Oct. 20, 1942. H. L. ROGERS ET AL 2,299,072

APPARATUS FOR CASTING SLABS

Original Filed Feb. 12, 1940 3 Sheets-Sheet 1

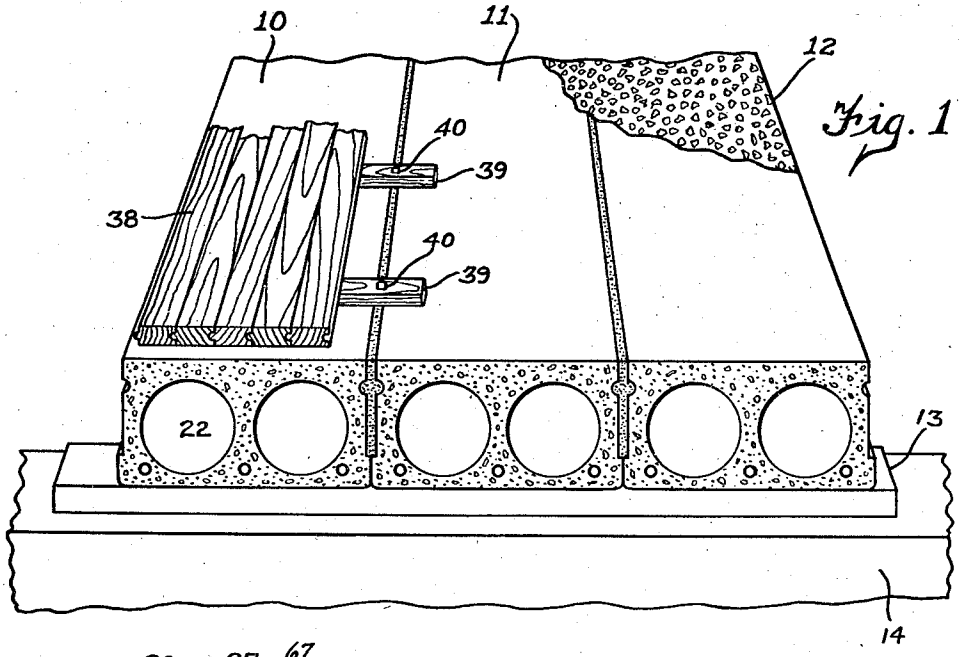


Fig. 1

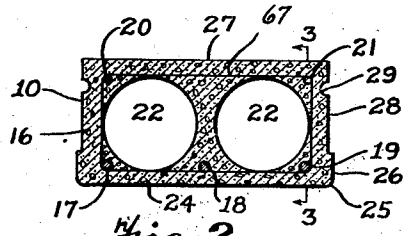


Fig. 2

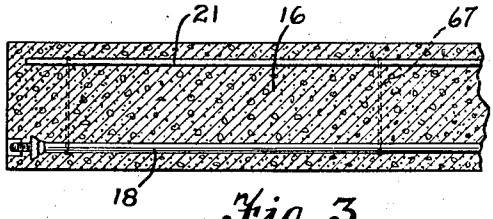


Fig. 3

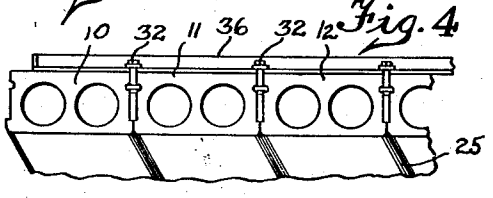


Fig. 4

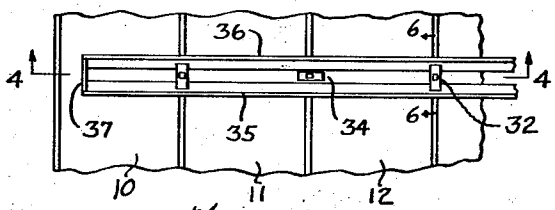


Fig. 5

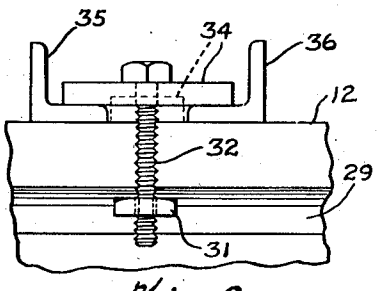


Fig. 6

INVENTORS
Homer L. Rogers
BY Gayle B. Price
Marechal & Noe
ATTORNEYS

Oct. 20, 1942. H. L. ROGERS ET AL 2,299,072

APPARATUS FOR CASTING SLABS

Original Filed Feb. 12, 1940 3 Sheets-Sheet 2

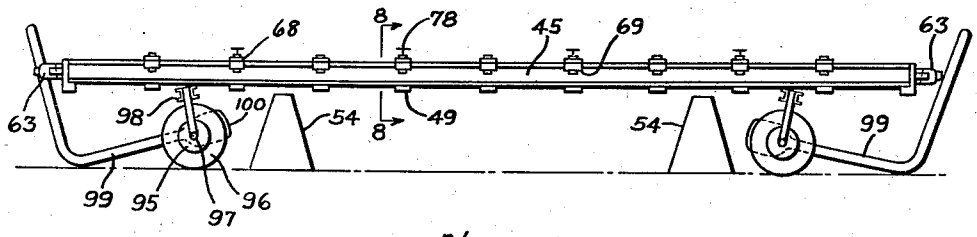


Fig. 7

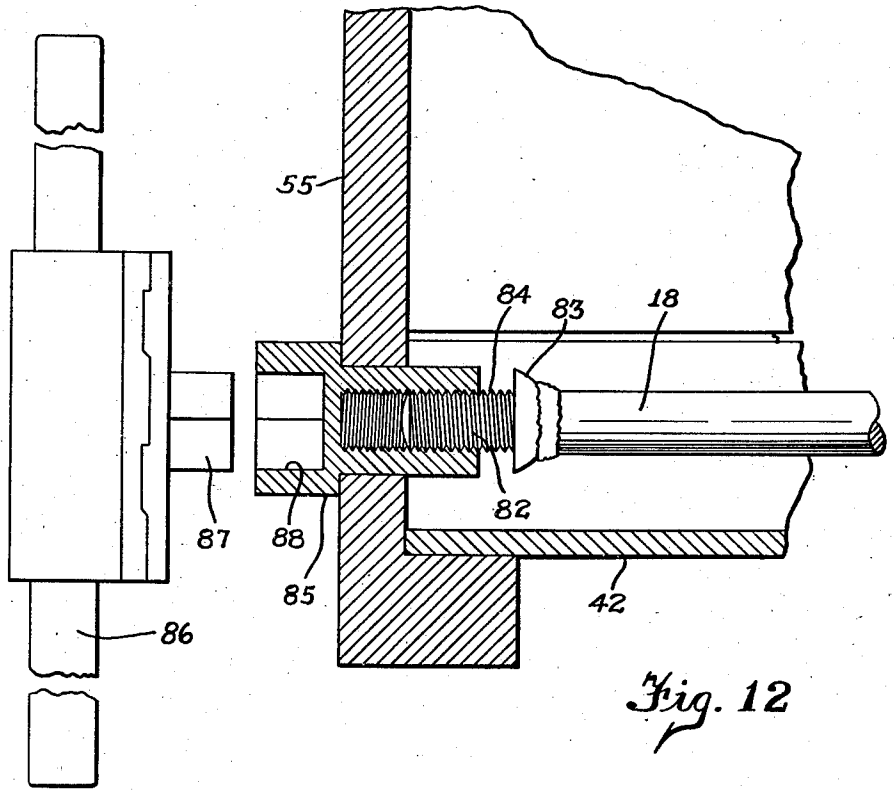


Fig. 12

INVENTORS
Homer L. Rogers
BY Gayle B. Price
Marechal & Noe
ATTORNEYS

Oct. 20, 1942. H. L. ROGERS ET AL 2,299,072

APPARATUS FOR CASTING SLABS

Original Filed Feb. 12, 1940 3 Sheets-Sheet 3

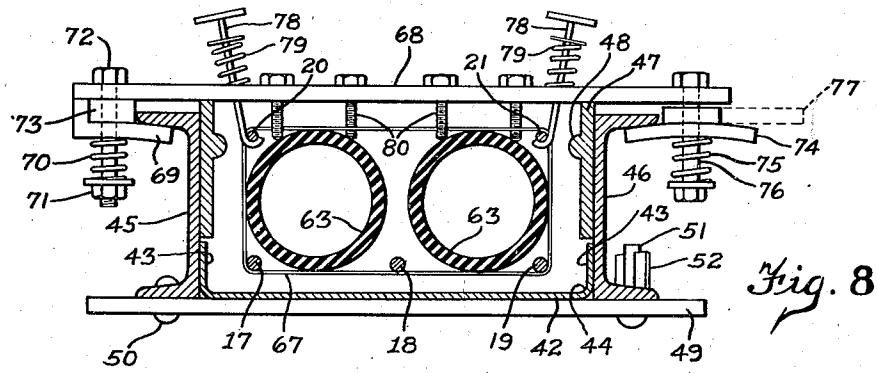


Fig. 8

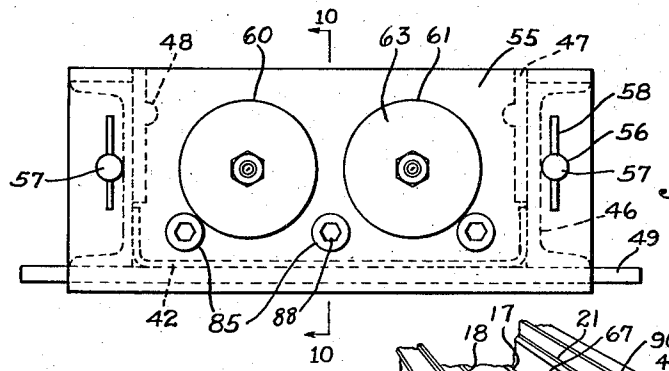


Fig. 9

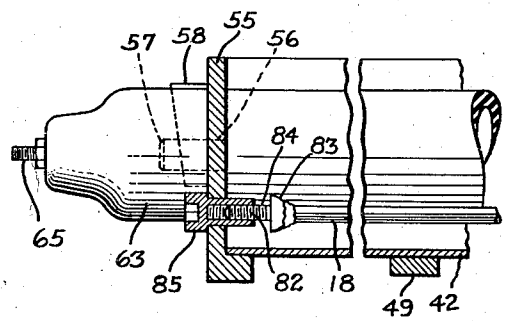


Fig. 10

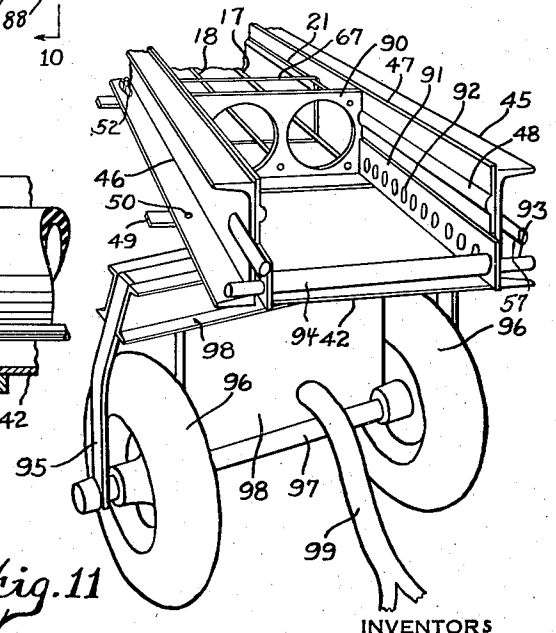


Fig. 11

INVENTORS
Homer L. Rogers
BY Gayle B. Price
Marechal & Noe
ATTORNEYS

Patented Oct. 20, 1942

2,299,072

UNITED STATES PATENT OFFICE

2,299,072

APPARATUS FOR CASTING SLABS

Homer L. Rogers and Gayle B. Price, Dayton, Ohio, assignors, by mesne assignments, to Gayle B. Price, Dayton, Ohio

Original application February 12, 1940, Serial No. 318,461. Divided and this application January 22, 1941, Serial No. 375,472

9 Claims. (Cl. 25—121)

This invention relates to apparatus for making precast concrete slabs, the present application being a division of our application Serial Number 318,461 filed February 12, 1940, for Process for casting slabs.

One object of the invention is the provision of apparatus for making precast slabs and adapted to be used to provide slabs of great strength or rigidity and of predetermined size in an accurate and economical manner.

Another object is the provision of apparatus for making precast slabs and adapted to give one surface of the slab a very smooth finish so that it may be used in building construction without additional surfacing.

Another object of the invention is the provision of apparatus for making precast concrete slabs, so arranged that the form in which the concrete is cast can be readily vibrated to remove air from the concrete mixture.

Another object is the provision of apparatus for making precast concrete slabs and providing for the convenient holding and pretensioning of longitudinally extending reinforcing rods.

Another object is the provision of apparatus for making reinforced precast concrete slabs, the apparatus incorporating inflatable tubes held in a predetermined exact relationship with respect to the slab reinforcement and with respect to the sides of the form in which the concrete is cast.

Other objects and advantages of the invention will be apparent from the following description, the appended claims and the accompanying drawings.

In the drawings, in which the preferred embodiment of the apparatus of the present invention has been illustrated as adapted for the production of precast reinforced concrete slabs for use in building floors, roofs, etc.:

Fig. 1 is a perspective view of a portion of a building floor formed from precast concrete slabs made in accordance with the present invention;

Fig. 2 is a transverse sectional view through one of the slabs;

Fig. 3 is a section on the line 3—3 of Fig. 2;

Fig. 4 is a perspective view of a series of the slabs arranged to provide a floor and a ceiling, and showing how the slabs are assembled;

Fig. 5 is a top plan view of a portion of the slab series shown in Fig. 4;

Fig. 6 is a section on the line 6—6 of Fig. 5;

Fig. 7 is a side elevation of a form in which the concrete slabs are cast, and showing the supporting means for the form;

Fig. 8 is a transverse section through the form on the line 8—8 of Fig. 7;

Fig. 9 is an end view of the form showing the upper straps removed;

Fig. 10 is a longitudinal section through a portion of the end of the form and taken on the line 10—10 of Fig. 9;

Fig. 11 is a perspective view of an end portion of the form and its support; and

Fig. 12 is an enlarged sectional view corresponding to Fig. 10 and illustrating the pretensioning of the reinforcing rods.

Referring more particularly to the drawings, like parts being designated by the same reference numerals in the several views, 10, 11 and 12 designate portions of precast concrete reinforced slabs or beams such as may be made in accordance with the process and by means of the apparatus as will hereinafter be described. Such slabs may be arranged side by side to form a building wall, being shown supported at their opposite ends to provide a floor or roof of a building and to provide the ceiling of a room below the floor or roof. The slabs may be carried at one end on a flat surface such as a leveling strip 13 arranged on a metallic, masonry or concrete foundation 14, the opposite ends of the slabs being carried in a similar manner.

The particular form of slab herein shown, and as set forth in our copending application Serial No. 318,460 filed February 12, 1940, for Cast slabs, comprises a concrete body 16 of general rectangular cross section form, see Figs. 2 and 3, having reinforcing rods 17, 18 and 19 extending longitudinally of the slab near its lower side, with additional reinforcing rods 20 and 21 preferably embedded in the concrete near the upper side of the slab. Longitudinal passages 22 of large diameter compared to the thickness of the slab extend longitudinally from one end of the slab to the other, these passages, as shown, having a diameter considerably in excess of one-half the slab thickness to give a total void space of from 40% to 50% of the slab. The slab is preferably twice as wide as it is thick, and with that proportioning, there are preferably two passages 22 spaced a suitable distance apart and from the side walls of the slab.

The lower side 24 of the slab is smooth, having curves 25 at its edges, these curves merging into side surfaces 26 which are adapted to be arranged in abutting relation with the corresponding portions of adjacent slabs. The top surface 27 of the slab is somewhat shorter in width than the bottom surface, so that the upper side sur-

faces 28 of adjacent slabs are spaced apart to provide a channel to which grout is applied so that when the grout is set the slabs will be held firmly one to another. The side surfaces 28 are provided with longitudinally extending grooves 29 so that the hardened grout will be securely interlocked to the adjacent slabs.

These slabs are so formed that adjacent slabs may be pulled into flush relationship with one another at one or more points between their ends before applying the grout between the slabs, as set forth in our copending application Serial No. 318,462 filed February 12, 1940, for Building construction. With the supported ends resting on flat leveling strips 13, these end portions will be flush with one another but the several slabs may not be of exactly uniform strength and may not extend exactly even with one another when first placed in position on the leveling strips. To level the slabs at their middle or unsupported points, nuts 31 threaded on bolts 32 are placed in the channels between adjacent slabs, being moved longitudinally along these channels from one end of the slabs, the nuts 31 being of such size that they engage the grooves 29 and are held against turning in these grooves. The bolts, when applied to the channels between adjacent slabs, carry plates 34 which slide over the upper surfaces of the slabs. With several bolts arranged at suitably spaced intervals along the length of the channels, the plates 34 are arranged to extend transversely of the length of the slab, as indicated in dotted lines in Fig. 6 and as shown in the center of Fig. 5. A frame comprising angle irons 35 and 36 connected at their ends by connecting plate 37, see Fig. 5, is then moved down against the top of the slabs, so as to extend transversely of the slab length, the width of the plates 34 being small enough so that they will be received between the angle iron webs as the frame is placed in position. The plates 34 are then raised and turned 90° so that they will rest on the horizontal webs of the angle irons and the bolts 32 are turned with a wrench so that one slab is pulled vertically with respect to an adjacent slab that may be at a slightly different level, as the nuts 31 are brought tight against the upper parts of the grooves 29 of the slabs. All of the slabs may thus be brought to a flush relationship with one another.

After the slabs have been leveled and all of the bolts 32 tightened, the space between adjacent slabs is filled with grout level with their upper surfaces, suitable grout retaining plates being placed across the ends of the slabs. After the grout is hardened, the bolts 32 are unscrewed from the concrete, leaving the nuts 31 in place, and the angle iron frames are taken off. If desired the threaded holes which are left in the concrete when the bolts 32 are removed may be filled with grout, although they may remain if a wood flooring is to be applied to the upper surface of the slabs. The left-hand portion of Fig. 1 shows a wood flooring 38 laid on wood strips 39 secured by bolts 40 that thread into the threaded passages in the concrete left when the bolts 32 are removed.

In accordance with the present invention the concrete slabs are cast in a form shown in Figs. 7 to 11 in the shape of an open top horizontally extending trough having internal dimensions in accordance with the size of the slab produced. The form comprises a smooth metal plate 42 which extends continuously along the length of the form, and which is preferably made of heavy sheet metal having upwardly turned side walls 43 providing smooth curved fillets 44 at each of the lower corners. On each side of the plate 42 are side walls 45 and 46, preferably in the form of channel irons, each channel iron having a metal plate 47 secured to its inner side above the location of the wall portions 43 of the bottom plate. There may be a small distance between the lower ends of the plates 47 and the upper ends of the wall portions 43. On each plate 47 is a semi-circular rod 48 which forms the longitudinally extending groove 29 in the slab. The bottom plate 42 is carried by a series of transversely extending bars 49, alternate bars being secured by rivets 50 to one of the side channel members 45, 46 and having an interlocking readily detachable connection with the other side member. As shown in Fig. 8, the left-hand end of the bar 49 is riveted to the lower flange of the side channel 45 and at its right-hand end it extends under the channel 46 and is provided with a hole registering with a hole location in the lower flange of this channel so that a headed pin 51 may be slipped up through the registering holes and a wedge 52 driven in a slot in the pin, thus clamping the bar 49 securely against the lower side of the channel. The wedge may be very readily driven out of place and the pin 51 removed to separate the bar 49 from this channel. As previously mentioned, the next adjacent bar 49 is riveted or bolted to the lower wall of the channel 46 and has a detachable connection to the lower wall of the channel 45. The side members of the form are carried on a plurality of spaced pedestals 54, the bars 49 supporting the bottom plate 42 in its proper position to constitute the lower wall of the trough or form.

One end of the form is closed by an end plate 55 which has a pair of small openings 56 receiving pins 57 which are welded to and project from the outer sides of the channels 45 and 46 as shown in Figs. 9 and 11, these pins 57 being slotted to receive wedges 58 which secure the end plate 55 against the ends of the side channels and the end of the bottom plate 42. A similar plate 55 may be carried in a similar manner at the opposite end of the form so that the length of the form will determine the length of the slab to be cast in it.

In the plate 55 are large holes 60 and 61 having a diameter corresponding to the size of the passages that are cored in the slabs. These holes 60 and 61 receive the ends of tubes 63 which are of greater length than the slab to be cast, and serve to exactly position the ends of the tubes. In the embodiment of the invention herein illustrated, these tubes are inflatable rubber tubes of the character disclosed in the patent to Lindas No. 1,949,650. Where such rubber inflatable tubes are employed, the normal uninflated tube diameter is considerably less than the diameter of the openings 60 and 61 in the end plates. The tubes, when inflated, expand uniformly in diameter throughout their effective length, and shorten in length at the same time. The opposite ends of the tubes are provided with valves 65 which may be readily coupled to and inflated from an air hose. The tubes are applied and then subjected to sufficient pressure to bring the walls of the tube securely against the holes 60 and 61 and the pressure supply is then cut off.

The tubes are applied to the form from one end

by passing them through the reinforcing steel structure which is first laid in the form, this structure comprising the reinforcing rods 17, 18 and 19 which act in tension in the finished product, and additional longitudinally extending reinforcing rods 20 and 21 which are especially desirable for transportation purposes when the forms are carried in an inverted position. These several rods are interconnected to one another at spaced intervals along the length of the form by means of wires 67, connected preferably by welding to the longitudinally extending rods and having a cross sectional form corresponding to the size of the rectangle defining the total cored area. The distance between the horizontally extending portions of the wires 67 will thus correspond to the inflated diameter of the tubes 63, and the sides of the tubes 63 will contact with the vertically extending portions of these wires, which are of sufficient rigidity to hold the tubes from spreading apart within the form.

After the reinforcing structure and the core tubes are in place in the form, straps 68 are placed across the top of the form at suitable spaced intervals along its length, these straps having a readily detachable connection so that they may be quickly applied and removed. As shown in Fig. 8 one end of the strap 68 is provided with a clamping plate 69 which is pivotally carried by a connecting bolt 72 so that it may be turned to the position shown in Fig. 8 and extend under the upper flange of the channel 45, being held up against the channel by a spring 70 which bears against a thrust washer above the nut 71 on the bolt. A spacing washer 73 is interposed between the clamping plate 69 and the strap 68 as indicated. When the clamping plate 69 is turned 90° from the position shown the strap 68 may be pulled upwardly and removed. At the other end of the strap 68 is a clamping plate 74 pressed upwardly by a spring 75 that bears against a nut on the lower end of a bolt 76 which supports the clamping plate for turning movement below the extended end of the strap 68. A handle 77 is fixed to the plate 74 and extends at 90° to the length of this plate so as to extend parallel to the channel 46 when the clamping plate is held in clamping position by the spring 75. The handle may be turned into the dotted line position shown in Fig. 8 to turn the clamping plate 74 and release it from the channel iron and to permit the withdrawal of the strap 68.

The clamping plate 68 carries two hooks 78 extending through holes in the clamping plate and reaching down so as to hook under the upper rods 20 and 21 and pull the reinforcing structure upwardly. Springs 79 urge the hooks 78 in an upward direction but permit a person grasping the handled upper ends of the rods to press them downwardly and release them from or engage them with the rods of the reinforcing structure. These hooks hold the reinforcing structure up in its proper position within the form and also hold the tubes 63 up against locating pins 80 fixed on the strap 68 and engaging the upper sides of the tubes 63 so as to position these tubes at the proper distance from the sides of the form and at a desired height in the form. The tubes, being hollow, tend to rise in the concrete mixture applied to the form, but the pins 80 hold them down in their intended positions.

When the several straps 68 are in place and engaged with the reinforcing structure and with the upper sides of the tubes, the several parts are held in their intended positions throughout the length of the form.

The rods 17, 18, and 19 end in threaded lugs 82 having head portions 83 which may be welded to the ends of the rods, and threaded extensions 84, the plates 55 having openings located opposite the threaded extensions 84 and of such size as to receive tensioning nuts 85 adapted for threaded engagement with the extensions 84. The tensioning nuts 85 are tightened so as to stretch the rods and thus pretension them to give a predetermined initial elongation, the nuts 85 being turned by a torque wrench 86 having a square stud 87 engageable with the sockets 88 of the tensioning nuts 85. The handle of the torque wrench may be turned and the amount of torque applied to the nuts 85 shown by suitable indicating means or by presetting the torque wrench to give the required amount of torque in order that the rods may be pretensioned to some point below their elastic limit. The degree of pretensioning is preferably such that the finished slabs, when supported at their opposite ends, will be prevented from sagging in their middle portions, and will extend horizontally when supporting their own weight from their opposite ends. This pretensioning of the rods also increases the effectiveness of the reinforcement when the slab deflects under heavy load. The upper rods 20 and 21 may be tensioned in the same way although that is ordinarily unnecessary since they offer sufficient strength to permit carrying the slabs in an inverted position without applying excessive or cracking strains from their own weight.

In those cases where the length of the slab is shorter than the length of the form a plate 55 may be used at one end of the form, while the other end of the form is provided with a plate 90 that fits between the inner sides of the side members of the form and rests on the bottom plate 42, as shown in Fig. 11. Side bars 91 are welded to the outer side of this plate and project along the inner sides of the side channels. The bars 91 are provided with a series of holes 92 adapted to receive a transversely extending holding bar 93 which engages against the ends of the side channels and thus holds the plate 90 at a predetermined distance from the end of the form. A spacing tube 94 holds the ends of the side bars 91 in properly spaced relation. This plate 90 is provided with openings 60 and 61 and with additional openings for the reception of the tensioning nuts 85, and when the tensioning nuts are in place engaging the ends of the rods, the plate 90 is securely held at its proper distance from the plate 55 at the other end of the form to give a slab of the required length.

With the form assembled, the reinforcement and core tubes 63 in place, and the tubes inflated, the form is ready to receive the concrete mixture, it being understood that the surfaces of the form to which the concrete mixture is applied are first oiled so that the concrete, when set, can be readily separated from the metal parts of the form. The concrete mixture is poured or shoveled into the form, until it comes level with the top of the form, the concrete mixture being a suitable mixture or mass to provide a hard strong compound formed by concretion or coalescence of the particles such, for example, as a mixture of one part cement and five parts of a mixture of sand and gravel, thoroughly mixed together with water.

After filling the form it is then supported for vibratory movement and rapidly vibrated for a short time. For this purpose the form is raised up from the pedestals 54 by, and supported on, lifting trucks 95 having pneumatic tires 96, an axle frame 97, a load supporting bar 98 fixed to the frame 97, and a bifurcated handle 99 also fixed to the frame, see Figs. 7 and 11. When the handle is positioned as indicated in Fig. 7, the load carrying bar 98 is above the level of the pedestal 54 and the form is thus supported from the pneumatic tires of the truck. With the form supported in this manner and promptly after the form has been filled with concrete mixture, vibration is imparted to the form by vibrators 100 carried by the axles of the trucks and therefore rigid with the load carrying bar 98. The vibrating means preferably includes an eccentric weight mounted on motor driven shaft which rotates on a horizontal axis parallel to the truck axle, the eccentrically mounted weight causes a vibratory movement at rather high speed, shaking the form vertically with an amplitude of the order of one-eighth of an inch. The amount of air pressure to which the tires 96 of the trucks are inflated is properly chosen with respect to the length of the slab, longer slabs being vibrated with less air pressure in the tires, while if only a comparatively short slab is to be made, and the weight to be shaken is therefore much less, the tires may be inflated harder so that the degree of movement imparted to the form will be about the same regardless of the length of the form. The air pressure in the tires of course depends upon the size of the tires themselves, and may be varied through a wide range. In casting concrete beams twenty feet in length and having a width and thickness of the order of twelve inches and six inches respectively, the air pressure in the tires may be of the order of twenty pounds. The vibratory movement of the concrete causes air bubbles to rise rapidly in the concrete mixture, and causes the mixture to entirely fill all of the crevices and come into intimate contact with all surfaces of the form, tubes, reinforcement, etc., resulting in a very strong product because of the elimination of the air bubbles and causing a very smooth surface on those portions of the slab that engage the metal bottom and side members of the form. This vibratory movement continues for a few minutes, or until air bubbles cease to come rapidly from the top of the mixture, and the handles 99 of the trucks are then raised to lower the form on the pedestals again in order that the trucks may be used for another form. Raising the handles swings the supporting bars 98 of the truck towards the pedestals and in a downward direction so that the trucks may be readily wheeled out from below the form.

After the air has been removed from the concrete mixture, the hooks 78 are released from the reinforcement, the handles 77 turned, and the straps 68 removed from the top of the form. The top surface of the concrete is then smoothed and leveled off with the top of the plates 47 which preferably extend a little distance upwardly from the top of the side channels 45 and 46, and any depressions such as those caused by the pins 80 and the hooks 78 are filled up with concrete, preferably by a hand operation. The concrete is then permitted to stand in the form for several hours or until the concrete sets hard enough to permit the form to be removed.

After the concrete has set the tubes 63 are deflated and pulled out of the concrete. Of course this step is unnecessary if the tubes employed are of such character that are designed to remain permanently in the slab. The forms are inverted on a flat table, and the keys 52 driven out and pins 51 removed. The tensioning nuts 85 are unscrewed, and the plates 55 removed by driving out the pins 58. When the nuts 85 are unscrewed the rods remain bonded throughout their length to the concrete and the head portions 83 prevent any relative slipping or stripping of the concrete along the rods. The two sides of the form are then pulled horizontally away from one another and the plate 42 is taken from the top of the form. This may leave a small fin-like projection where the concrete has filled in just between the wall portions 43 of the plate 42 and the ends of the plates 47, and this fin is removed by hand. The concrete is then permitted to dry and harden until the slab is in condition to be transported.

The forms, as will be quite apparent, are capable of being quickly assembled and disassembled and of being readily handled without loss of time to produce reinforced concrete slabs of different desired lengths of uniform strength and cross sectional form, and with an accurate and reliable positioning of the core passages and the reinforcing structure.

While the form of apparatus herein described constitutes a preferred embodiment of the invention, it is to be understood that the invention is not limited to this precise form of apparatus, and that changes may be made therein without departing from the scope of the invention which is defined in the appended claims.

What is claimed is:

1. Apparatus for making precast slabs comprising a trough having a bottom plate, a pair of opposing side members provided with longitudinally extending inward projections, and end members extending across the side members, said side members and bottom plate having quickly detachable connections to one another, one of said end members having adjustment longitudinally of the form between the side members and above the bottom plate and provided with bars operable along the inner sides of the side members, said bars having means engageable at selected points therealong with the ends of the side members, preventing movement of the end member towards the center of the trough, said end member also having means for engaging slab reinforcing rods to hold the end member against movement towards the form end.

2. Apparatus for making precast slabs comprising a longitudinally extending bottom plate having filleted lower corners and upwardly extending short side walls, a pair of opposed side members extending upwardly from the side walls of the bottom plate, end members extending across the side members, means detachably connecting the side members to one another and to the bottom plate in a definite predetermined relationship, said side members having longitudinally extending inwardly projecting ribs arranged above the side walls of the bottom plate.

3. Apparatus for making precast concrete slabs comprising a trough having a smooth metal bottom plate provided with a flat bottom portion and opposite upturned side portions connected integrally to the bottom portion by curved fillet portions, a pair of opposing side plates extending along the outer sides of the said upturned portions and projecting thereabove, said side plates having longitudinally extending inwardly project-

ing ribs above said upturned portions, end members extending across the side plates, and means carried by said side plates and extending under said bottom plate and supporting the same from the side plates while providing a readily detachable connection between the side plates.

4. Apparatus for making precast concrete slabs comprising a longitudinally extending bottom plate having filleted lower corners and upwardly extending short side walls, a pair of opposed side members at opposite sides of the bottom plate and extending upwardly from the side walls of the bottom plate, means detachably connecting the side members to one another, said connecting means extending under the bottom plate and supporting it from the side members, said side members having longitudinally extending ribs arranged above the side walls of the bottom plate, and end plates detachably connected to the side members, said end plates having core tube receiving and locating openings and having additional holes in which rod tensioning devices are receivable.

5. Apparatus for making precast concrete slabs comprising an open-top form including an integral bottom plate in the form of a shallow longitudinally extending flat bottomed trough, and a pair of opposed side members provided with longitudinally extending inwardly projecting ribs below the upper ends thereof, end members extending between the side plates and having core locating openings, means detachably connecting said side members to one another and to the bottom plate, said end members having rod tensioning means rotatably journaled therein, and cross bars detachably connected to the side members and extending across the top of the form and provided with downwardly projecting core locating devices.

6. Apparatus for making precast concrete slabs comprising an open-top horizontal form having a smooth metal bottom plate having filleted lower corners and upwardly extending short side walls integral with a straight flat bottom portion, and a pair of opposed side channels having outwardly extending flanges and inwardly facing webs, arranged at opposite sides of the bottom plate, defining the exterior cross sectional slab shape, end members defining the length of the slab and each having a core locating opening and means for yieldingly supporting the form for vibrational movements vibrating the form.

7. Apparatus for making precast concrete slabs comprising a trough including a bottom plate, end members, and a pair of opposed side members having detachable connections to one another extending beneath the bottom plate so that the bottom plate is supported from the side members, and a series of straps extending across the top of the form beside the side members and detachably connected thereto and provided with downwardly extending locating lugs for the location of core forming tubes within the form.

8. Apparatus for making precast concrete slabs comprising an open-top form including a longitudinally extending bottom plate, a pair of opposed side members, and end plates, said plates and members having detachable connections to one another, one of said end plates having holes, headed tensioning devices rotatably received in said holes with the heads engaging the outer sides of the end plate and with inwardly extending internally threaded nut portions projecting into the form and engageable with reinforcing rods for pretensioning the same.

9. Apparatus for making precast concrete slabs comprising a trough including a bottom plate and a pair of opposed side channel irons having outwardly extending flanges and inwardly facing webs arranged at opposite sides of the bottom plate, means detachably interconnecting said channel irons, facing plates on the webs of the channel irons arranged above the bottom plate and extending above the top of the upper flanges of the channel irons, and end members closing the ends of the trough.

HOMER L. ROGERS.
GAYLE B. PRICE.

CERTIFICATE OF CORRECTION.

Patent No. 2,299,072. October 20, 1942.

HOMER L. ROGERS, ET AL.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 5, second column, line 8, claim 6, strike out "vibrating the form"; line 16, claim 7, for "beside" read --between--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 8th day of December, A. D. 1942.

(Seal)

Henry Van Arsdale,
Acting Commissioner of Patents.