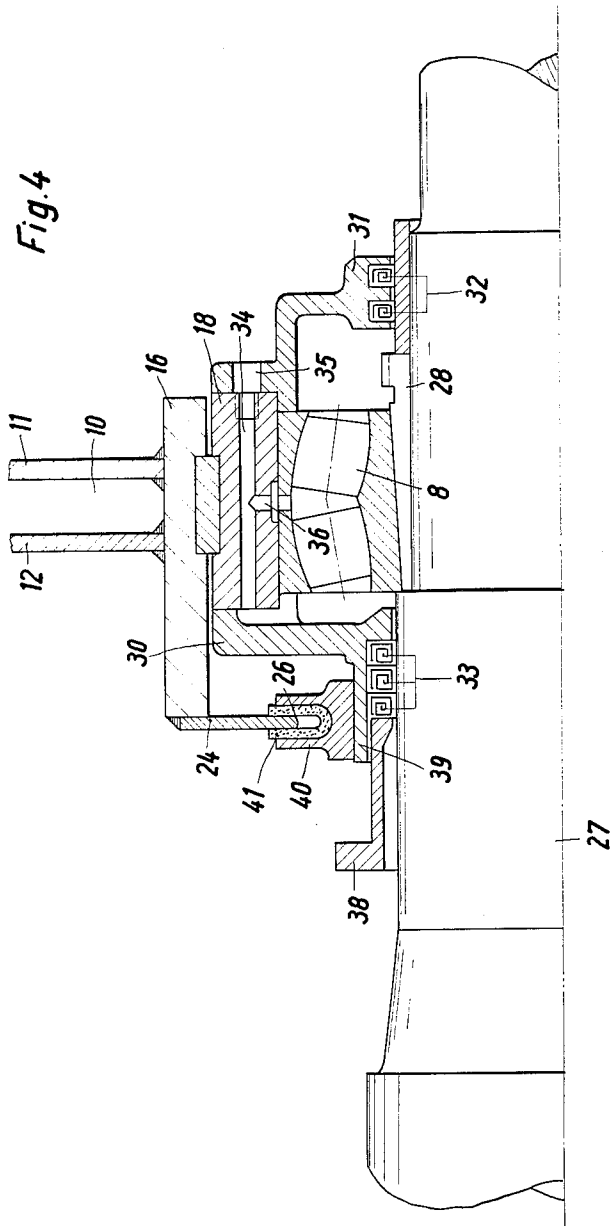
Fig. 4



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HOT BRIQUETTING ROLLER PRESS

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Claims priority, application Germany, July 8, 1960, M 45,871
6 Claims. (Cl. 18—9)

This invention relates to improvements in briquetting presses, and this application is a continuation-in-part of my application Serial No. 122,534, filed July 7, 1961, now abandoned.

Briquetting presses of the type here involved comprises a frame provided at both sides with longitudinally extending openings for receiving bearing blocks for the cooperating press rolls, whereby one of said blocks is slidably mounted and supported by hydraulic means against the wall adjoining the opening. The openings are strengthened by surrounding flange-like bands, and the frame itself is divided along the center of the axes of the press rolls.

A principal object of the invention is to provide such a press frame which is suitable for hot briquetting.

Another object of the invention is to provide means for enclosing the protecting gas atmosphere in a smooth and easily cleaned space.

Other objects and advantages will be apparent from a consideration of the specification and claims.

In using presses of the character described for hot briquetting, a particular problem arises by the need to seal the longitudinally extending openings in such a manner that on the one hand, the passages of the shafts of the briquetting rolls are sealed while, on the other hand, the movable bearings can be displaced in the plane laid through the axes of said rolls.

In the accompanying drawings which illustrate two embodiments of my invention in a diagrammatic manner,

FIG. 1 is a schematic view in side elevation of a press frame according to the invention, a portion of the frame being broken away;

FIG. 2 is a sectional view taken along line II—II of FIG. 1;

FIG. 3 is a cross section taken along line III—III of FIG. 2;

FIG. 4 shows on an enlarged scale, a detailed sectional view of the frame in the area of a bearing, and

FIG. 5 is a vertical sectional view, taken through the shaft of a press roll, showing another embodiment of a press frame in accordance with the invention.

As will be seen from FIGS. 1 and 2, the briquetting machine of the invention comprises the two rolls **1**, **2** rotating in opposite directions, which rolls are equipped on their surfaces with bands providing the desired molds. The rolls **1**, **2** are journaled in the frame **4** of the press in bearings **5**, **6**; bearing **6** is displaceable and bears against a hydraulic adjustment and safety device **7**. Between the two bearings, there is provided a spacer bar **8** which defines the smallest spacing of the shafts of the rolls. A hopper **9** is provided on a cover closing the upper part of the press frame **4**.

The sides of the frame **4** are double-walled. The space formed between walls **11** and **12** serves as a cooler equipped with inlets **13** and outlets **14** for the cooling liquid.

The frame is provided with a longitudinal rectangular opening or slot **15** surrounded by a flange-like band **16**; bearing blocks **17**, **18**, which support the bearings **5**, **6** are mounted in said slot, as well as the spacer bar **8** and a hydraulic adjustment device which comprises two adjusting plungers **19** and **20** which abut against the bearing block **17** above and below the shafts of the rolls, respectively. The frame is divided in the plane of the axes of the shafts. Ajoining the division plane, the two sections of the frame are provided with flange-like bands **22**, **23** which are bolted or screwed together.

The two openings or slots **15** are closed at the inside of the frame by means of plates **24** which are hermetically joined to the inner edge of the band **16**, preferably by welding. As will be noted from FIG. 3, said plates are also divided in the division plane of the frame **21** and provided adjacent their division plane **25** at one side or at both sides with flanges through which they are joined by means of bolts and screws like the two sections of the frame. Said plates have openings **26** for passage of the shafts, the sealing of which will be described in detail hereafter.

On a section of shaft **27**, a roller bearing **29** is secured by means of a cone key **28** and outwardly enclosed by a housing **18** (FIG. 4). By means of lateral covers **30**, **31**, a fluidtight seal of the bearing is obtained. The covers **30**, **31** seal against the shaft by means of packings **32**, **33**. A bore **34** extends in axial direction through the housing **18**; the outside end of said bore is equipped with a connection **35** while the opposite end opens towards the inner front side of the roller bearing. A radial bore **36** leads from the bore **34** to the center area of the bearing **29**. A further fitting **37** is provided on the outer cover **27** (FIGS. 1 and 2).

The described construction provides for a circulating oil lubrication for the bearing which achieves at the same time a liquid cooling of the bearing. Hereby, the oil is introduced through a conduit connected to connection **35**. Part of the oil enters radially into the bearing through bore **36** while the remaining oil leaves at the opposite end of the bore **34**, passes along the inner surface of the cover **30** and flows then through the roller bearing from the inside in axial direction. After leaving the bearing **29**, the oil passes through the connection **37** (FIG. 2) into a return conduit.

The bearing has to be lined so as to have the normal clearance when the shaft **27** is hot. The packings **33** in the inner cover **30** are preferably formed as gland packings. The reference numeral **38** designates the stuffing box gland.

The stuffing box prevents the leakage of oil which serves for lubrication and cooling of the bearings, as well as the leakage of protecting gas from the inside of the closed press housing. Inside the housing a protective gas atmosphere must be maintained to prevent at the high temperatures obtaining in the press ignition or oxidation of the material to be briquetted.

The inner bearing covers **30** are provided with axial annular projections **39** extending in direction of the press rolls; said projections form with their inner sides the stuffing box housing and carry at their outer sides a sealing support **40**. Said sealing support comprises an annular channel in which a U-shaped packing **41** is inserted which consists of a high temperature resistant material retaining good lubricating properties even at elevated temperatures.

The packings **41** straddle the plate **24** and seal the same against the bearing housings. In the area of the seal, the plate **24** is not flanged. In the area of the displaceable bearing block, the opening **26** in the plate **24** can either be longitudinally extended in the direction of the displacement, or it can be made with a certain radial excess to allow of the displacements of the bearing block during operation of the press.

The sealing arrangement set forth hereinabove makes it possible to carry out the horizontal displacement of the bearing block, which is necessary for operative and thermic reasons, while maintaining the seal of the interior of the press against the outer atmosphere.

In the embodiment of the invention shown in FIG. 5, the press frame 4 itself is not a part of the enclosure for the inert gas atmosphere. Rather, I provide inside the press inwardly of the press frame a closed housing 42. Said housing 42 may, like the plates 24 of the modification described above, consist of relatively thin walled sheets and is supported in the frame by crossbars 43, 44. It is also divided in the plane passing through the two shafts of the press and provided with flanges for their assemblage. Openings 45 are provided for passage of the shafts. Said passages may be sealed as set forth with respect to FIG. 4. In the embodiment of FIG. 5, the axial projections 46 of the inner bearing covers are provided with an annular flange 48 which projects at the outside of the housing 42 over the opening 45. At the inside of the housing, there is a disc 49 which bears with an axial projection 50 against the flange 48 and is joined thereto by bolts and screws 51. Coil springs at the outside of the flanges 48 tighten the assemblage.

A U-shaped packing 52, similar to the packing 41, is placed between the flange 48 and the disc 49.

At the inside of the flange 48, a channel 53 for a cooling fluid decreases the heat stresses to which the bearing is subjected.

Compared with the embodiment of the invention illustrated in FIGS. 1–4, the modification of FIG. 5 has the advantage of presenting for the inert gas atmosphere a housing which has a smooth inside, whereby the enclosed space is small. In addition, this modification allows of using stainless heat resistant steel for the walls of the housing 42. If such steels would be used for the parts of the frame of FIGS. 1–4 which are subject to the compression forces, the construction would become much more expensive.

In the construction of FIG. 5, the annular channel receiving the packing is formed of two parts which are pressed against each other by the force of spring 51, ensuring an even axial pressure on the packing at all times. The part 48 of the bearing cover is equipped with a channel 53 for cooling water to protect the bearings against heat. The inner bearing cover 30 of the modification of FIG. 3 could be similarly designed.

The feed system 9 is a constructive unit and forms the upper cover for that part of the press housing in which a protective gas atmosphere must be maintained.

The roller press is suitable for the hot briquetting of coal and other particulate materials.

I claim:

1. A roller briquetting press for the hot briquetting of coal and similar materials by means of rolls which are rotatable in a closed housing in mutually opposite directions about parallel shafts which are displaceable with respect to each other in their common plane, said press comprising, in combination a double walled frame consisting of two sections joined in said common plane, longitudinally extending corresponding openings in opposite sides of said frame, strengthening flanges passing around said openings, bearing blocks for said shafts located inside said openings, one of said bearing blocks being displaceable, hydraulic means supporting said displaceable bearing against a wall forming said opening, bearing

covers firmly secured to said bearing blocks and covering the bearings at their sides facing said rolls, projections at said covers extending in the direction of said rolls, a stuffing box between said projection and the shaft supported by said bearing, a plate tightly joined to said flange and extending inside the frame over said entire opening, said plate consisting of two sections joined in said common plane, apertures in said plate for passage of the shafts and said projections, the apertures for the shaft supported by the displaceable bearing being shaped to permit such displacement, annular channeled packing supports secured to said bearing covers, and U-shaped packings in said supports straddling said plates.

2. A press as claimed in claim 1 wherein said apertures for the displaceable shaft have a longitudinally extended shape.

3. A press as claimed in claim 1 wherein said apertures for the displaceable shaft have a larger diameter than the diameter of the bottom of the U-shaped packing.

4. A roller briquetting press for the hot briquetting of coal and similar materials by means of rolls which are rotatable in a closed housing in mutually opposite directions about parallel shafts which are displaceable with respect to each other in their common plane, said press comprising, in combination, a double walled frame consisting of two sections joined in said common plane, longitudinally extending corresponding openings in opposite sides of said frame, strengthening flanges passing around said openings, bearing blocks for said shafts located inside said openings, one of said bearing blocks being displaceable, hydraulic means supporting said displaceable bearing against a wall forming said opening, bearing covers firmly secured to said bearing blocks and covering the bearings at their sides facing said rolls, projections at said covers extending in the direction of said rolls, a stuffing box between said projection and the shaft supported by said bearing, a casing inside said frame, said casing consisting of two sections joined in the same plane as the sections of said frame, the walls of said casing being located between the walls of said frame and said rolls, apertures in said casing for passage of the shafts and said projections, the apertures for the shaft supported by the displaceable bearing being shaped to permit such displacement, annular channeled packing supports secured to said bearing covers, and U-shaped packings in said supports straddling the walls of said casing.

5. A press as claimed in claim 4 wherein said apertures for the displaceable shaft have a longitudinally extended shape.

6. A press as claimed in claim 4 wherein said apertures for the displaceable shaft have a larger diameter than the diameter of the bottom of the U-shaped packing.

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