Dec. 20, 1960 I. D. OLSON ET AL 2,964,820

CASTING JIG

Filed July 10, 1957 3 Sheets-Sheet 1

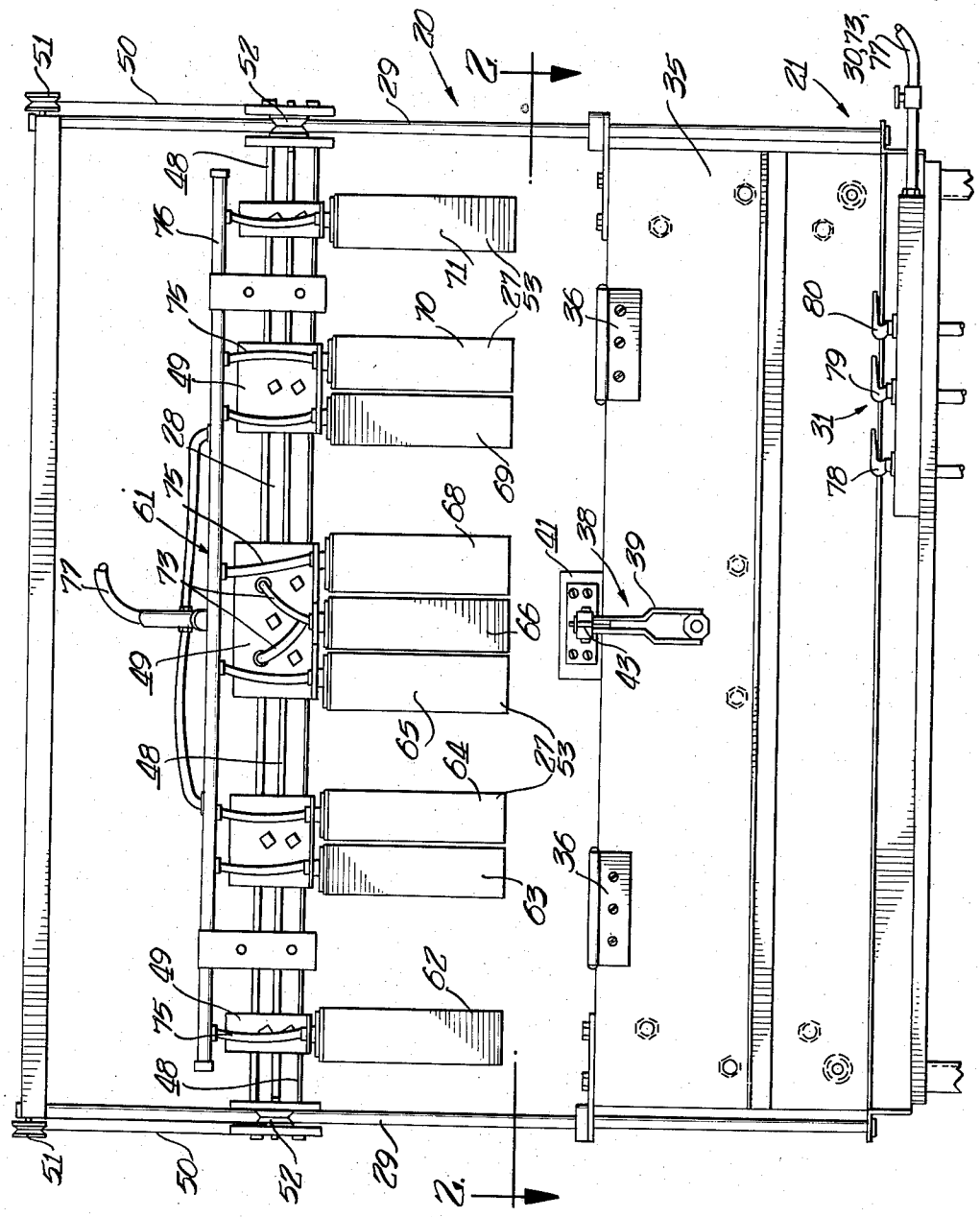


Fig. 1.

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CASTING JIG

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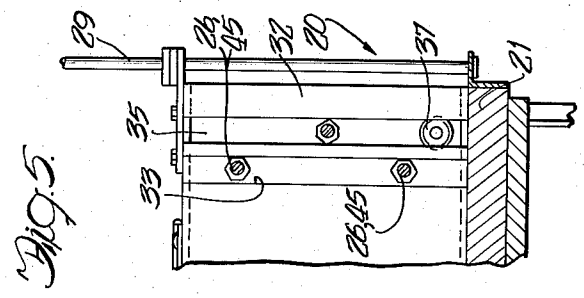


Fig. 5.

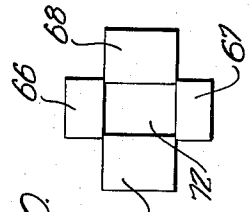


Fig. 10

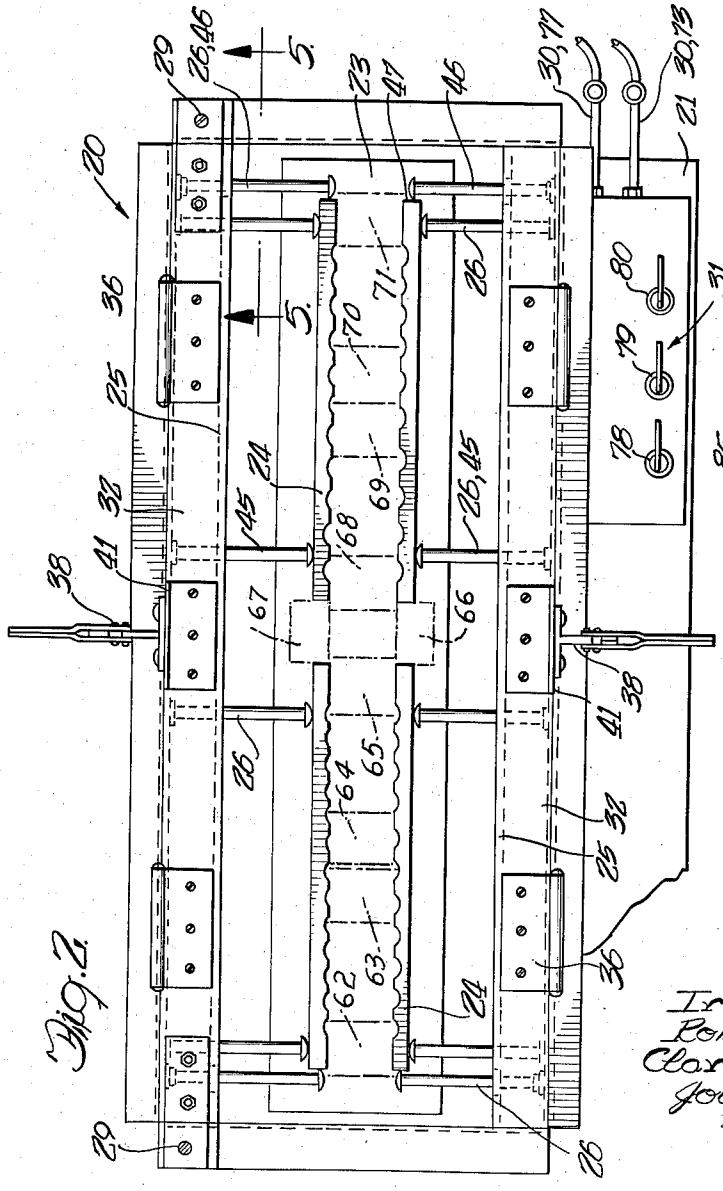


Fig. 2.

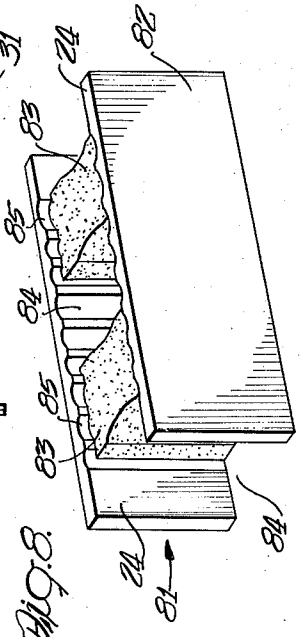


Fig. 8.

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CASTING JIG

Filed July 10, 1957 3 Sheets-Sheet 3

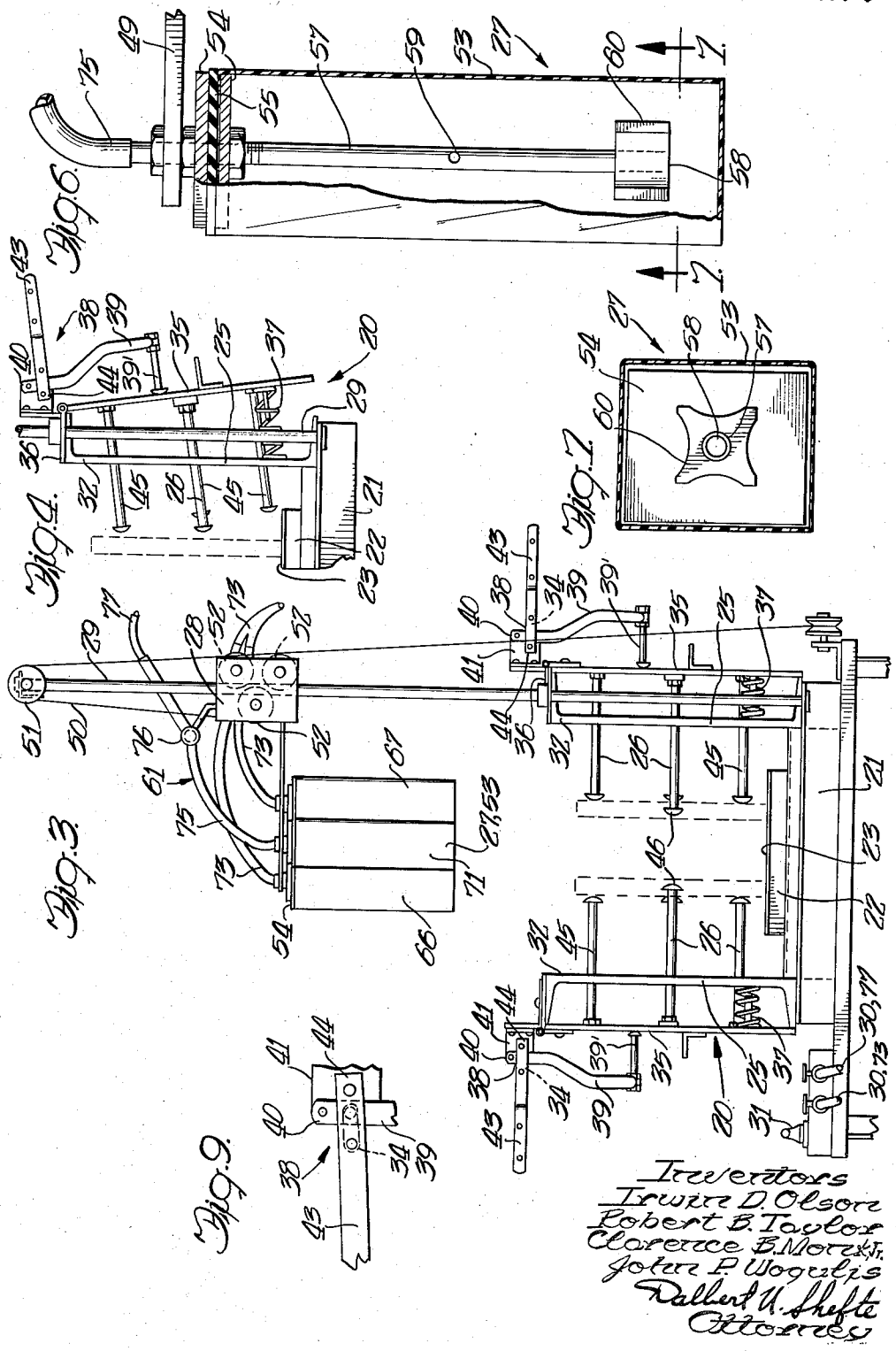


Fig. 6.

Fig. 4.

Fig. 7.

Fig. 3.

Fig. 9.

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CASTING JIG

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6 Claims. (Cl. 25—121)

This invention relates to a casting jig, and more particularly, to a jig for casting slabs into integral units having cores therein.

Of the many various materials adapted for use in building walls, one of the most desirable is glazed, structural clay tile. Glazed facing tile units are especially in demand for laboratory walls and partitions, food-handling rooms and other areas where cleanliness and durability are to be combined with pleasing appearance.

The most desirable facing tile unit would be one which could be used without other structural elements to form either an outside wall or an inside partition, and as ordinarily both exposed faces are desired to have glazed surfaces, a double-faced unit is required.

Double-faced units can be produced by glazing both sides of a single unit, but this ordinarily limits the units to a single surface texture on both sides, and more important, the irregular shrinkage resulting from the glazing process tends to alter the dimensions of the units so that both sides cannot be held to an exact tolerance. The best wall construction made from these units is a smooth, accurate surface on one side and an uneven, jagged surface on the other side. This, of course, is very undesirable for most building purposes where both surfaces should be smooth.

At the present, the only acceptable method of building tile walls having glazed surfaces on both sides is to use separate units on each side of the wall which costs approximately twice as much as a single width wall because of increased labor costs. Also, using two units the thickness of the wall is increased reducing the size of the rooms, and when thin units are used to keep the thickness down to a minimum, they are extremely difficult to lay, great care being necessary to hold them in position while mortaring.

The ideal but heretofore unobtainable individual glazed tile unit would be one having two glazed surfaces having tolerances within a standard range capable of use to form a wall of single unit thickness without additional structural elements and capable of being produced in different colorings and textures on the opposing surfaces. Further, the units should have cores which mate with the cores of adjacent units to provide the wall with coring for wiring, conduits, reinforcing rods or the like, and if possible, there should be coring running both vertically and horizontally.

The present invention provides a jig into which single-faced slabs are placed opposite one another and alined by the jig. Spacing members are insertable between the slabs to hold them in position and to form with other elements of the jig the walls of a cavity into which a bonding material such as fast-setting grout may be poured to bond the slabs into an integral unit having vertical cores determined by the space occupied by the spacing members and horizontal cores determined by the level of the bonding material.

With this jig, slabs of any texture or coloring can be combined, and the slabs can be pre-selected so as to be within any desirable dimensional tolerance.

The general object of the present invention is to provide a new and improved casting jig.

Another object of the present invention is to provide a new and improved jig for casting slabs into an integral unit having cores therein.

A further object of the present invention is to provide a jig of the type described having spacing members which are insertable between the slabs to urge them against alining members.

Yet another object of the present invention is to provide a jig of the type described in the preceding paragraph wherein the spacing members are inflatable to hold the slabs in position and deflatable to permit unobstructed removal from the jig.

Yet a further object of the present invention is to provide a jig as described, having alining members movable into engagement with the slabs to hold them during the casting, and movable out of engagement with the slabs to permit removal of the cast unit.

Still another object of the present invention is to provide a jig as described herein with inflatable spacing members, each having a rod extending therein, through which air passes to inflate or deflate the spacing member, the rods having enlarged ends within the spacing members to insure deflation of the spacing members about the enlarged end to prevent the deflated spacing member to contact portions of the adjacent unit.

A still further object of the present invention is to provide a jig as described which forms a cavity between the slabs for receipt of bonding material which binds the slabs into an integral unit.

Yet another object of the present invention is to provide a jig wherein the spacing members provide vertical cores in the cast unit and the vertical cores are determined by the amount of the bonding material used.

A further object of the present invention is to provide a jig as described wherein unit is cast on a pallet to facilitate removal and handling of the unit after casting.

Other and further objects and advantages of the present invention are readily apparent from the following description and drawings in which:

Fig. 1 is a side elevation view of one embodiment of the casting jig of the present invention;

Fig. 2 is a horizontal sectional view taken along line 2—2 of Fig. 1, the inflatable bags being shown schematically by dot-dash lines;

Fig. 3 is a side elevational view of the device of Fig. 1;

Fig. 4 is a partial side elevational view similar to Fig. 3, but with the elements in a different position;

Fig. 5 is a vertical sectional view taken along line 5—5 of Fig. 2;

Fig. 6 is a side elevational view partially in section of an inflatable spacing member of Fig. 1;

Fig. 7 is a horizontal sectional view taken along line 7—7 of Fig. 6;

Fig. 8 is a perspective view of an integral unit cast in the jig of Fig. 1;

Fig. 9 is an enlarged partial side elevational view of the locking mechanism shown in Fig. 3; and

Fig. 10 is a bottom view of the center spacing members of the device of Fig. 1.

While this device is susceptible of embodiments in many different forms, there is shown in the drawings and will herein be described in detail one specific embodiment, with the understanding that the present disclosure is to be considered as an exemplification of the principles of the invention and is not intended to limit the invention to the embodiment illustrated. The scope of the invention will be pointed out in the appended claims.

Referring now to the drawings, the casting jig, shown generally as **20**, consists of a support **21** having a wooden base **22** for the support of a pallet **23** upon which slabs **24** are placed to be cast into integral units. The support has upstanding sides **25** to which movable, aligning or side members **26** are attached for engagement with the slabs **24**. Above the support **21**, spacing members **27** are movably mounted for insertion between the slabs. The spacing members **27** are attached to a rack **28** which is movably supported and guided by upstanding rods **29**. Air conduits **30** lead from controls **31** which control the inflation and deflation of the spacing members **27** by alternately introducing air under pressure to inflate the spacing members and evacuating the air to deflate the spacing members.

Turning now to the sides **25** of the support **21**, it is seen from the figures in more detail that these sides consist of channels **32** having vertical slots **33** to permit movement of the aligning member **26** illustrated in the drawings as lugs which are attached to hinged plates **35**. These plates are attached to the top of the side channels **32** by means of hinges **36**, and thus are movable outwardly away from the side channels. Coil springs **37** are attached to the plates **35** and engage the side channels to urge the plates outwardly therefrom.

A locking mechanism **38** is provided to lock the plates **35** into engagement with the side channels **32**. This mechanism consists of a plate engaging link **39** having one end **40** pivotally attached to a flange **41** on the side **25**, and the other end **39'** contacting the plate **35**. Adjacent the end **40**, a locking link **42** is pivotally attached and extends outwardly for pivotal attachment to the locking handle **43**. The locking handle has one end **44** pivotally attached to the flange **41**. The links are so arranged that when in a locked position, as shown in Fig. 3, the locking link **42** would normally urge the operating handle downwardly as the spring urges the plate **35** away from the side channel **32**. Thus the operating handle is prevented from moving upwardly, and the plate **35** is locked in the slab engaging position.

To unlock the locking mechanism, the locking handle **43** is moved upwardly until the locking link **42** is forced out of the locking position permitting the spring to urge the plate **35** away from side channel **32** as shown in Fig. 4. An enlarged view of the locking mechanism is shown in Fig. 9.

The aligning lugs **26** which extend from the hinged plates **35** through the slots **33** in the side channels are positioned so as to contact the slabs **24** and hold them in place for the casting of a unit having exact dimensional tolerances. This is accomplished by having center lugs **45** in contact with the faces of the slabs to control the thickness of the cast unit, and end lugs **46** in contact with the ends **47** of the slabs to provide a cast unit with ends perpendicular to the faces.

In the jig shown in the drawings, two units are cast simultaneously, and in the embodiment shown, end lugs **46** are provided only at the outer ends of the jig, the inner ends of the slabs being aligned by two of the inflatable spacing members **27** as will be described below.

The spacing members **27** are vertically movable into and out of engagement with the slabs **24** and are bolted to the rack **28** to provide rigidity. The rack consists of three horizontal bars **48** to which angle plates **49** are bolted, and it is from these angle plates that the spacing members depend. The rack **28** is movably suspended from the rods **29** by wires **50** extending down from pulleys **51**, and is guided in its vertical movement by engagement of three rollers **52** attached to each end of the rack. The rollers are arranged with at least one of each set of rollers on opposite a side of the rod **29**. The rack construction and the means of moving the rack may be of any similar construction and still be within the purview of the present invention. For instance the wires **50** may be secured to counter-weights to facilitate movement of the rack. An alternative would be to use a power winch of some sort.

As shown in the drawings, the spacing members actually are plastic bags **53** having rectangular vertical and horizontal cross sections and are inflatable. The top of each plastic bag is hermetically sealed by bolting the top between clamping plates **54** having a resilient gasket **55** therebetween to insure a proper seal. Extending through the plates and gasket is a hollow rod **57** having an open end **58** inside the bag and an intermediate opening **59** also inside the bag. This rod serves as a conduit through which air under pressure may pass to inflate the bag and through which air may be evacuated from the bag to deflate the bag and create a vacuum therein so that the bag will collapse about the rod **57**. The open end **58** is enlarged as at **60** and is spaced above the bottom of the bag so as to prevent the bag from collapsing against the open end **58** before the bag has been thoroughly evacuated. Further, the rod and especially the enlarged end guide the collapse of the bag so that it will not collapse against the adjacent portions of the cast unit and will prevent obstruction of withdrawal of the bag, or possible damage to the cast unit when the bags are removed before the mortar has thoroughly hardened.

In the embodiment shown in the drawings, ten bags are utilized and are arranged with a single bag **62**, two bags **63** and **64** spaced from the first bag, a combination of four bags **65**, **66**, **67** and **68** spaced from the two bags, two bags **69** and **70** spaced from the four bags, and finally the last single bag spaced from the preceding two bags. When the bags are inserted into the jig, the spacing of the bags provides cavities into which mortar may be poured with the bags adjacent the spaces forming sealed cavity walls when inflated. Two of the central bags **66** and **67** of the four-bag combination are arranged so as to be spaced between adjacent slabs to properly space the units and thus extend outwardly between adjacent slabs. To properly position the bags in the combination of the four bags for precise displacement when inflated, a wooden block **72** is mounted in the center so that each bag has a side abutting the block thereby positioning each bag independently.

Air conduits **73** are attached to the rods **57** extending from the two central bags **66** and **67** and join to form a single conduit leading to the controls **31** for separate inflation of the central bags. Air conduits **75** extend from the rods **57** of the other bags **62**, **63**, **64**, **65**, **68**, **69**, **70** and **71** and are each joined to a pipe **76** from which a main conduit **77** extends to the controls **31**.

The controls **31** consist of three valves. The first valve **78** controls the introduction of air under pressure through the first air conduit **73** and into the central bags **66** and **67**. The second valve **79** controls the introduction of air under pressure into the other bags, and the third valve **80** controls the evacuation of all the bags. With this arrangement, the central bags can be inflated independently of the others bags, and all the bags can be evacuated simultaneously.

In operation, the jig is initially open with the bags or spacing members **62** through **71** withdrawn upwardly as shown in Fig. 3 and deflated and with the hinged plates **35** retracted horizontally away from the side channels **32** as shown in Fig. 4. The pallet **23** is then slid onto the wooden base **22** and slabs **24** are placed on the pallet adjacent and in front of the aligning lugs **26** as shown in phantom in Fig. 4. The locking handle **43** is then forced downwardly to lock the hinged plates **35** against the side channels **32** so that the lugs **26** extend into engagement with the slabs **24** as shown in Fig. 3, the positions of the slabs being indicated by broken lines. The rack **28** is then lowered so that the spacing members **27** are inserted between the slabs **24** in the position indicated by dotted lines in Fig. 3. After the spacing members are fully inserted, the first valve **78** is adjusted so as to inflate the central bags **66** and **67** thereby spacing the adjacent slabs

and urging them against the end lugs **46** for precise alignment. The second valve **79** is then adjusted to inflate the other bags which urge the slabs **24** against the center lugs **45**. Also when the bags are inflated, they form a seal between the slabs and sealingly abut the pallet **23** to form a cavity for the receipt of bonding material such as quick-setting grout which is poured into the cavities. The lugs **26** and **45** do not come into contact with the grout, but rather, are located in the free space on the outside of the finished block. Therefore, there is no problem of moving the lugs away from the block. Upon setting of the grout, the bags are evacuated and withdrawn, the plates **35** swing out and the finished unit **81** is removed on the pallet **23**.

Fig. 8 illustrates a typical unit **81** cast in the jig of the present invention. The unit has two glazed faces **82** provided by the two slabs **24** which are bonded together by the bonding material **83**. Vertical coring **84** has been provided by the spacing members **27** occupying a portion of the space between slabs and horizontal coring **85** can be accomplished as desired by controlling the amount of bonding material used to provide a space between the level of the bonding material and the top of the slabs.

In order to make this jig commercially successful it is necessary that a very fast setting grout be used such as that of the co-pending application No. 458,512 filed September 27, 1954, now abandoned. With that particular grout using a combination of Portland cement and Luminite with little or no sand, an initial setting time of five to six minutes is possible, after which the unit can be removed on the pallet **23** and stored for further setting. Thus it is obvious that with a bank of a multitude of jigs designed to cast a multitude of units, mass production at low cost can be easily accomplished.

Therefore, the present invention provides a jig that can be utilized to cast slabs into integral units with channels running both vertically and horizontally, which is especially adaptable for casting slabs of glazed tile into double-faced units. The opposite glazed surfaces of the units may be of different textures and colors and the dimensions of the unit can be held within standard tolerances so that the units can be used without other structural elements to form a two-faced wall with smooth surfaces on either side.

We claim as our invention:

1. A jig for casting spaced slabs into integral units having cores therein, the jig comprising: a support having a horizontally disposed slab supporting base and side members having lugs spaced apart horizontally above said base to engage exterior surfaces of said slabs to align opposing slabs in upright laterally spaced positions, resilient spacing members insertable between said positions and opposing slabs and engaging opposed interior faces of the slabs to space the slabs and urge them outwardly against said side members, said slabs, spacing members and base forming a cavity therebetween for receipt of bonding material, and means for inserting said spacing members between the slabs, and for retracting the spacing members after the bonding material has bonded the slabs into an integral unit.

2. A jig for casting spaced slabs into integral units having cores therein, the jig comprising: a support having a slab supporting base and upstanding sides, side plates hingedly secured to said upstanding sides and having slab aligning lugs extending inwardly therefrom, means for swinging said plates into a slab engaging position wherein the lugs align the opposing slabs, resilient spacing members insertable between opposing slabs to space the slabs and urge them against the lugs, said slabs, spacing members and base forming a cavity therebetween for receipt of bonding material, and means for inserting said spacing members between the slabs and for retracting the spacing members after the bonding material has bonded the slabs into an integral unit.

3. A jig for casting spaced slabs into integral units having cores therein, the jig comprising: a support having a slab supporting base and upstanding sides, side plates hingedly secured to said upstanding sides and having slab aligning lugs extending inwardly therefrom, spring means normally urging said plates and lugs out of engagement with said slabs, means for swinging the plates and lugs into a slab engaging position and locking the plates in said engaging position wherein the lugs align the opposing slabs, inflatable spacing members insertable between opposing slabs, means for inserting and retracting said spacing members, and means for inflating the spacing members while inserted between the slabs and deflating prior to retraction, the inflated spacing members extending between opposing slabs to urge the slabs against the lugs, said inflated spacing members, side members and base forming a cavity therebetween for receipt of bonding material which bonds the slabs into an integral unit.

4. A jig for casting spaced slabs into integral units having cores therein, the jig comprising: a support having a slab supporting base and upstanding sides, side plates hingedly secured to said upstanding sides and having slab-aligning lugs extending inwardly therefrom, means for swinging said plates into a slab engaging position wherein the lugs align the opposing slabs, inflatable spacing members insertable between opposing slabs, means for inflating said spacing members while inserted between the slabs including the introductions of air under pressure, said means including hollow rods extending into said spacing members, each said rod having an air hole within its associated spacing member and having an enlarged end within the spacing member shaped to serve as a guide against which the spacing member is deflated so as to be incontiguous with adjacent objects, the spacing members when inflated extending between opposing slabs to urge the slabs against said aligning lugs, said inflated spacing members, side members and supporting base forming a cavity therebetween for receipt of bonding material which bonds the slabs into an integral unit.

5. The jig of claim 4 wherein a unit transporting pallet is slidable onto said slab supporting base for casting of said unit thereon and upon which the cast unit is removed from the jig.

6. In a jig for casting spaced slabs into integral units having cores therein, the combination of a support having a slab-supporting base and laterally spaced upstanding sides having opposed sets of slab-aligning lugs extending inwardly therefrom, means mounting at least one of said sets of lugs for movement toward the other set and into a slab-engaging position wherein both sets engage and align opposing slabs, resilient spacing members insertable between opposing slabs to space the slabs and urge them against the lugs, said slabs, spacing members and base forming a cavity therebetween for receipt of bonding material, and means for inserting said spacing members between the slabs and for retracting the spacing members after the bonding material has bonded the slabs into an integral unit.

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