

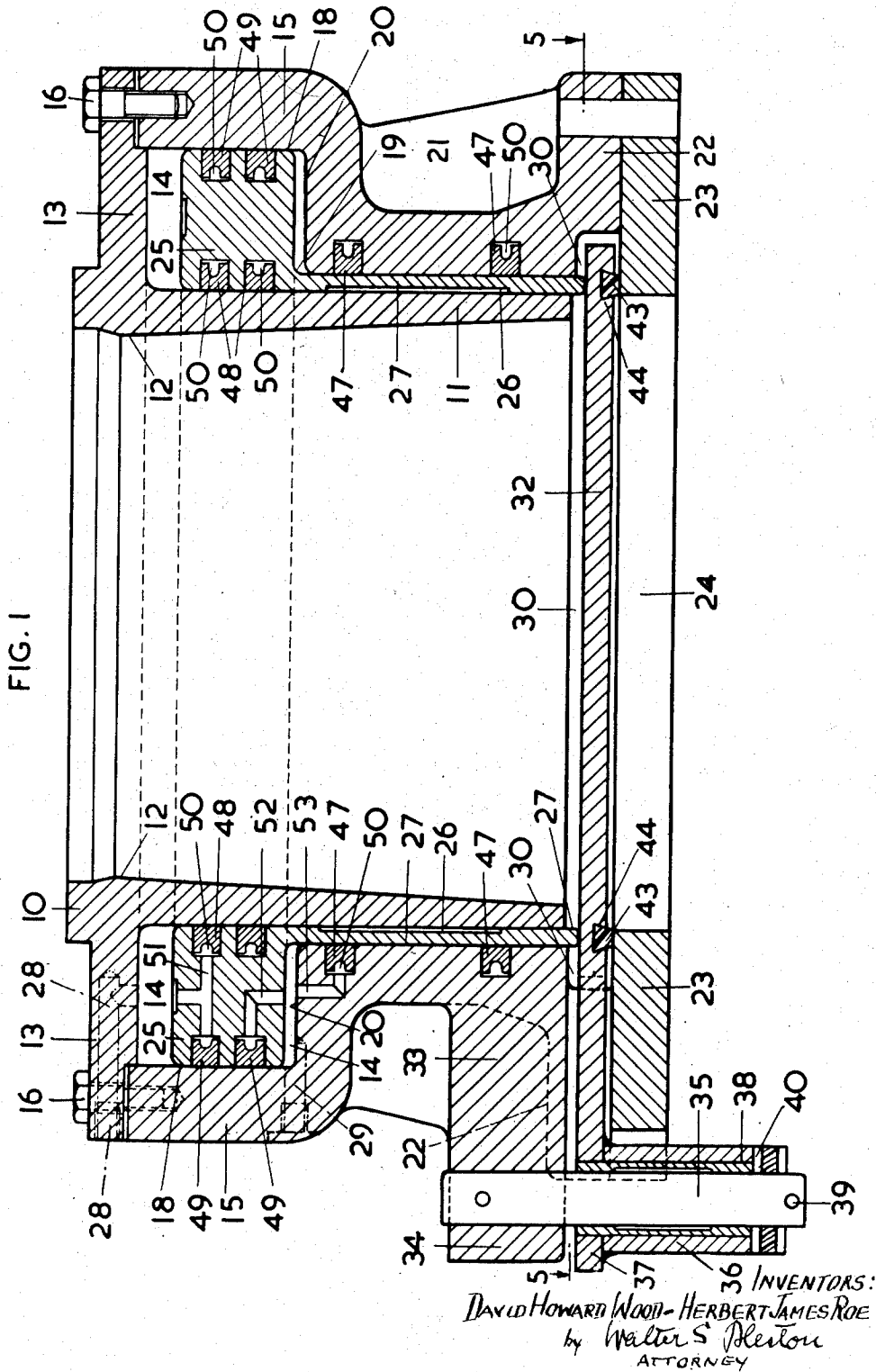
Oct. 13, 1953

D. H. WOOD ET AL
CLOSURE DEVICE FOR FEED CHAMBERS
FOR FINELY DIVIDED MATERIALS

2,654,924

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3 Sheets-Sheet 1



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FIG. 2.

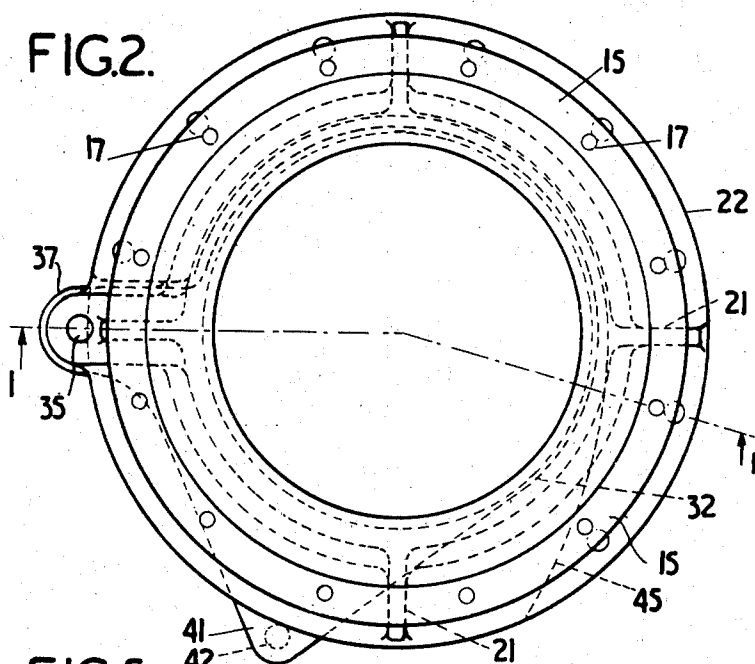
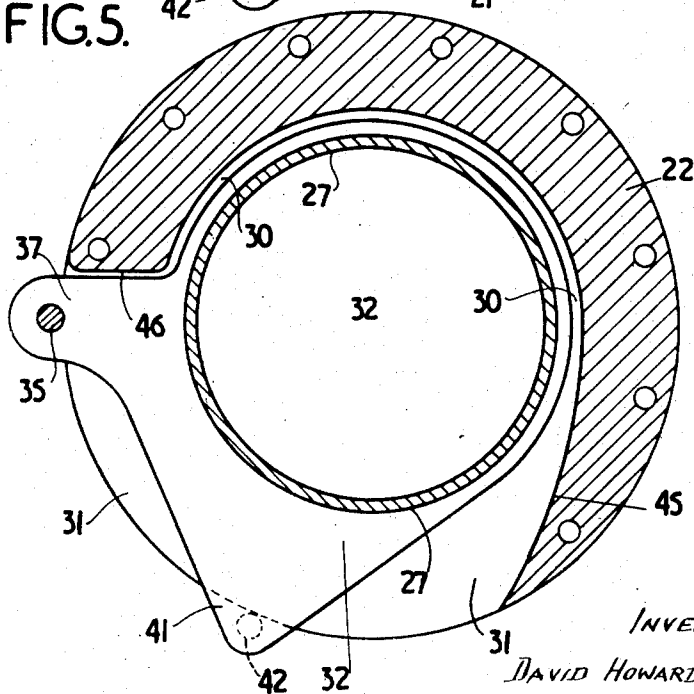


FIG. 5.



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FIG.3.

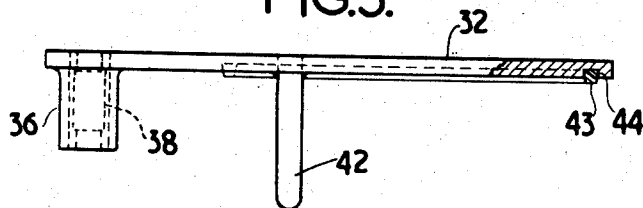
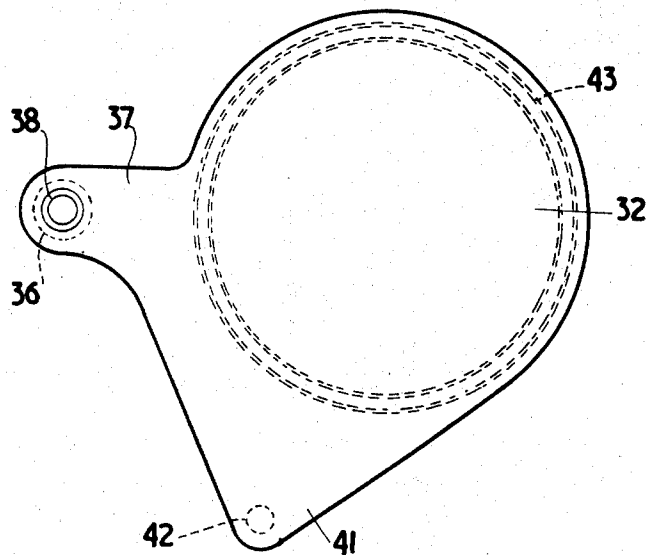


FIG.4.



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CLOSURE DEVICE FOR FEED CHAMBERS
FOR FINELY DIVIDED MATERIALSDavid Howard Wood, Barnt Green, and Herbert
James Roe, Knowle, EnglandApplication January 4, 1950, Serial No. 136,766
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6 Claims. (Cl. 22—10)

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The invention relates to feed chambers and the like through which finely divided materials such as sand, pulverized coal, cement, or the like are fed to machines and provides an effective means of making a quick air tight seal against a closure for the exit opening of the feed chamber.

The feed chamber may, for example, be applied to the feeding of foundry sand or sand mixtures to a sand chamber of a core blowing machine; and the closure means may be a pivotal or sliding cut off plate or disc which can be manipulated, or mechanically operated, to bring it into and out of closing position across the discharge mouth of the feed chamber.

The object of the invention is to provide pressure means surrounding the feed chamber exit opening which can be brought to bear upon the cut off plate or disc when that is in position across said opening and thereby to force that plate or disc into sealing contact with a surface surrounding the opening leading to the receptacle of the machine to which the feed chamber is applied.

A further object is to provide the feed chamber with a surrounding annular member having an internal bore of two diameters both parts being spaced from the external wall of the feed chamber, the larger diameter bore forming a cylinder for a piston and the smaller diameter bore accommodating a skirt or extension of the piston which surrounds the exit opening of the feed chamber and can be caused to bear upon and seal a closure member for that opening.

Other objects and features of construction of the invention will be apparent from the general description of the appended drawings which illustrate, by way of example, a feed chamber assembly suitable for attachment to the sand chamber of a core blowing machine for foundry use.

In the drawings:

Figure 1 is a vertical sectional view on line 1—1 of Figure 2 through a feed chamber assembly of a blowing head of a core blowing machine.

Figure 2 is a plan of the surrounding casting that supports the feed chamber on the core blowing machine, with the feed chamber removed.

Figure 3 is an elevation of the cut off plate shown in the assembly seen in Figure 1, removed from the assembly.

Figure 4 is a plan of the cut off plate.

Figure 5 is a section on line 5—5 of Figure 1.

In this illustrated example the feed chamber 10 may conveniently consist of an externally cy-

lindrical casting or forging with an internal bore slightly conical as at 11 from the lower end to a minimum diameter within the upper end at 12. An integral flange 13 surrounds the exterior of the upper end of the feed chamber 10 and overhangs and closes an annular space 14 below it and between the wall of the feed chamber and an upstanding cylindrical wall 15 of an outer surrounding casting. To the top of this vertical wall 15 of the outer casting, the flange 13 of the feed chamber 10 is rigidly secured by bolts 16 entering a ring of holes 17. A gasket or other suitable packing means is placed between them. The outer surrounding casting has an internal bore of two different diameters: an upper and larger bore 18 within the wall 15 and a lower smaller bore 19 surrounding but spaced from the feed chamber exterior. The change in diameter produces a circular step or ledge 20 at an intermediate point in the length of the outer casting and the upper surface of this step is the bottom of the annular space 14 below the external flange 13 of the feed chamber. The external surface of the outer casting preferably follows approximately the internal bore with suitable strengthening webs 21 between the underside of the step 20 and an annular attachment flange 22.

The lower ends of the feed chamber 10 and the stepped surrounding casting terminate at or about the same level and the annular external flange 22 of the surrounding casting is of substantial thickness and forms an attachment means for securing it by bolts or the like to an upper circular face of the sand chamber of the core blowing machine (not shown) or to a rigid annular attachment plate 23 capable of being secured to the said machine and having a central opening 24 coaxial with that of the feed chamber.

Around the feed chamber 10 is fitted a piston 25 for working in the annular space 14 below the external flange 13 of the said chamber and in the relatively deep but narrow annular space 26 between the wall of the chamber and the smaller bore 19 of the outer cylindrical casting, a skirt 27 projecting from the piston is a sliding fit.

Fluid inlet passages 28 and 29 supplied from an external source are arranged to lead compressed air to the upper and lower parts respectively of the annular space 14 which forms the cylinder for the aforesaid piston 25 so that the piston can be forced downwardly and upwardly as desired by appropriate control of the supply to the passages 28, 29. The cylinder for the piston 25 is defined by the exterior and interior surfaces of the chamber 10 and the surrounding casting

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respectively. When the piston 25 is in its lowermost position, its skirt 27 projects below and surrounds the lower, exit end of the feed chamber 10 as shown in Figure 1. The exit end of the chamber 10 terminates above the level of the bottom of the substantial annular flange 22 of the surrounding casting and the bottom of the casting is recessed as at 30, 31 Figures 1 and 5. The space thus formed below the feed chamber 10 and the top of the annular attachment plate 23 is for the reception of a cut off plate 32, see Figures 3 and 4.

The cut off plate 32 in this example is arranged to swing into and out of the recess 30. For this purpose, the bottom flange 22 of the surrounding casting is formed with a radial lug 33 of considerable thickness which projects radially as shown at 34, Figure 2, and has secured in it a stout pivot 35. A boss 36 on an arm 37 of the cut off plate, is provided with a bearing sleeve 38 and is mounted on this pivot by a retaining pin 39 and preferably with rubber packed washers 40. The cut off plate is further provided with a projection 41, outside its particular perimeter to receive a handle 42 for turning it on its pivot into and out of the closed position. Instead of the handle 42 a connection for a linkage system can be provided, if it is desired to operate it from a moving part of the machine.

This cut off plate 32, preferably has a sealing ring 43 of rubber or the like attached to its under surface, e. g. in a dovetail section annular recess 44 therein, and this ring presents its projecting face on to the rigid upper surface of the annular plate 23, which is adapted to secure the whole feed chamber assembly above the entrance to a sand chamber of a core blowing machine.

As will be seen from the sectional plan, Figure 5, the recessed part of the underside of the bottom flange 22 has a part-circular portion 30 of larger diameter than the inner bore 19 of the surrounding casting and is slotted out at the part 31 from a curved wall 45 struck from the axis of the pivot 35 to a wall 46 just beyond the pivot 35 of the cut off plate 32. This slotting in the bottom surface of the flange provides an entrance through which the cut off plate 32 can be swung into the space below the bottom opening of the feed chamber.

When the piston 25 is forced down, the skirt 27 will engage and force the cut-off plate 32 into sealing relation with the surface of the attachment plate 23 which will surround the entrance to the sand chamber of a core moulding machine when the feed chamber assembly is secured thereto. In this closed position, the feed chamber opening above the cut-off plate 32 is securely closed by the skirt 27 of the piston 25 which is firmly pressed against the upper surface of the cut-off plate.

When the piston 25 is raised, the skirt 27 is withdrawn into the space 26 and the cut-off plate 32 is freed from pressure and can be swung out on its pivot 35 to leave the exit opening from the feed chamber and the opening 24 in the plate 23 quite free so that the feed chamber can be used to pass a fresh supply of sand or sand mixture to the sand chamber of the blowing head of the core making machine.

It is preferable to provide a packing or packings in the inner face of the smaller bore 19 of the surrounding cylindrical casting—say two spaced rings 47, to make a seal against the outer surface of the skirt 27 of the piston. Similar packings 48, 49 will be provided around each cir-

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cumferential face of the annular piston 25 and these packings 48, 49 and one or more of those around the skirt may be formed with annular spaces 50 behind them to which a supply of compressed air is led through passages, as for example 5, 52, 53 Figure 1, communicating with the annular space 14 which forms the cylinder in which the piston 25 operates. Thus air tight packing of the piston 25 and its skirt 27 is assured during their movement and the entry of particles of the divided materials fed through the chamber is prevented.

We claim:

1. Feed chamber assembly for the supply of pulverised and finely divided material to machines comprising in combination a feed chamber open at the top and having an exit opening at the bottom, an inner bore for said feed chamber which is conical and gradually increased in diameter from a part of minimum diameter within the upper end of the chamber to the exit opening thereof, a removable closure device for the exit opening of the feed chamber, a casting surrounding the exterior of the feed chamber and forming a means for supporting it and providing a surrounding base flange by which the feed chamber assembly can be secured to a machine, the surrounding casting having a bore of two diameters both parts of which bore are spaced from the exterior of the feed chamber, the upper, larger diameter part forming the cylinder in which an annular piston is arranged and the part of smaller diameter accommodating a skirt extension of the piston, the lower end of which surrounds the exit opening of the feed chamber when the piston in said cylinder is forced down under pressure, the said skirt extension then bearing on the aforesaid removable closure device and in conjunction with that device making an airtight seal around the exit opening of the feed chamber.

2. Feed chamber assembly for the supply of pulverised and finely divided material to machines comprising a feed chamber open at the top and having an exit opening at the bottom, a surrounding casting spaced from the exterior of said feed chamber and terminating at its lower end in an outwardly directed attachment base flange, an attachment flange around the upper part of the feed chamber which closes the top of the supporting casting and forms the means by which the feed chamber is supported on the surrounding casting, said casting defining an annular space surrounding the feed chamber, means operated by fluid pressure in the said space and slidably engaging the exterior wall of the chamber and the interior wall of the surrounding casting, an annular extension from said fluid pressure means, and a pivoted closure device movable from an opened position in which it is entirely removed from the exit opening of the feed chamber into a closed position in which it is beneath said exit opening, in which closed position of the closure device the annular extension of the fluid pressure means is adapted to bear upon the closure device and make an air-tight seal therewith for the exit opening of the feed chamber.

3. Feed chamber assembly for the supply of pulverised and finely divided material to machines comprising, in combination, a feed chamber open only at its upper and lower ends to provide material feed and exit openings respectively, an inner bore of the chamber of gradually increasing diameter from a part of minimum

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diameter within the upper end of the chamber to the lower end of the chamber, an imperforate closure device for the exit opening mounted for rotation from an operative position where it is beneath and axially displaced from the exit opening to an inoperative position where it is angularly displaced and entirely removed from the exit opening, and pressure means surrounding and mounted for axially directed sliding movement relatively to the exit opening and adapted, when the closure device is in its operative position, to be moved in an axial direction to bear on said closure device and seal the exit opening.

4. Feed chamber assembly for the supply of pulverised and finely divided material to machines comprising, in combination, a feed chamber open at the top and having an exit opening at the bottom, an imperforate pivoted closure device for the exit opening from the said chamber, a surrounding casting spaced from the exterior of the said chamber, attachment means at the base of the said casting, a cylinder defined by the surrounding casting and the exterior of the feed chamber, an annular piston within the cylinder and movable axially under fluid pressure to bear on the closure device for the exit opening from the said chamber, and packing rings to which fluid pressure may be applied for sealing the spaces between the piston and the exterior of the feed chamber and interior of the surrounding casting.

5. Feed chamber assembly for the supply of pulverised and finely divided material to machines comprising a feed chamber open at the top and having an exit opening at the bottom, a cylindrical exterior wall of the feed chamber, a removable closure device for the exit opening, a sealing ring secured in the under surface of the closure device, a casting surrounding and spaced from the cylindrical wall of the feed chamber and supporting the said chamber, an inner cylindrical wall of the casting and the exterior wall of the chamber defining a cylinder, an annular piston guided in said cylinder, an attachment flange at the base of the surrounding casting, and a rigid attachment plate secured to the attachment flange and having a central opening co-axial with the exit opening of the feed chamber, said attachment flange and rigid attachment plate defining therebetween a space for accommodating the removable closure device be-

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low said exit opening with the sealing ring of the removable closure device bearing upon the upper surface of the rigid attachment plate so that, when the piston is forced down on to the closure device, an air-tight closure is made around the exit opening of the chamber.

6. Feed chamber assembly for the supply of pulverised and divided material to machines comprising an attachment plate adapted to be secured to the machine and having a central opening therein, an imperforate pivoted closure plate adapted when in closed position to cover the opening in said attachment plate, said closure plate being adapted for displacement towards or away from said attachment plate, a hollow feed chamber surmounting said attachment plate and spaced therefrom to permit pivotal movement of the closure plate, a bore in the feed chamber co-axial with the attachment plate opening, the upper and lower ends of said bore defining material feed and exit openings respectively of the chamber, a casting surrounding and spaced from the feed chamber and supporting it in position above the attachment plate, cylindrical exterior and interior walls of the feed chamber and surrounding casting respectively, which walls confront each other and define an annular cylinder, and an axially displaceable annular piston mounted in the cylinder where it slidably engages the confronting walls of the feed chamber and casting, said piston having a skirt which, when the piston is axially displaced in the cylinder towards the attachment plate, projects from the cylinder and bears upon the closure plate in its closed position to force the latter into abutment with the attachment plate.

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