

Nov. 25, 1958

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2,861,301

SAND BLAST MOLDING MACHINE

Filed Dec. 1, 1954

2 Sheets-Sheet 1

Fig. 1

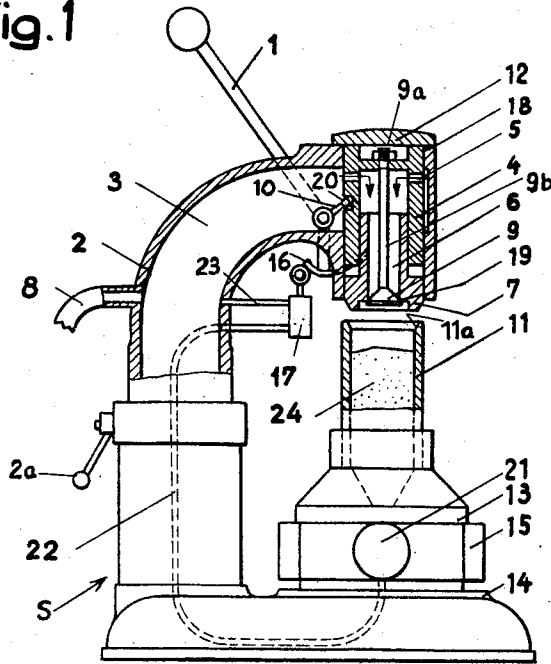


Fig. 7

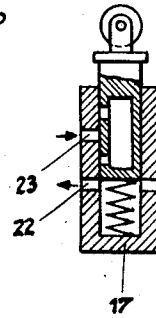


Fig. 2

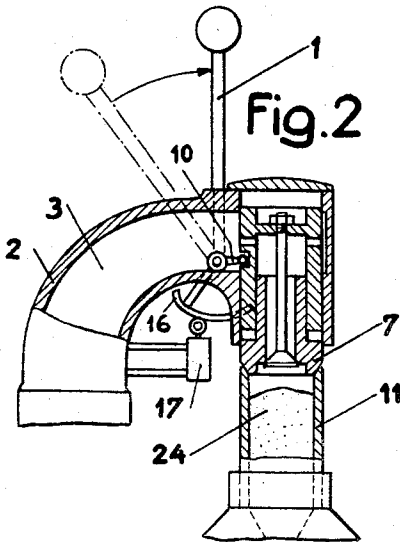
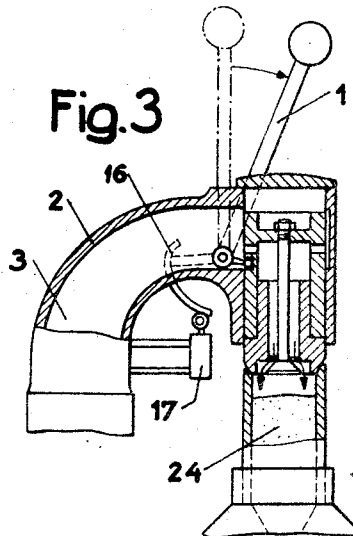


Fig. 3



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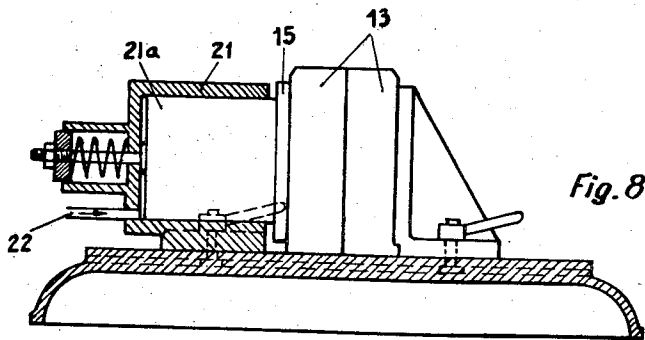
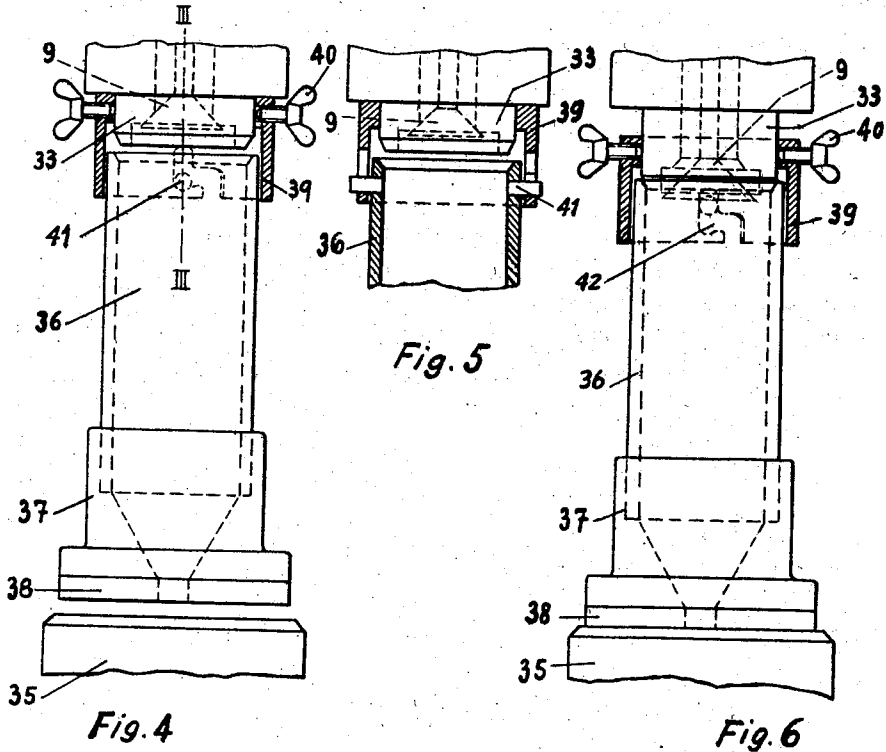
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SAND BLAST MOLDING MACHINE

Filed Dec. 1, 1954

2 Sheets-Sheet 2



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2,861,301

SAND BLAST MOLDING MACHINE

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Application December 1, 1954, Serial No. 472,451

Claims priority, application Switzerland December 5, 1953

5 Claims. (Cl. 22—10)

This invention relates to a sandblast molding machine equipped with a removable blasting sand storage hopper in particular for use in foundries.

In sandblasting machines of the aforesaid type conventionally used the following operations are successively carried out:

- (1) Pressing the molding box against the blast nozzle or valve;
- (2) Opening of the blast nozzle;
- (3) Closing of the blast nozzle;
- (4) Pressure relief and removal of the molding box.

In order to properly perform these operations at least two manipulating elements or a complicated and expensive control mechanism were heretofore employed.

The present invention overcomes these and other great deficiencies and disadvantages inherent in such known operational steps and has as one of its prime objects to provide means conducive to a considerable simplification in the structure and function of sandblast molding machines.

It is a further important feature of the invention to provide means affording high economy and speedy operation of sandblast molding machines, so that the production thereof may be markedly increased and accuracy of cast products derived therefrom will always be uniform.

It is another object of the present invention to provide means facilitating operation of a sandblast molding machine by means of a single control element, which acts on the blast valve, the sand hopper and other vital operable parts concomitant to such machine.

Still a further object of the present invention resides in the provision of means contributing to rapid centering of the valve body, core box, sand hopper and similar parts to be jointed or sealed to thereby reduce necessary manipulating steps of labor or operators to a minimum.

These and other objects and advantages will become apparent from the following description taken in conjunction with the accompanying drawings, wherein:

Fig. 1 shows a sandblast forming machine embodying the invention as seen in elevation and partly in section.

Fig. 2 is a section through the upper upright cap and blast valve shown in a median position of the actuating lever.

Fig. 3 is a section similar to that of Fig. 2, showing the valve in one end position of said actuating lever.

Fig. 4 is an enlarged fragmentary view of a portion of Fig. 1, shown partly in section.

Fig. 5 is an enlarged section taken along lines III—III of Fig. 4.

Fig. 6 shows a section similar to that of Fig. 4 with the sand hopper in blasting position.

Fig. 7 is an enlarged sectional view of a regulating valve employed in a machine embodying the invention.

Fig. 8 is an enlarged, partly sectional view of a core box clamping mechanism employed in a machine embodying the invention.

Referring now more particularly to the drawings, there is shown in Fig. 1 a sandblast forming machine S having

a hollow standard 2 which is adjustable in height in a well known manner by means of clamp handle 2a. The hollow inner space or chamber 3 of the upright 2 serves as an enclosure for compressed air used for blasting purposes. The supply of compressed air is effected through air inlet means 8. Within the head 18 of the upright 2 is disposed a displaceable or shiftable cylinder or sleeve 4, which is provided with air inlet means 5 and has further a cylindrical bore which is open at the lower end into which a valve bushing 7 may slide. A valve or valve cone 9 is suspended from the cylinder 4 at 9a and has a stem 9b coinciding with the longitudinal axis of the displaceable cylinder 4. Thus, the sleeve 4, the bushing 7 and the valve 9 together comprise a valve means whose operation is set forth hereinafter.

The valve bushing 7 is provided with a valve seat 19 and the displaceable cylinder 4 is provided with a recess or groove 20 into which extends a cam lever with cam piece or member 10 for operating said cylinder 4. Cap or lid 12 closes in an airtight manner the hollow head 18 of the upright.

On the molding board or table 14 there is disposed a supporting device 15 for the core box 13. On the core box 13 rests a cylindrical blasting sand hopper 11. The valve bushing 7 may be pressed against the corresponding seat 11a on blasting sand hopper 11 in order to close the upper opening thereof. Operatively connected with the pivotal hand lever 1 is a cam piece or member 16, which upon swivelling of lever 1 actuates a regulating valve 17, which operates accordingly a piston 21a within cylinder 21 for clamping core box 13 in desired position. Conduit 22 connects the regulating valve 17 with the cylinder 21 for compressed air and conduit 23 connects chamber 3 of the standard with the regulating valve 17. Instead of cylinder 21 with piston 21a, a compressed air operated membrane or diaphragm may be employed.

The sandblast forming machine according to Figs. 1 to 3 is operated in the following manner:

An empty core box 13 is placed on the supporting device 15 and thereafter a receptacle or hopper 11 filled with sand is placed above this core box. The operating lever 1 is then swung from its starting or end position (Fig. 1) into the median position, as shown in Fig. 2. As soon as the valve bushing 7 contacts sand-filled receptacle 11 a tight connection is obtained between parts 7 and 11. The valve cone 9 is at this position still closed on its seat 19; however, upon further swinging of operating lever 1 into a position shown in Fig. 3, a further displacement of cylinder 4 within the head of the upright occurs, so that compressed air under a pressure of from 2 to 6 atmospheres is directed from chamber 3 of the standard through air inlet means 5 and cylindrical space 6 which surrounds the stem of valve cone 9, and then through the now open passageway between the valve cone 9 and the valve seat 19 into said receptacle 11 as may be visualized from the arrows shown in Fig. 3. In other words the valve bushing 7 and the cylinder 4 are forced to move apart from each other by the air pressure prevailing inside the bushing, i. e. the valve bushing 7 presses against the valve cone 9. In this manner, by the downward movement of cylinder 4 the valve bushing 7 is pressed down by the sleeve until the bushing rests against the sand container 11. Only then do parts 4 and 9 move further in order to open the valve 9, admitting air into the sand container for the actual sand-blowing operation.

In the median position of lever 1, cam 16 is moved to actuate the regulating valve 17. The compressed air passing through conduits 23 and 22 then produces a clamping action by means of piston 21a movable in cylinder 21 on core box 13 and thus prevents opening of the latter while a subsequent stream or flow of sand takes place. The piston 21a of clamping device 21 presses sup-

port 15 against the core box 13 with a horizontal force. This is best illustrated in Fig. 8. The clamping effect on the core box takes place not only during the first portion of the swinging motion of lever 1, but also during the entire core-blowing operation, in order to keep the core box closed during the inrush of sand into the core box. The sand 24 stored in hopper or receptacle 11 is then forced by the admitted compressed air and with striking impact into the core box 13. Lever 1 is subsequently retracted to its starting position.

During this latter operation the valve cone 9 will be automatically closed and the displaceable cylinder 4 lifted to its initial position. Cam 16 thus releases regulating valve 17, so that compressed air may escape from conduit 22 and cylinder 21. The supporting device 15 releases core box 13, as soon as lever 1 has returned to its starting position. The core box 13 and the sand hopper or receptacle 11 may then be removed from the machine, which is thus again readied for a new blasting operation.

A particular mode of execution of the invention makes use of the fact that the valve head, which is movable and contains the blasting valve, is provided with a centering closure mechanism for a centered suspension of the sand receptacle, as more clearly disclosed in Figs. 4 to 6. According to Fig. 4 a sleeve member 39 is fixed by means of wing screws 40 on the valve head 33 (which corresponds to the valve bushing 7 of Figs. 1 to 3) to form centering means. The coupling of the sand receptacle 36 with the valve head 33 is effectuated through pins 41 movably insertable into bayonet slots 42 of sleeve member 39.

The sandblast molding machine with its centering means according to Figs. 4 to 6 operates as follows:

An empty blasting form core box 35 is inserted below blasting plate 38. Receptacle 36 previously filled with sand is then coupled by means of pin and bayonet slot connection 41, 42 with centering sleeve 39. The operating lever 1 is then swung from its starting position, as shown in Fig. 1, to a position in which valve head 33 with the centering sleeve 39 together with sand receptacle 36 will be seated onto blasting form core box 35. Fig. 5 shows the position of receptacle 36, blast head 37 and blast plate 38 in a position before same are lowered. Fig. 6 shows the aforesaid parts after the lowering operation with the plate 38 set onto the blast form 35.

The present invention permits by the use of centering and sealing means to empty the sand hopper through blasting in the course of several blasting operations, or to only employ for core boxes the sand receptacle once, centering thereof taking place automatically and airtight connection being established between the sand hopper and valve head. Thus the operator has both his hands free after insertion of the sand hopper to carry out other operational steps.

As centering and closure or sealing means other elements than those shown and herein disclosed may be employed as, for instance, clamp springs or electro-magnets.

The combination centering-closure means permits the removal of the sand receptacle after each blasting operation from the valve head. The sand receptacle will be de-aerated and simultaneously, in the position of rest, a required play between blasting plate and blasting form is afforded.

Instead of the mechanical transmission of force by means of an operating lever actuating the displaceable cylinder and the valve cone, actuation may also be obtained by means of regulatable compressed air. In such arrangement the operating lever forms a regulator acting onto special compressed air valve means. It is desirable that for closing the blasting valve a compression spring be employed. The oscillatable or swingable operating lever may be actuated by any known compression or electrical means, the release movement thereof being brought about either manually or by means of a foot pedal.

The supporting device for the core box may also be electrically actuated. In such case a cam is connected with

the swingable lever, which upon swinging movement thereof trips a contact to operate an electro-magnetic device for clamping the core box into desired operative position.

5 Various changes and modifications may be made without departing from the spirit and scope of the present invention and it is intended that such obvious changes and modifications be embraced by the annexed claims.

Having thus described the invention, what is claimed 10 as new and desired to be secured by Letters Patent, is:

1. A sand blast molding machine, comprising a standard and a support thereon, compressed air supply means, compressed air-actuated clamping means located on said support for clamping a core box in position thereon, conduit means interconnecting said supply means and said clamping means, a control valve operatively connected to said conduit means for regulating flow of compressed air from said supply means to said clamping means, a hopper for delivering sand and positionable on said core box 15 when the latter is placed on said support, said hopper being provided with a first opening at its bottom to communicate with the interior of said core box and being further provided with a second opening at its top, valve means comprising a sleeve, a valve bushing and a valve carried by said standard for movement toward and away from said hopper when the latter is positioned on said core box, said valve means communicating with said supply means and said valve bushing being adapted when moved toward said hopper to first close said second opening from the surrounding atmosphere and said valve being 20 then adapted to admit compressed air into said hopper from said supply means, and single means arranged for pivotal movement on said standard and provided with a first member operatively connected to said control valve for actuating the latter and thus said clamping means during said pivotal movement of said single means, said single means being further provided with a second member operatively connected to said sleeve for moving the latter toward said hopper during said pivotal movement 25 whereby sand may be blown from said hopper into said core box by said compressed air.

2. A machine according to claim 1, further comprising pin and slot means interconnecting said valve means and said hopper, whereby said hopper is retained in centered alignment with said valve means and said core box when the latter is located on said support, said pin and slot means simultaneously permitting predetermined relative movement between said valve means and said hopper 30 when the latter is positioned on said core box.

3. A sand blast molding machine comprising a standard, a chamber in said standard for supplying compressed air, supporting means on said standard, clamping means on said supporting means and constructed for actuation by compressed air to clamp a core box in position when said core box is placed on said supporting means, a sand hopper having inlet and outlet openings, said outlet opening communicating with said core box when the latter is on said supporting means, valve means including a valve and a displaceable valve bushing on said standard, said valve bushing being adapted to close and open said inlet opening with respect to the surrounding atmosphere, said valve being adapted to permit admission of compressed air from said chamber to said hopper when said inlet opening is closed by said valve bushing and said valve is open, conduit means interconnecting said chamber and said clamping means, a control valve in said conduit means for regulating the flow of compressed air therethrough, said control valve including an operating element, and single actuating means movably mounted on said standard and in mechanical engagement with said operating element of said control valve and with said valve bushing of said valve means to sequentially actuate first said clamping means to clamp a core box on said supporting means, then said valve bushing to thereby close said inlet opening, and finally said valve to open the same, said valve means and said clamping means being returned to respec- 75

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tive starting positions, successively, when said actuating means is returned to its starting position.

4. A machine according to claim 3, further including pin and slot means interconnecting said hopper with said valve bushing for centering said hopper with respect to said valve means and said core box.

5. A core-blowing machine comprising a standard, a support thereon for a core box, compressed air supply means, compressed air-actuated clamping means located on said support for clamping said core box in position thereon, conduit means interconnecting said supply means and said clamping means, a control valve operatively connected to said conduit means for regulating flow of compressed air from said supply means to said clamping means, a hopper for delivering sand and positionable on said core box when the latter is placed on said support, said hopper being provided with a first opening at its bottom to communicate with the interior of said core box and being further provided with a second opening at its top, valve means comprising a sleeve, a valve bushing and a valve carried by said standard for movement toward

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and away from said hopper when the latter is positioned on said core box, said valve means communicating with said supply means and said valve bushing being adapted when moved toward said hopper to first close said second opening from the surrounding atmosphere and said valve being then adapted to admit compressed air into said hopper from said supply means, and means common to said valve means and to said control valve for initially actuating the latter and thus said clamping means and for subsequently moving said sleeve toward said hopper, whereby sand may be blown from said hopper into said core box by said compressed air.

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