PATENT SPECIFICATION 1,120,838

DRAWINGS ATTACHED.

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1,120,838

Date of filing Complete Specification: 7 Dec., 1965.

Application Date : 8 Dec., 1964. No. 49847/64.

Complete Specification Published: 24 July, 1968.

Index at Acceptance:—B5 F(22A2, 23C1, 23D6); B8 C(3F2, 10E, 10T1A, 10T3).

Int. Cl.:— B 65 b 1/24.

COMPLETE SPECIFICATION.

Improvements in the Compression of Materials.

We, COURTAULDS LIMITED, a British Company, of 18, Hanover Square, London, W.1, England, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to apparatus for the compression of materials to form bales, particulary fibrous materials.

In our British Patent Specification No. 986,483 there is described and claimed a method of compressing material comprising the steps of placing the material in a bottomless first container placed on a stand, enclosing the container in a rigid second bottomless container having mechanical strength sufficient to withstand lateral forces due to subsequent compression of the material, removing the first container, and compressing the material in the second container against the stand on which the first container stood to form a bale.

By means of the said method material to be compressed can be loaded into the first container when mounted on its stand, and this container, being used only as a storage receptacle, can be of light weight construction so that it can readily be transported, for example, from a delivery point for the material to a baling press.

In the preferred method described in the said specification the first container is a sliding fit within the second container and both containers are open at the top so that the first container can be lifted out of the second container. In practice, the filled containers, one within the other, are positioned beneath a press head which can move downwardly to compress the material, and to retain the material in the second container whilst the first container is withdrawn, the press head is lowered on top of the material so as to apply a small degree of compression It will thus be appreciated that in order for the first container to be withdrawn it must be able to pass over the press head which must therefore be somewhat smaller than the cross-section of the first container. When the first container is removed and the material is subsequently compressed by the head in the second container a ridge of material may be forced into the gap between the walls of the second container and the edges of the press head. This may cause difficulty in wrapping the compressed bale of material and detracts from the neat appearance of the bale.

According to the present invention a press head has at least a part of its pressing surface defined by plate-like members disposed in substantially co-planar or close, substantially parallel-planar relation, and movable relatively to each other in paths which are substantially parallel to said planes, whereby the effective area of the head can be varied.

Preferably the head comprises four plate-like members movable relative to each other in four mutually perpendicular directions in a single plane.

An embodiment of the invention is illustrated by the drawings accompanying the Provisional Specification which shows a press head for compressing masses of textile fibres to form bales and in which:

Figure 1 is a plan of the expandable part of the head, shown in the expanded position, and

Figure 2 is a section on the line B—B of Figure 1.

The expaandble part of the head 1 has a rectangular plate 2 which is rigidly connected to the base of the head (not shown). One of

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the rigid connections is a central hollow pillar 3 about which a disc 4 is rotatable in bearings 5. Rigidly connected to the disc, one in each quadrant, are four identical quadrangular plates 6, the portion of each plate extending outside the circumference of the disc having a curved slot 7, one end of which is closer to the centre of the disc than the other. Geometrically speaking, the perpendicular diameters of the disc 4 defining the said quadrants are co-linear with two perpendicular lines dividing the rectangular main plate 2 into four equal rectangles, hereinafter referred to as "quarters".

Four identical, rectangular plates 8 are movably connected to, and symmetrically positioned underneath the main plate 2, one adjacent to each "quarter" with the longer sides of each plate 8 parallel to the longer sides of the plate 2. On the underside of the plate 2, in each "quarter", there is a groove 9 extending from the centre of the plate 2 at an angle of 45° to its sides, this groove being engaged in a horizontal direction by two projections 10 attached to the adjacent rectangular plate 8. An oval slot 11 is provided in each "quarter" of the plate 2 and is longitudinally aligned with, and of greater width than, the groove 9, its position along the groove and its length being such that from the centre of the plate 2, the radial distances of its inner and outer ends are respectively less and greater than the radial distances of the inner and outer ends of the curved slot 7. A peg 12 attached to the adjacent plate 8, projects upwards through the slot 11 in the plate 2, so that a roller 13, mounted on top of the peg 12 with its axis perpendicular to the plate surfaces, engages the curved slot 7.

In each "quarter" there are three devices 14 which secure that "quarter" of the plate 2 to the adjacent plate 8 whilst allowing relative movement between them in a direction parallel to the side of the groove 9. All the devices 14 are identical and each comprises a lug 15 attached to the plate 8 and projecting through an oval slot 16 in the plate 2, the longitudinal axis of the slot being parallel to that of the groove 9, and a roller 17 attached to the lug 15 by a horizontal shaft 18 at a position above the plate 2 so that the roller engages a shallow oval groove 19 in the plate 2 alongside the slot 16.

It will be understood from the foregoing description that if the disc 4 is rotated relative to the plate 2 in a clock-wise direction from the position shown the curved slots 7 will act as spiral cams and cause inward movement of the rollers 13 and consequently of the four plates 8 in mutually perpendicular directions along the grooves 9, thus reducing the effective area of the press head. To provide such rotation of the disc 4, and reverse rotation for expanding the effective area of the press head, a double-acting pneumatic cylinder 20 is provided, being mounted with its axis parallel to the plate surfaces by a trunnion 21 at one end engaging a member 22 secured to a part of the wall 23 extending from the plate 2 for securing it to the press head base. The trunnion 21 has its axis parallel to the axis of rotation of the disc 4 so as to accommodate the degree of swing of the cylinder 20 necessary when the disc is rotated, as will be described. The piston rod 24 projecting from the end of the cylinder opposite to the trunnion is connected to the disc 4 by a pivot 25. Compressed air can be supplied to the opposite ends 26, 27 of the cylinder by means of flexible supply pipes 28, 29, for causing the piston to move in its two directions.

As mentioned above, the head is shown in its expanded position, that is with the plates 8 moved outwardly with respect to the centre of the plate 2, so that the effect cross-sectional area of the head is a maximum. For contracting the head, for example when it is to be lowered inside the first container when being used in accordance with the method described in our aforesaid patent application, compressed air is supplied through the pipe 28 to the end 26 of the cylinder so as to cause the piston rod 24 to move outwardly from the cylinder. This movement causes rotation of the disc 4 in a clock-wise direction. The rotation of the disc causes a slight angular movement of the pivot 25 about the axis of the trunnion 21 so causing a small swing of the piston about the trunnion, as described. As the disc 4 rotates, carrying with it the quadrangular plates 6, the outer edges of their curved slots 7 engage the follower rollers 13 causing them to move inwardly and thus move the plates 8 inwardly in the directions of the four grooves 9.

To expand the head, air is supplied through the pipe 29 to the opposite end 27 of the cylinder and the sequence is reversed.

When a press, constructed with such an expandible head, is used for baling tow by the method described before, then after the first container has been lifted over the head of the press the head can be expanded to fit close to the walls of the second container and thus prevent the formation of the extruded ridge of tow during the pressing.

It will be understood that the terms "upper", "lower", "horizontal", "vertical", and the like used herein refer to the normal position of operation of a baling press in which the head moves in a vertical direction and compresses material in its downward stroke. The invention is not, however, limited to such an arrangement of the press.

WHAT WE CLAIM IS:—

1. A press head having at least a part of its pressing surface defined by plate-like members disposed in substantially co-planar

or close, substantially parallel-planar relation, and movable relatively to each other in paths which are substantially parallel to said planes, whereby the effective area of the head can be varied.

2. A press head as claimed in Claim 1 having four plate-like members movable relatively to each other in four mutually perpendicular paths in a single plane.

3. A press head as claimed in Claim 1 or 2 in which a rotary device is adapted to move the plate-like members along said paths by means of cams.

4. A press head as claimed in Claim 3 in which a double-acting, fluid-operated piston is arranged to actuate rotation of the rotary device in either direction.

5. A press head substantially as hereinbefore described with reference to and as illustrated by the drawings accompanying the Provisional Specification.

6. A press having a head as claimed in any preceding claim.

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Printed for Her Majesty's Stationery Office by Burgess & Son (Abingdon), Ltd.—1968.
Published at The Patent Office, 25 Southampton Buildings, London, W.C.2,
from which copies may be obtained.

Fig.1.

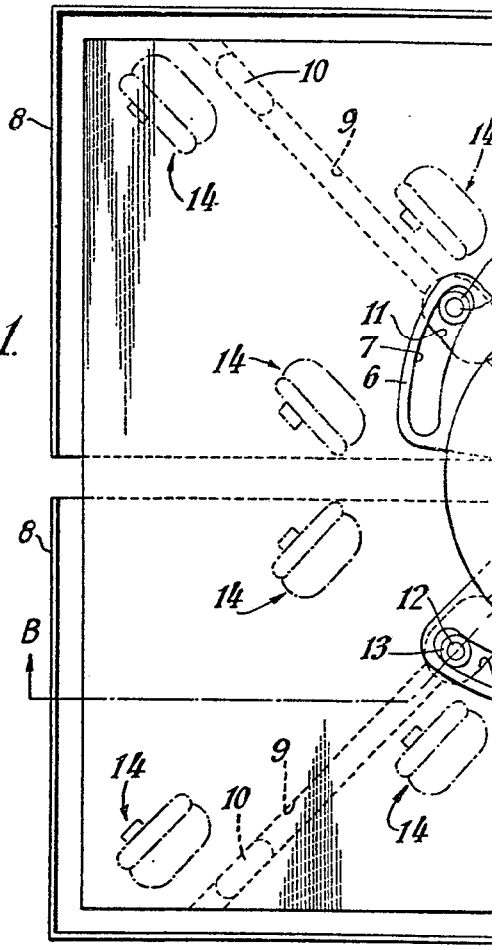
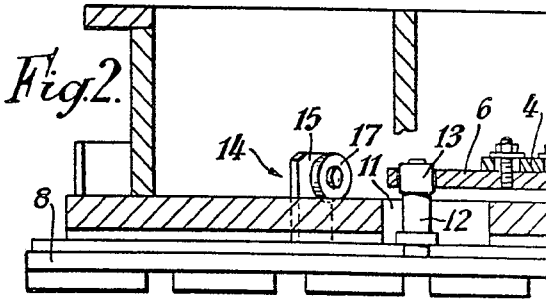


Fig.2.



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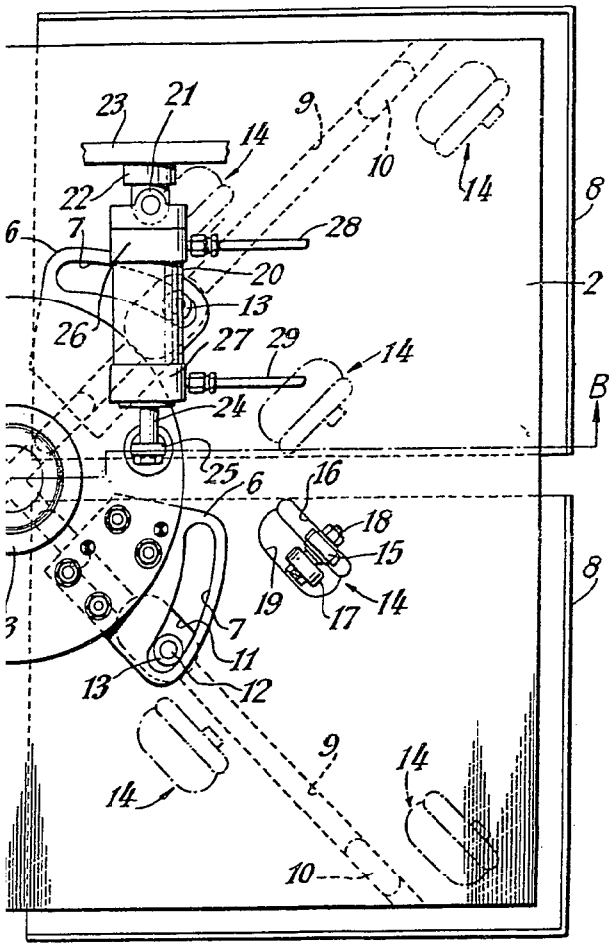
1 SHEET *This drawing is a reproduction of the Original on a reduced scale*



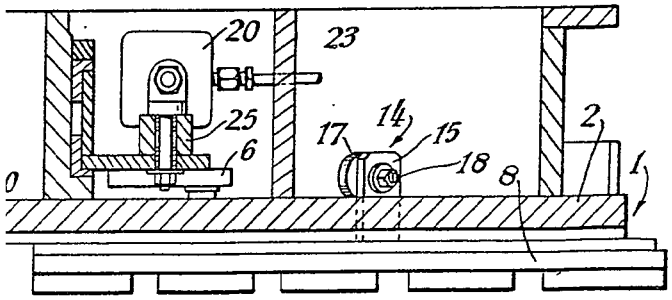


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Fig.1.

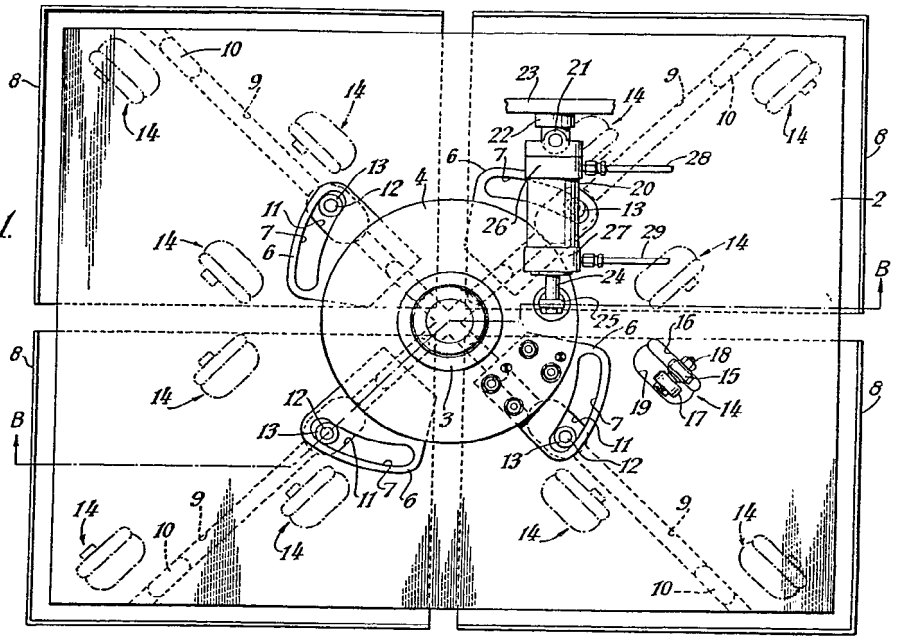

Fig.2.