June 28, 1955 A. H. PETERSON 2,711,566

SIDE CLAMP FOR CORE BOXES

Filed Jan. 30, 1951 2 Sheets-Sheet 1

Fig. 1.

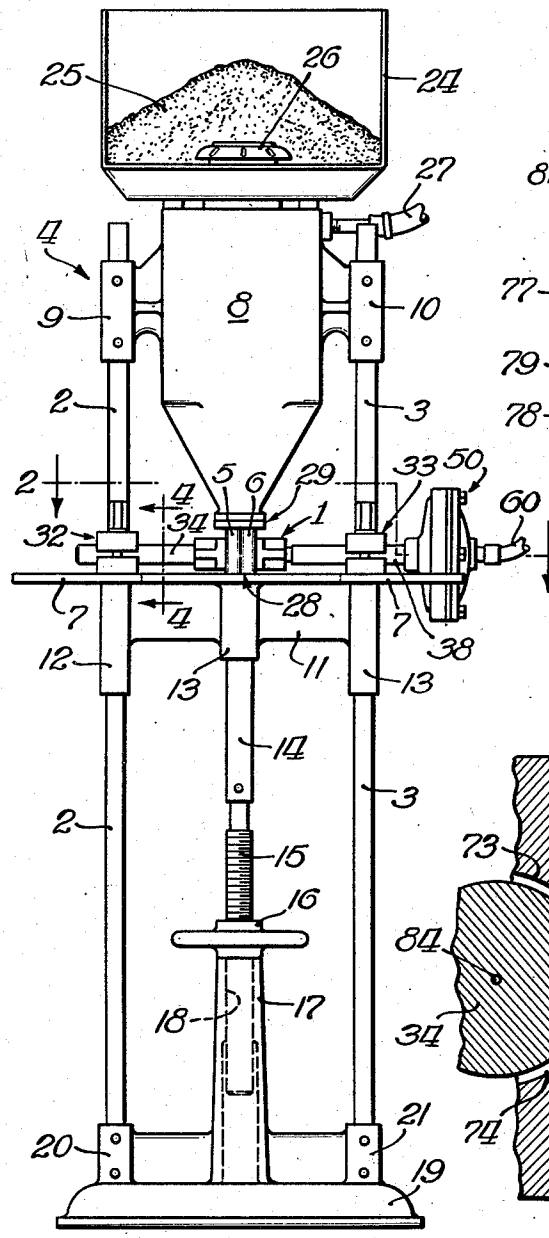


Fig. 4.

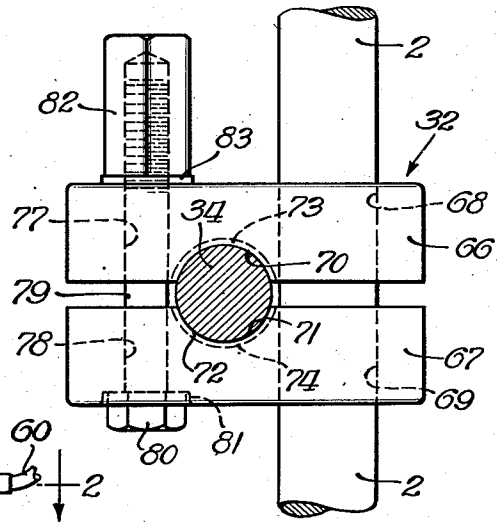


Fig. 5.

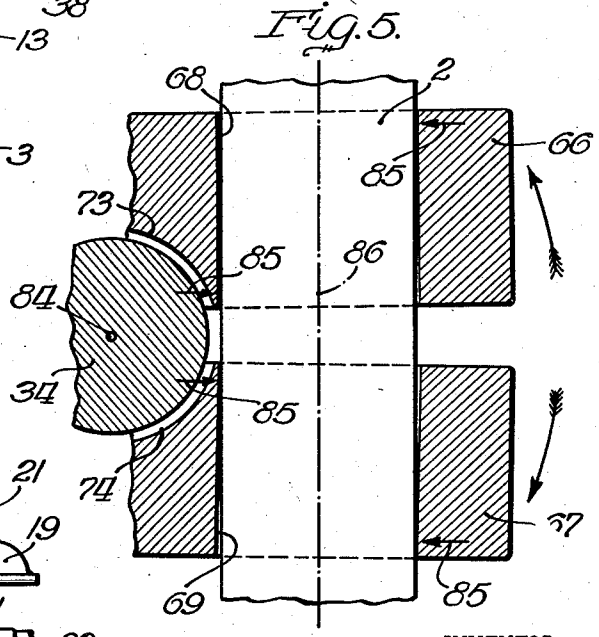
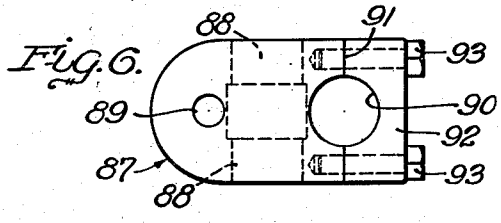


Fig. 6.



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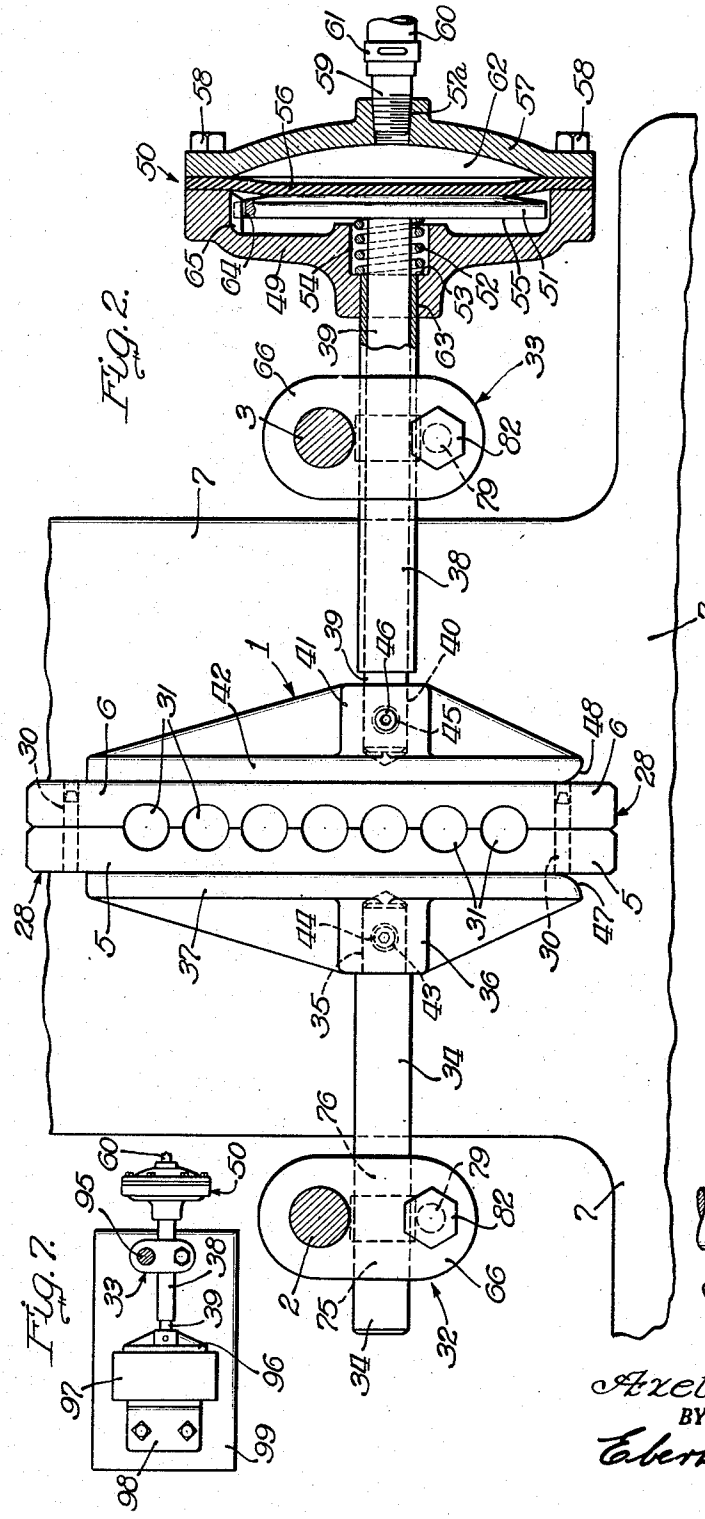


Fig. 2.

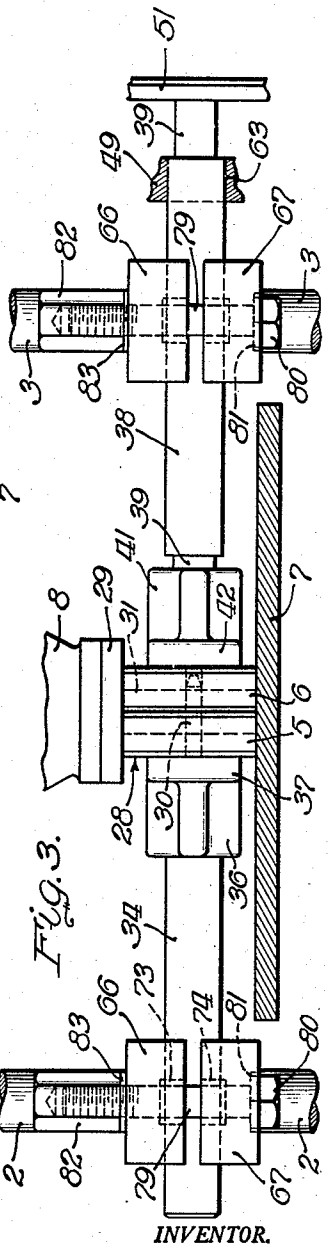


Fig. 3.

Fig. 7.

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United States Patent Office 2,711,566
Patented June 28, 1955

2,711,566

SIDE CLAMP FOR CORE BOXES

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Application January 30, 1951, Serial No. 208,565

2 Claims. (Cl. 22—10)

This invention relates to a work holding clamp universally applicable to a great many uses in shop work.

More specifically, the invention relates to a side clamp arranged for connection with a core making machine and functioning to clamp the sides of split core boxes having vertically disposed parting surfaces.

Past practice has brought about many forms of clamps to hold vertically split core boxes. Most of these clamps are anchored directly to the work supporting table requiring various fastenings such as a plurality of bolts, nuts and studs or more complicated forms of fasteners. A great many tables are specially designed with apertures, etc. to provide clearances for mounting the core box clamp arrangements. Furthermore, side clamps for core boxes should be quickly movable or readily shiftable into out-of-the-way positions since they are not used when a core making machine is set up for blowing horizontally split core boxes. And side clamps should be adjustable vertically and horizontally for accommodating various sizes of core boxes. Many clamps that are now in use are adjustable in one direction, horizontally, but not vertically relatively to the core box supporting table. Only the more complicated clamps do have vertical and horizontal adjustment but these are usually made as part of the regular equipment of core making machines used specifically for blowing cores in vertically split core boxes.

One of the objects of this invention is to provide a side clamp for vertically split core boxes that is not supported by the table or other core box supporting means of the core making machine.

Another object of this invention is to provide a side clamp for core boxes which is readily attachable to at least two posts of a post frame core making machine.

Another object of this invention is to provide a side clamp having only one fastening element at each post to fix all of the other connected cooperative clamp parts in operative position for engaging a core box.

Still further objects of this invention are to provide a clamp arrangement at each post that universally permits vertical adjustment of the clamp parts and/or horizontal adjustment thereof; and to also provide means so that each adjustment of the parts at each post can be efficiently and quickly brought about to fix the parts in a predetermined position by the use of a single bolt; and the clamp structures are each readily loosened and shiftable into out-of-the-way positions along the posts and there clamped while the machine is used for blowing horizontally split core boxes when that becomes desirable.

Other objects and advantages relating to the side clamp construction of the present invention shall hereinafter appear in the following detailed description having reference to the accompanying drawings forming a part of this specification.

In the drawings:

Fig. 1 is a front elevational view of a core making machine embodying the side clamp of the present invention which is illustrated in operative position holding a core box in sand receiving position;

Fig. 2 is a fragmentary plan sectional view taken substantially along the line 2—2 in Fig. 1 illustrating the side clamp of the invention in greater detail;

Fig. 3 is a front elevational view of the side clamp illustrated in Fig. 2, portions thereof being broken away and in section;

Fig. 4 is a side view of one of the post clamp assemblies of the side clamp substantially as viewed along the line 4—4 in Fig. 1;

Fig. 5 is a diagrammatically illustrated sectional view of a fragmentary portion of the post clamp of Fig. 4 to better illustrate the clamping action of the parts adjacent the post shown in Fig. 1;

Fig. 6 is a plan view of one of the post clamp parts showing a modified construction thereof; and

Fig. 7 illustrates a plan view of another clamping arrangement wherein a single clamp unit is secured to a single post of a machine with a simple adjustable back stop used to hold the work in place upon a table or support which stop coacts with the single clamp.

This invention in its broader sense comprises a clamp that may be used to hold various objects to be worked upon in a shop or factory. More specifically, the clamp arrangement comprises a means that is easily attached to any machine having at least two standards or a double post frame to which the clamping members may be attached. It is also possible in some instances to apply a single clamp to a single post as will be explained.

A more specific illustration, by way of example, of the use of the side clamp is portrayed in Fig. 1 wherein the clamping arrangement 1 is connected with a pair of upright posts 2 and 3 forming integral parts of the core making machine 4. The clamping arrangement 1 comprises side clamps for the core box halves 5 and 6 may, therefore, be used in any machine having at least two uprights or other similar standards, and more particularly, the clamping arrangement is used with any core making machine having a table or other support 7 arranged in cooperative relation with respect to a sand blowing head 8 and in any such machine wherein the table 7 and the sand blowing head 8 are disposed for relative movement with respect to each other.

The core making machine 4 illustrated in Fig. 1 more specifically has the head 8 secured through sleeves 9 and 10 to the uprights 2 and 3 and in this construction, these uprights or posts are cylindrical rods. The table 7 is provided with a supporting structure 11 having sleeves 12 and 13 slidably carried upon posts 2 and 3 and the supporting structure 11 has a central sleeve 13 to which is secured a depending rod or sleeve 14 secured to a threaded screw 15. Screw 15 is supported through a threaded hand wheel 16 that rests upon the end of an abutment sleeve 17, and the threaded screw 15 slidably passes through an opening 18 in the abutment sleeve for vertical guidance. The abutment sleeve 17 forms a portion of a base 19 which has vertical bosses 20 and 21 that securely receive and fix the positions of the posts 2 and 3 with respect to the base and to the supporting surface upon which the machine rests.

A sand supply hopper 24 is suitably carried above the sand blowing head 8 and this hopper holds a quantity of sand 25 available for entry into the sand blowing head 8 through a conventional capped feed duct 26 which is opened at intervals to admit sand when necessary. An airline 27 is connected with the head 8 for the admission of air under pressure at selected intervals for blowing sand into the halves 5 and 6 of the core box 28. Admission of sand to the core box 28 is usually controlled by means of a blow plate 29 which has openings formed

therein for alignment with corresponding openings in the core box 28.

The core box 28 is a typical example of a vertically split box having the sections 5 and 6 as above described, and as best illustrated in Fig. 2 this box is provided with alignment dowels 30 and with a plurality of core sand receiving openings 31. The openings 31 form cylindrical cores which are limited in height by means of the table 7 supporting the core box 28 and by means of the blow plate 29 forming part of the head 8. The vertical clamp action of the core box is produced by raising the table 7 through means of the threaded hand wheel 16 and screw 15 which places the core box in the receptive position for sand as illustrated in Figs. 1, 2 and 3. The vertical clamping action upon the core box is readily released by a turn of the wheel 16 so that the core box 28 is easily removed and subsequently replaced by another to repeat the sand blowing operation.

Core boxes such as 28 comprise vertically split boxes which must also be clamped on the sides to normally maintain the two halves such as 5 and 6 of the box together to receive the sand under pressure from the head 8 under the action of air under pressure admitted through the airline 27.

With the clamping arrangement of the present invention as best illustrated in Figs. 1, 2 and 3, it should be noted that the side clamp 1 is solely mounted upon the two posts 2 and 3 by means of post clamps 32 and 33 that are of identical construction to be interchangeable or replaceable by like units. Each of the post clamps 32 and 33 supports the entire clamping arrangement independently of the movement of the table so that the side clamps are always available in proper position to clamp a particular core box such as 28 whenever such a box is placed into position upon the table 7 and forced upwardly against the blow plate 29 of the sand blowing head 8.

As best seen in Figs. 2 and 3, the post clamp 32 supports a horizontal rod 34 that terminates in a reduced end 35 socketed within a boss 36 comprising an integral part of the clamp foot 37.

The post clamp 33 functions to clamp a sleeve 38 in a horizontal position and to provide a tubular guide means to support a rod 39 for sliding movement within said tube 38, and the rod 39 is socketed at 40 in a boss 41 forming an integral portion of a clamp 42.

It should be noted that the clamp foot 37 and the clamp foot 42 are of identical construction with boss 36 of the clamp foot 37 having a threaded opening 43 to receive a set screw 44 from underneath to fix the position of the foot upon the reduced end 35 of the rod 34; while the boss 41 of the clamp foot 42 has a threaded opening 45 shown on top of the boss to receive a set screw 46 to lock the foot 42 upon the end of the rod 39. Both of the feet 37 and 42 have rounded ends 47 and 48 adjacent their clamping surfaces and facing the front of the machine to facilitate placing the core boxes into the space between the clamps.

As seen at the right hand end of Fig. 2, rod 39 extends into the casing 49 of a pneumatic diaphragm cylinder 50, and this rod forms a part of or is secured to a diaphragm head 51 which is normally urged to the right in Fig. 2 by means of a spring 52 confined between the shoulder 53 in a bore 54 and the adjacent face 55 of the diaphragm head 51. A flexible diaphragm 56 is clamped against the casing 49 by means of the cap 57 and the bolts 58. Cap 57 has a threaded opening 57*a* to receive a nipple 59 arranged for connection with a flexible airline hose 60 clamped to the nipple by suitable means such as 61.

As illustrated in Fig. 2, the diaphragm 56 is flexed to the left in operative position by means of air under pressure being admitted to the cavity 62 through the flexible hose 60, under which conditions the head 51 is forced to the left moving the rod 39 through the sleeve 38, the latter being fixedly secured within a bore 63 to the casing 49 of the pneumatic power cylinder 50. Release of the air pressure in the cavity 62 will permit the spring 52 to move the head 51 to the right in Fig. 2 flexing the diaphragm 56 to the right, which action draws the rod 39 to the right through the sleeve 38, obviously carrying the foot 42 to the right to release the clamp and to free the core box from the side holding thrust of the feet 37 and 42.

It should also be noted that the head 51 is provided with a notch 64 which receives a ridge 65 forming a part of the casing 49, so that the head 51 may be permitted to move axially with the rod 39, but relative rotation between the rod 39 and the sleeve 38 is prevented by means of the slot and ridge described.

Each of the post clamps 32 and 33 is of identical construction so that the description of one will suffice for both. Referring therefore to Fig. 4, which illustrates the post clamp 32, this clamp comprises a pair of coacting blocks 66 and 67 having aligned vertical bores 68 and 69 through which these blocks are vertically positioned for sliding movement upon the post 2. Each of the blocks 66 and 67 also contains corresponding partial bores 70 and 71 which together are adapted to coincide with the outer peripheral surface 72 of the rod 34. In addition, each of the blocks contains central clearance recesses 73 and 74 to produce better grasping action at lateral points on the rod 34 as indicated generally at the areas 75 and 76 shown to the left in Fig. 2.

Each of the blocks 66 and 67 are further provided with aligned openings 77 and 78 to receive a bolt 79 therethrough. Bolt 79 has a hex head 80 held against rotation within a hexagonal recess 81 in the adjacent face of the block 67. An elongated cap nut 82 is threaded upon the end of the bolt 79 against the upper surface of block 66 and preferably a washer 83 is interposed between the cap nut 82 and the adjacent face of block 66.

By tightening the cap nut 82 pressure is exerted against the opposite outward faces of the blocks 66 and 67 when considered in relation to the rod 34, thereby acting to tighten the partial bores 70 and 71 upon the rod 34 and at the same time cocking the normally free ends of the blocks 66 and 67 at post 2 as illustrated in exaggerated form in Fig. 5. The axial center 84 of rod 34 as shown in Fig. 5, therefore, provides a fulcrum point around which both of the blocks tend to shift separating their ends along the post 2 as they are forced together adjacent the bolt 79. The clamping action is such that the two blocks rotate upon the rod 34 until the binding action of each block at the points indicated by arrows 85 forcibly halts this rotation setting the two blocks thereafter into a tight gripping action against the rod 34.

As illustrated in Fig. 5, the axial center line 86 of the post 2 is very close to the axial center of the rod 34 to prevent and forcibly counteract any rotation of the post clamp about the axial center line 86 of the post 2 under the action of the clamp feet 37 and 42 when power operated by means of the pneumatic diaphragm cylinder 50.

The post clamp 33 operates substantially in the same manner except that the latter clamp engages the sleeve 38 which is of the same diameter as the rod 34 and the diaphragm cylinder 50 operates the rod 39 endwise through the sleeve 38.

It should also be understood that the internal diameters of the bore 68 in block 66 and 69 in block 67 are fairly close to the external diameter of the post 2 to permit vetrically sliding adjustment of the blocks 66 and 67 but that at the same time a very small amount of pressure is necessary through the bolt 79 and cap nut 82 to lock the post clamp unit in rigid relation to the post 2.

Since the blocks 66 and 67 are preferably of cast metal and must necessarily be assembled endwise upon the posts of the core making machine 4 prior to the addition of the head 8, Fig. 6 illustrates a clamp block which has a separable end adjacent the post bore therein to

facilitate quickly installing this block upon the post without requiring disassembly of any of the machine parts or necessitating prior assembly of the block before complete assembly of the machine is accomplished. The Fig. 6 construction comprises the cast block **87** containing aligned cross bores **88** to receive a rod **34** and also having a vertical bore **89** for the bolt **79**. This block, however, terminates with a bore **90** that is divided at **91** on a plane radially disposed with respect to the bore **90**. Block **87**, however, is completed by a removable cap **92** which is bolted at **93** to the main body portion of the block **87** to thus provide a separable end so that the block may be quickly assembled about one of the posts of a core making machine. In all other respects, this block and a companion block will operate and function in the same manner as do the blocks described and illustrated in Figs. 4 and 5.

As above described, both of the post clamps **32** and **33**, which are of identical construction, have been shown as applied with the individual block ends fulcruming about the horizontal rods **34** and **39**, thus clamping the vertical posts **2** and **3**. It is to be understood that the same blocks may be used in reversed order so that, as an example with reference to Fig. 4, the partial bores **70** and **71** in the blocks **66** and **67** may be applied to grasp the vertical post **2** with the rod **34** positioned through the aligned bores **68** and **69** in these blocks. This can be done with no change in the entire structure, and by tightening up on the cap nut **82** these blocks will fulcrum about the post **2** and will be caused to grasp the rod **34**, thus producing the same clamping action as in the explanation above made with reference to the post clamp **32**. By using the blocks in the reverse order just defined, it will be easy to release the entire clamp unit from the post **2** for moving the clamping mechanism out of the way when not required in the core making process. This same reversal of use is equally applicable to the post clamp unit **33**.

It may be necessary under certain conditions to use an individual clamp of the present construction when the attachment is made to only one post or when a machine is provided with only a single upright or post. Fig. 7 shows such an arrangement wherein the machine has a single post **95** to which the right hand clamp of Fig. 2 may be bodily secured with clamp **33**. In this use, a suitable foot **96** may be secured to the rod **39** and foot **96** is actuated against a work piece **97** by cylinder **50** with the work piece braced against any suitable back stop such as **98** which here comprises an angle piece secured to a rigid part of the machine **99**.

Changes and variations are contemplated in the exact structure described and illustrated without departing from the fundamental concept of this invention. Such modifications and deviations shall, however, be governed by the breadth and scope of the appended claims directed to the core box side clamp of the present invention.

What I claim is:

1. A core blowing machine comprising a sand blowing head and a core box supporting table each having guide means slidably mounted on a pair of vertically arranged round supporting posts, adjusting means for shifting said table along said posts relative to said head, a core box clamping structure to fix the position of a core box with respect to said table and to said sand blowing head, said clamping structure comprising a pair of mechanisms each independently and adjustably connected with one of the round supporting posts, the first mechanism providing a horizontal rod carrying a foot for contact with one side of a core box and having a pair of separable blocks apertured to simultaneously grip one of said vertical posts and said horizontal rod with screw fastening means arranged to cause said blocks to effect their gripping action, and the second mechanism providing a horizontal tube fixedly secured to an air operated unit having an air actuable member, a horizontally disposed rod freely and movably disposed within said tube and having a core box engaging foot at one end and an operative connection with said actuable member of the air operated unit at its other end, and a pair of separable blocks apertured to simultaneously grip the other of said posts and said horizontal tube, and screw fastening means arranged to cause the latter separable blocks to effect their gripping action.

2. In a core box clamping structure of the type characterized in claim 1, but wherein coacting stop members are connected with said freely movable foot rod and said air operated unit respectively and so constructed and arranged to permit relative axial movement between said freely movable foot rod and said tube, but to counteract relative turning action between said latter rod and said tube to maintain the foot associated with said rod in a given relation with respect to said table and sand blowing head.

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