July 2, 1963 P. A. MELVIN ETAL 3,095,789

ADJUSTABLE PORTABLE STRIKE-OFF

Filed April 28, 1959 3 Sheets-Sheet 1

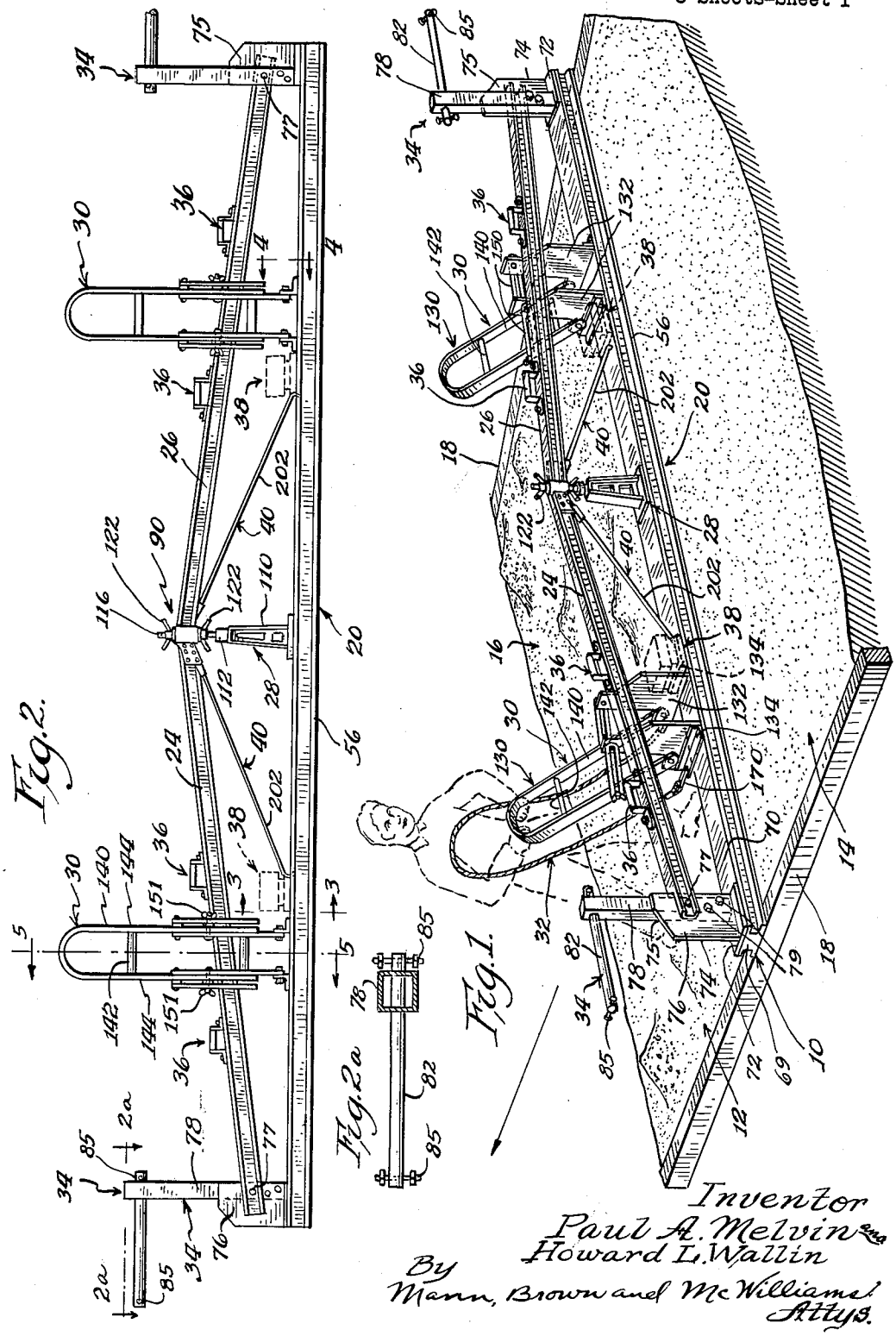


Fig. 2.

Fig. 1.

Fig. 2a

Inventor
Paul A. Melvin and
Howard L. Wallin
By
Mann, Brown and McWilliams
Attys.

July 2, 1963 P. A. MELVIN ETAL 3,095,789

ADJUSTABLE PORTABLE STRIKE-OFF

Filed April 28, 1959 3 Sheets-Sheet 2

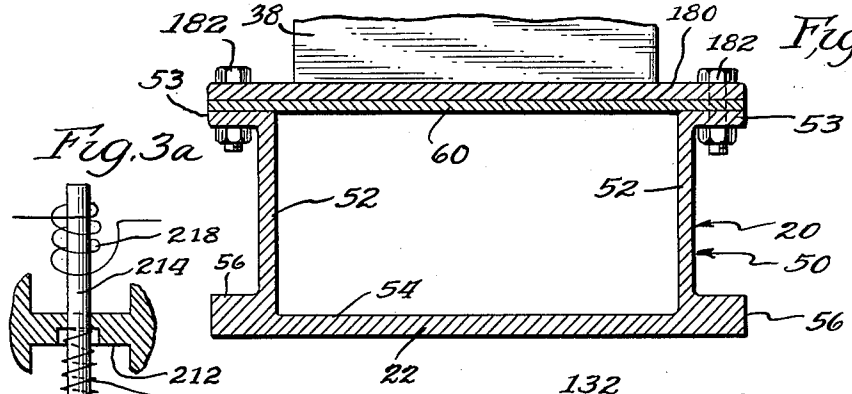


Fig. 3.

Fig. 3a

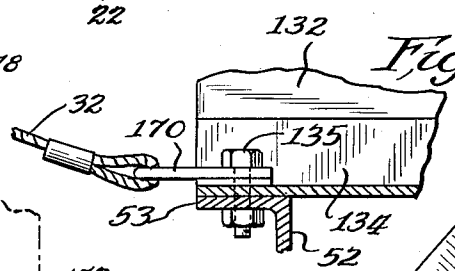


Fig. 4.

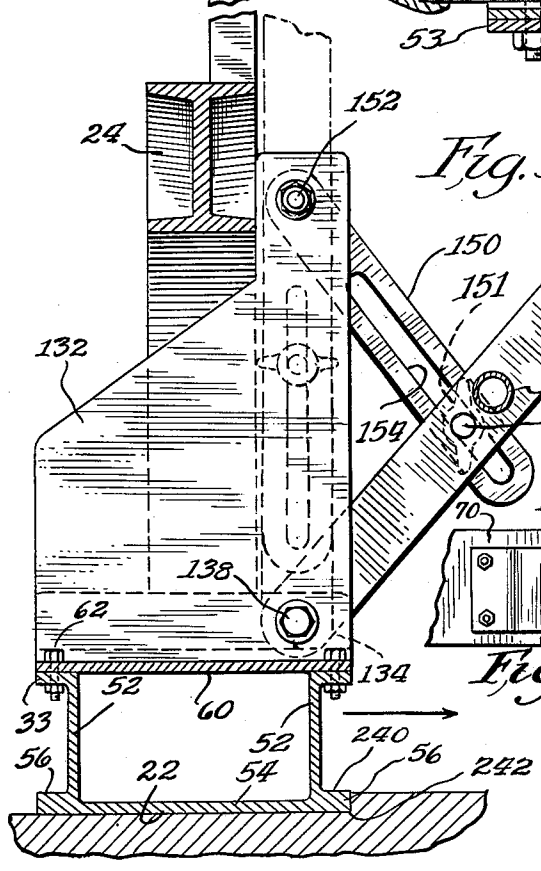


Fig. 5.

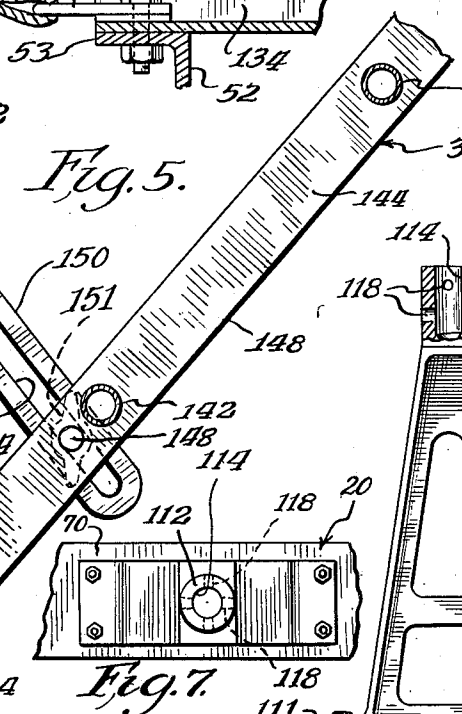


Fig. 7.

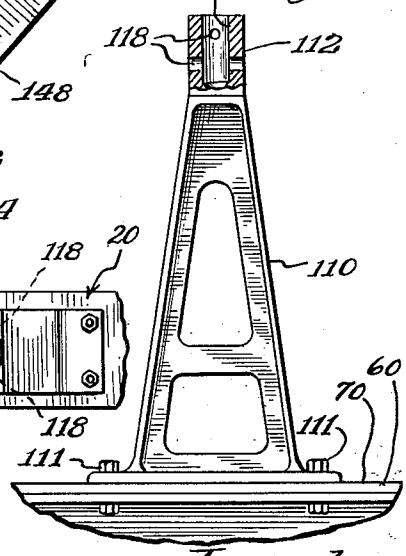


Fig. 6.

Inventors
Paul A. Melvin and
Howard L. Wallin

By
Mann, Brown and McWilliams
Attys.

July 2, 1963 P. A. MELVIN ETAL 3,095,789

ADJUSTABLE PORTABLE STRIKE-OFF

Filed April 28, 1959 3 Sheets-Sheet 3

Fig. 8.

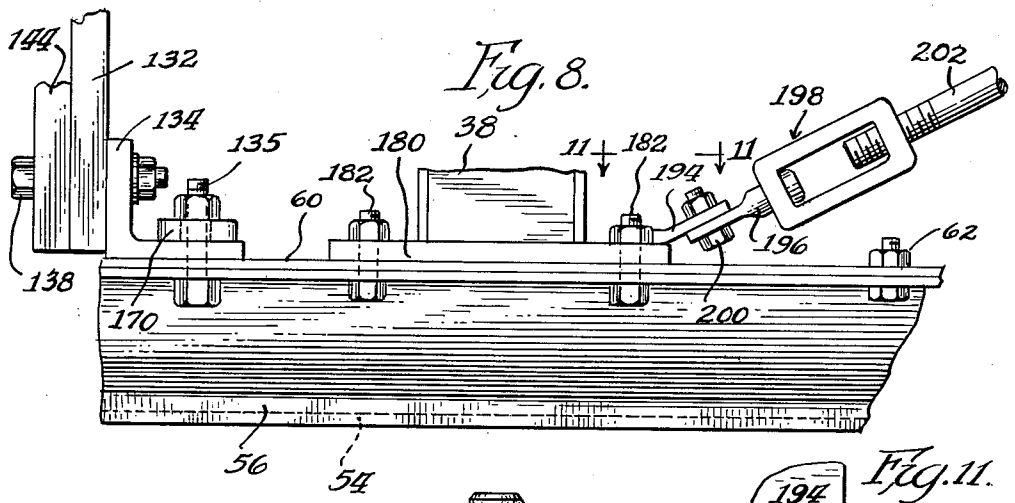


Fig. 11.

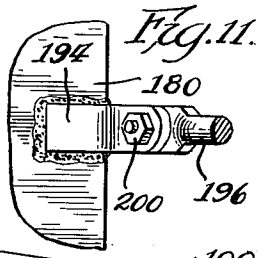
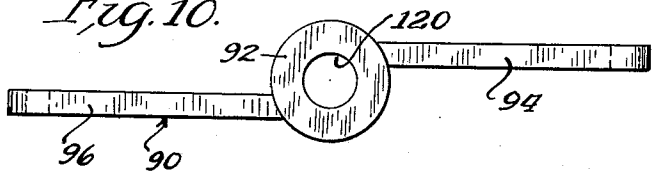


Fig. 9.

Fig. 10.



INVENTORS
Paul A. Melvin and
Howard L. Wallin
By Mann, Brown and McWilliams
Attys.

United States Patent Office

3,095,789

Patented July 2, 1963

3,095,789

ADJUSTABLE PORTABLE STRIKE-OFF

Paul A. Melvin, Chicago, and Howard L. Wallin, Oak Park, Ill.; said Wallin assignor to Paul A. Melvin

Filed Apr. 28, 1959, Ser. No. 809,525
4 Claims. (Cl. 94—45)

Our invention relates to an adjustable straight edge or strike-off for working, compacting, profiling and smoothing poured concrete or other plastic materals for grading and sub-grading, and more particularly, to a light weight, long span, vibratable adjustable hand or power operated device for producing level or contoured surfaces which is especially adapted for finishing low slump concrete.

A common practice in concrete work for floors and the like is to lay the concrete in relatively large squares or long sections of various widths. As the concrete or other material is dumped into position, it must be struck off to established grades or contours and smoothed out.

Straight edges or strike-offs, as they are known in the trade, have been devised for this purpose. Conventional hand operated straight edges comprise a beam, formed from a length of wood or metal, having a powdered vibrating unit mounted thereon positioned as desired, and handles attached at each end of the beam by which the beam or strike-off is actuated. The beam or strike-off is positioned across the area to be filled in with concrete, at the beginning thereof, on top of suitable generally horizontal supports along the edges of this area, such as the forming boards defining it. At least one man grasps the handles at each end of the beam and the men move the beam back and forth across the freshly poured concrete with a seesaw action, and in a forward direction to provide a surface at the desired elevation ready for additional finishing as required.

Experience has shown that these conventional straight edges are objectionable for a number of reasons. For instance, the weight of the material out of which they are fabricated limits their usable length, as does the inconvenient and awkward manner of handling them required by the positioning of the handles. Moreover, even in relatively short lengths, of say from ten to fourteen feet, they are so heavy and demand so much of the operator's strength to handle and move, construction workers are reluctant to use them, resulting in limited production per unit.

Another important defect in conventional straight edges is that invariably they are not straight or true, and due to their length and weight, it is heretofore proved impossible to hold or maintain them true. This results in irregularities being formed in the surface of the concrete, which is obviously objectionable.

Furthermore, handles for conventional straight edges are generally rigidly or non-adjustably mounted, and prove to be either uncomfortably high or uncomfortably low for construction workers shorter or taller than average height. This condition causes a twisting of the strike-off contact surface thus producing a ripply and unsatisfactory finish; it also necessarily detracts from worker efficiency.

Moreover, none of the conventional straight edges, whether of the hand or power operated type, are effective for finishing low slump concrete.

A principal object of the invention is to provide an accurate lightweight vibrating straight edge capable of efficient use in much longer lengths than was heretofore though possible, and which is especially adapted for finishing low slump concrete.

A further principal object of our invention is to provide an adjustable straight edge or strike-off in which the working surface thereof may be maintained in a straight or true line, and in which the handles thereof are positioned and mounted for optimum ease and efficiency in operating the straight edge.

A further object of the invention is to provide a long span lightweight straight edge in which the handles thereof may be adjusted vertically to suit the height of each individual worker, so as to obtain a true flat or contour surface over the full length of the strike-off.

Yet a further object of the invention is to provide a strike-off which is adjustable to provide a surface of any desired profile within a range of 6 inches.

Still a further object of the invention is to provide a straight edge which eliminates the need for the above mentioned seesaw action in profiling concrete or the like.

Other and further objects of the invention are to provide a rope saddle arrangements for permitting operators to move the tool laterally thereof as desired while leaving their hands free to direct application and removal of concrete in front of the tool; to provide an accurate adjusting jack device for positioning the contour of the tool; and to provide a design for devices of this type which keeps manufacturing and assembly costs at a minimum while providing a maximum of effective vibratory action on the concrete, and eliminating the fatiguing vibration otherwise absorbed by the operators.

Still further objects, uses and advantages will be obvious or become apparent from a consideration of the following detailed description and the drawings.

In the drawings:

FIGURE 1 is a perspective view of a proven embodiment of the invention illustrating the manner in which it is applied to a section of poured concrete, with a worker shown (in phantom) grasping one of the handles thereof;

FIGURE 2 is a front elevational view of the device shown in FIGURE 1, looking at the forwardly moving side thereof;

FIGURE 2*a* is a diagrammatic cross-sectional view along line 2*a*—2*a* of FIGURE 2;

FIGURE 3 is a cross-sectional view along line 3—3 of FIGURE 2;

FIGURE 3*a* is a diagrammatic view illustrating the type of vibrator unit that is preferred for use in association with our invention;

FIGURE 4 is a fragmental cross-sectional view along line 4—4 of FIGURE 2;

FIGURE 5 is a cross-sectional view along line 5—5 of FIGURE 2;

FIGURE 6 is an elevational view, partially in section, of the post member that forms a part of the adjustable strut of the device shown in FIGURES 1 and 2;

FIGURE 7 is a plan view of the post shown in FIGURE 6;

FIGURE 8 is a fragmental elevational view of the mounting for one of the vibrators together with an associated portion of a supplementary strut support member for the beam and a portion of one of the handle mountings;

FIGURE 9 is a fragmental elevational view of the manner in which the two truss members are secured together at their upper ends;

FIGURE 10 is a plan view of a splice member that is employed to secure the adjacent ends of the two truss members together while at the same time forms part of the adjustable strut of the device; and

FIGURE 11 is a fragmental plan view approximately along line 11—11 of FIGURE 8.

General Description

Referring now to FIGURE 1, reference number **10** generally indicates a tested and proven embodiment of our invention being applied to a section **12** of freshly poured concrete. The smoothed surface of the concrete

is indicated at **14** and the rough concrete is indicated at **16**. The straight edge or strike-off **10** is shown resting on side bulkheads or forms **18** that define the area in which the concrete **12** has been or is to be poured.

The device **10** comprises an elongate fabricated beam **20** which includes a relatively wide and flat undersurface **22** (see FIGURE 3) that actually contacts the concrete that is to be shaped or finished. Elongate rigid truss members **24** and **26** are secured together and to the extreme ends of the beam to form a truss structure of the type indicated in the drawings. An adjustable strut or jack means **28** rigidly but adjustably interconnects the adjacent ends of members **24** and **26** to the central portion of beam **20**.

Device **10** includes, in the illustrated embodiment, a pair of outwardly and forwardly extending elongate draw handles **30** which are each secured to beam **20** between the ends of a draw rope **32**, the ends of the respective draw ropes being secured to beam **20**. The device **10** is also provided with end handles **34** and carrying handles **36** to facilitate moving the device from place to place before and after it is used in the various operations for which it is designed.

The device **10** in its illustrated form includes magnetic vibrators where generally indicated at **38**, the vibrators preferably being of the type diagrammatically illustrated in FIGURE 3*a*. This is a pulsating magnet electrical vibrator operating at 3600 vibrations per minute and vibrates undersurface **22** at that rate and at an amplitude which together with the rigidity of beam **20** insures that the entire under-surface **22** remains in continuous contact with the concrete.

The device **10** also includes a pair of adjustable tie rods **40** that extend between the joined ends of members **24** and **26** and the adjacent supports for the vibrator units. Tie rods **40** are provided to facilitate adjusting the beam for required contours and holding same at the desired contour.

The invention has been found particularly useful in fininshing low slump concrete, or concrete having a slump of three inches or less.

Specific Description

The beam **20** preferably has the cross-sectional configuration indicated in FIGURE 3. In the illustrated embodiment, the beam **20** comprises an elongate box-like girder **50** including vertical walls or flanges **52** that are integrally united by substantially horizontal plate forming web **54**, the bottom surface of the latter forming concrete contacting surface **22**. The wall flanges **52** are formed with laterally extending projections **53** along their upper edges and laterally extending squared ridges or ribs **56** along their lower edges, the latter being levels or sights for facilitating the positioning of the dumped concrete, as hereinafter made clear.

The girder **50** is preferably an integral unit that is conveniently formed in one piece by an extrusion process of an appropriate type.

The beam **20** also includes elongate plate **60** which closes the open top portion of girder **50**. Plate **60** is preferably secured to girder **50** by a plurality of bolts **62** (see FIGURES 5 and 8) passing through appropriate aligned perforations formed in the edges of the plate and projections **53** of girder **50**.

The ends of the girder **50** are closed by end plates **69** (welded in place), and on the top surface **70** of plate **60** at the ends of the beam, gusset base plates **72** are mounted in any suitable manner, as by welding or appropriate bolts and nuts, or screws. A gusset plate **74** is positioned centrally with one face **75** centered on each plate **72** and welded thereto. The members **24** and **26** as illustrated are in the form of I-beams which have their outer ends respectively secured, as by a single bolt **77**, to face **76** of the respective gusset plates. Upright members **78**, which comprise handles **34**, are preferably of box cross-sectional configuration (see FIGURE 2*a*) welded or otherwise secured to the face **75** of the respective gusset plates, as by bolts **79**.

A handle bar **82** is slidably mounted at the top of each member **78**. Bars **82** are each provided with fixed bolts **85** to prevent removal.

The beams **24** and **26** at the center of the device are rigidly joined together by a splice member **90** (see FIGURES 9 and 10). Member **90** comprises a hub portion **92** provided with a pair of laterally spaced outwardly extending parallel arms or wings **94** and **96**. The flanges **98** of elongate member **24** are removed flush with the web portions **100** thereof, and wing **96** is secured to the web **100**. The other side of the adjacent end of member **26** is similarly formed, wing **94** thus being secured to web **100** thereof on a side opposite to that which wing **96** abuts member **24**. The wings **94** and **96** are secured to the members **24** and **26** respectively by appropriate bolts **102** or in any other suitable manner.

The adjustable strut member **28** includes a substantially A-shaped base **110** (see FIGURE 6) that is attached to the top surface **70** of plate **60** as by appropriate bolts **111**. Member **110** at its apex is integrally united with cylindrical hub portion **112** which is drilled as at **114** to receive one end of screw threaded tube **116** (see FIGURE 9). Hub portion **112** is also formed with holes **118** to receive appropriate shear pins for fixedly mounting tube **116** within hole **114**.

The upper end of the threaded tube **116** passes through bore **120** formed in splice member **90**, and upper and lower wing nuts **122** are threaded on tube **116** on either side of hub portion **92**.

Handles **30** in the illustrated form each comprise a standard hand truck handle **130** pivoted between spaced mounting plate **132** that are in turn fixed to angles **134** bolted to the top surface of the plate **60** by bolts **135**. In the illustrated embodiment, the handles **130** at each side thereof are pivotally secured in place by bolts **138** that pass through both the respective plates **132** and angles **134** (see FIGURE 8).

The respective handles **130** each comprise a U-shaped member **140** including handle bars **142** secured between the legs **144** of each member **140**. As indicated in FIGURE 5, the legs **144** are formed with perforations in which bolts **148** are respectively mounted; the bolts **148** also pass through slots **154** of respective arms **150**, arms **150** also being respectively pivoted to the respective plates **132** by appropriate pins or bolts **152**. Bolts **148** preferably carry wing nuts **151** so that the operator at a handle **130** may move the member **140** about bolts **138** to the desired position of elevation and then tightly secure the respective members **144** and **150** together. When device **10** is not to be in use, the handles **30** are swung to the vertical dashed line position of FIGURE 5 and tightened in place.

Handles **30** are preferably positioned, on each side of the beam **20**, approximately half way between the adjustable strut **28** and the end of the beam. This is to eliminate longitudinal deflection of the beam as it is moved along the concrete.

The draw rope **32** that is secured about each handle **130** may comprise a flexible member formed from a strong grade of rope or cord which is secured at each of its ends to a bracket **170** positioned on the respective angles **134** of each handle **130** and held in place by angle securing bolts **135** (see FIGURES 4 and 8). The draw ropes **32** should be sufficiently long to be proportioned with respect to handles **130** approximately as indicated in FIGURE 1 and may be adjustable in length to suit the comfort of the user.

The vibrator units **38** are secured to the top surface of beam **20** in the manner indicated in FIGURES 3 and 8, and at the locations shown in FIGURES 1 and 2, i.e., adjacent each of the handles **30**. The vibrator unit of the

type specified above may be mounted on a plate 180 bolted to the girder by appropriate bolts 182.

At the side of each plate 180 that faces the adjustable strut 28, an angled bar 194 is secured (see FIGURE 11), as by welding adjacent the longitudinal center of the beam; each bar 194 is secured to element 196 of a turnbuckle device 198 by an appropriate bolt 200. The turnbuckle devices on each side of adjustable strut 28 each cooperate with a rod 202 that is pivotally secured as at 203 to a wing of splice member 90 in any suitable manner, as by clevis element 205 provided with bolt 207 received in a slot 209 formed in each wing of member 90.

Handles 36 may be shaped approximately as shown in FIGURES 1 and 2 and positioned where indicated along the respective members 24 and 26 approximately as indicated in FIGURE 2. They may be secured in place in any suitable manner.

In accordance with our invention, preferably, the only vibrations that are applied to beam 20 are vibrations in horizontal planes. That is to say, the vibrating element of each of the vibrators 38 moves vertically only, i.e., up and down, so that the vibrations communicated to the beam 20 are of the same kind, with the planar bottom surface of the beam constantly in a horizontal plane which constantly moves vertically or up and down. This kind of vibration may be obtained by employing, for instance, magnetic type vibrators which may include the structure of FIGURE 3*a* or its equivalent. FIGURE 3*a* shows a fixed lower abutment 210 which is spaced from fixed upper abutment 212, and a slidably mounted vertically disposed bar 214 extending through abutment 212 and carrying an appropriate weight 216. The upper end of the bar forms the core of a solenoid and passes through coil 218 that has its ends connected to an appropriate source of electrical energy. A compression spring 220 is interposed between abutment 212 and the weight 216 to bias the weight downwardly. When electrical energy is applied to coil 218, weight 216 is pulled upwardly against abutment 212. The source of electrical energy is then broken or removed, which permits the spring 220 to return weight 216 against abutment 210 with considerable force.

Of course, the vibratory action provided is quite rapid (3,600 vibrations per minute in the preferred arrangement), and the illustration of FIGURE 3*a* is largely diagrammatic in nature, it being provided solely for the purpose of illustrating the type of vibratory action which is best suitable when employing our invention.

Before employing the device 10, wing nuts 122 are positioned to draw or press the beam 20 into the desired contour, whether it be straight or curved. Once the nuts 122 position the beam as desired, it is securely fixed in this position by the truss-like framework formed by girder 50 and members 24 and 26. The turnbuckles 198 then should be turned to tension rods 202, with the result that the beam 20 is securely held and supported at five separate points along its length.

Since the members 24 and 26 are secured at their opposed ends by a single bolt, a pivotal action of the members 24 and 26, with respect to beam 20 occurs during adjustment of the contour of the beam regardless of how tightly bolts 77 are secured in place. If the load opposed ends of members 24 and 26 did not have this pivotal movement, the ends of beam 20 would be held against contour change, which would result in contour deformation at the ends of the beam when contour change is desired.

Of course, wing nuts 122 and turnbuckles 198 may be readily changed if and when a change in contour becomes desirable. Thus, our arrangement provides quick and accurate adjustments permitting the user to have the same beam define either a straight line or a curved or rounded profile, as desired, whether it be convex or concave in configuration. The adjustable strut 28 is in effect a jack means for holding and bending beam 20, as desired, in a few seconds without special tools or wrenches.

In operation, when concrete pouring is started workers place the straight edge 10 across the section of concrete at one end thereof and on top of, for instance, boards 18. Each handle 30 is grasped by a worker wearing boots and standing in the placed concrete. The worker grasping a handle 30 positions the accompanying draw rope 32 in the small of his back as indicated in FIGURE 1. The individual workers may adjust the handles and ropes to suit their individual heights and sizes.

After the vibrator units 38 have been turned on, if vibration is required, the device 10 is slowly moved along boards 18 in the direction of the arrow of FIGURE 1 against the rough graded concrete. The ledge 240 formed by the ridge 56 that is on the forward side of the beam porvides a sight or guide surface for insuring that sufficient concrete is positioned in front of and beneath the leading strike-off edge 242 (see FIGURE 5) of the unit. This is accomplished by a worker sliding a shovel along the ledge to keep it visible, and by so doing, sufficient poured concrete is properly disposed in front of and beneath the beam 20 to provide the proper finished surface.

One of the important features of our invention is that the draw ropes 32 free the hands of the workers that hold handles 30 so that they may indicate to helpers where concrete should be applied to or removed from the forward ledge 240. This also eliminates the vibrator fatiguing otherwise transmitted to the operator's arms.

The strike-off edge 242 of the beam 20 smooths down the concrete, and the action of the vibrator transmitted to the concrete by the relatively wide bottom face 22 of girder 50 brings up the mortar in the concrete to provide the desired dense layer adjacent the upper surface thereof. The bottom face 22 of the beam 20 is and remains in contact with the concrete during the entire operation of the device, the device being merely slid along over and against the concrete as the finishing process progresses. No seesawing or other movement longitudinally of the beam is required to provide a controlled dense and thus finished concrete surface.

FIGURE 3 illustrates an important concrete vibration principle that is incorporated in our invention. It will be noted that walls or flanges 52 are vertically disposed and that therefore the vibrations which are transmitted through them effect horizontal vibration of the contact base formed by web 54, i.e., vibration in which the contact base remains always horizontal but moves rapidly up and down, as has been explained hereinabove. Since the walls 50 are positioned at right angles to the plate 60, the vibrations are transmitted directly to plate 60, they travelling down through walls 50 to contact plate 54 and the concrete surface. This makes for maximum transmission of vibration and minimum absorption thereof by the structures that connect plate 60 to the vibrator.

As indicated above, when the worker first grasps a handle 30, he may adjust the elevation thereof to suit his individual height by appropriately manipulating wing nuts 151 and swinging handles 30 to the position desired. This makes for maximum worker comfort and accurate control during operation of the device. Furthermore, twisting of the leading ridge 56 and its edge 242 due to workers of unequal heights pulling on handles at a fixed angle is eliminated.

The above described method of operation proceeds until all of the concrete deposited has been smoothed off, no other movement of the straight edge being required other than the movement described above. The resulting concrete surface needs no further screeding or leveling to meet all standard surfacing requirements.

As the handles 30 on each side of the beam 20 are located substantially centrally between the end of the beam and the adjustable strut 28, they are substantially evenly distributed along the length of the beam and the

leading edge **242** of the beam adjacent its center will not gouge into the concrete and thus disfigure the finished surface as the beam is moved over it. It has been found that locating the handles at the ends of the beam results in such disfigurement, as the leading edge **242** would then be deflected downwardly, as the beam is pulled along the concrete, due to the tendency of the beam to arc; by locating the handles approximately as shown in the drawings, the drag on the beam is equalized and consequently any distortion is minimized, which results in the maintaining of leading edge **242** at its proper grade determining elevation.

The rigidity of the device **10** is one of the most important features of the invention. The truss-like structure together with adjustable strut **28** and the tie rod means **40**, preferably made adjustable by the turnbuckle struts **198** and **202**, insure that both the ends and the midportion of the beam will vibrate uniformly, and will not slap uncontrollably against the concrete, or at different amplitudes along the length of the beam.

When a high frequency vibrator of the type specified is employed, the beam **20** provides a hum type vibration of minimum amplitude that is distributed uniformly along the entire length thereof. In accordance with our invention, the surface **22** should be vibrated at a rate in the range of from 2400 or above vibrations per minute (experience to date indicates that best results are obtained at about 3600 v.p.m.) and the amplitude of vibration should be on the order of ⅛ inch or less, depending upon such factors as consistency of the mix. Surface **22** should have a width at least on the order of five inches transversely of the beam (a width of 7⅛ inches being employed in a preferred embodiment). The force of impact between the surface **22** and the concrete is optional and will depend upon the stiffness of the mix. The vibration rate and amplitude ranges specified insure the production of a uniform fluidization of the surface of low slump concrete mixes that is of minimum depth but permits a contouring of the concrete to the exact shape of surface **22** merely by sliding beam **20** slowly over it.

The significance of this will be apparent since low slump mixes by definition are only semi-fluid, which necessarily makes finishing very difficult. Furthermore, excessive vibration will defeat the purpose of employing low slump concrete, since the flow and segregation resulting tend to weaken the concrete. Vibration rates on the order specified when employing the rigid wide surface **22** cause the necessary differential motion between the particles of the mixture that results in the flowing and consolidation of the mix surface, but only at the surface of the mix while the amplitude range specified together with the rigidity of beam **20** insures that the surface **22** maintains continuous contact with the mix surface. It is these characteristics of the invention that particularly enable the device **10** to finish low slump concrete with facility, a heretofore unattained but long desired result that is a must in handling today's low water ratio, high strength concrete.

The closed box-like cross section of beam **20** insures that the concrete will not accumulate on or in the beam. Accumulation of concrete on the beam **20** would materially increase its weight and change its vibrating characteristics unfavorably. The boxed in construction of the beam and the lightness of the materials from which it is formed provides strength and rigidity without undue weight for fast pouring, long span operation.

The handles **30** can be readily changed to the other side of beam **20**, which would make the other ridge or projection **56** the leading side of the device. This can be done by detaching bolts **135** and reversing the positions of angles **134**, after which the bolts would be reapplied.

The device **10** may be moved from job to job by grasping it by handles **34** and/or **36**. Th device may also be lifted by a suitable hoist attached at its center, as about post **28**. Members **24** and **26** being attached at their opposed ends by a single bolt (as previously mentioned), they tend to pivot at these connections, when device **10** is lifted at its center, rather than bend as would be the case if said opposed ends of the members **24** and **26** were welded in place. Slots **209** of splice member **90** permit this movement with respect to the rods **202** when the tie rods are loosened.

We prefer to construct the straight edge or strike-off from magnesium or magnesium alloy, as these materials make an extremely strong and lightweight structure. These materials are also not adversely affected by the chemicals in the concrete and do not warp excessively. The device may be of any desired length, and its lightness in weight permits a relatively long length, 22 feet in the illustrated embodiment and weighing only 146 pounds. Longer units constructed in accordance with the principles of our invention have proved to be highly successful. While other materials may be employed to form a device in accordance with the teachings of our invention, those that are heavier than the materials specified above will of course make the unit heavier, and additional weight materially detracts from the usefulness of the invention since greater human effort is required to move and operate the same.

While the manner of forming level surfaces is illustrated and described herein, we contemplate that the device **10** may be employed in the forms of rounded contours, such as thin shell structure surfaces of new buildings, crowned alley and road pavements, and the like. The beam **20** may be made sufficiently flexible or fabricated to provide any contour desired, and the truss arrangement of the unit rigidly holds the beam in the desired shape or profile. Moreover, the device **10** may be employed to profile substances other than concrete and does not require a vibrator where vibration is not otherwise desirable.

The term "draw rope" as used in the appended claims means all chain, filament or belt-like members capable of performing the herein disclosed functions regardless of the material out of which they are formed.

This application is a continuation-in-part of our copending abandoned application Serial No. 584,969, filed May 15, 1956, the entire disclosure of which is hereby incorporated herein by this reference.

The foregoing description and the drawings are given merely to explain and illustrate our invention and the manner in which it may be performed, and the invention is not to be limited thereto except insofar as the appended claims are so limited since those skilled in the art who have our disclosures before them will be able to make modifications and variations therein without departing from the scope of the invention.

We claim:

1. A concrete finishing tool adapted for use in finishing a relatively large body of concrete poured between opposed spaced fixed forms and adapted to extend across the concrete and rest upon said forms, said tool comprising an elongate beam formed with a continuous planar bottom surface of uniform width throughout the length of the beam, the edges of said surface defining forward and rearward faces of said beam, a first elongate rigid truss member having one of its ends made fast to one end of said beam, a second elongate rigid truss member having one of its ends made fast to the other end of said beam, said members being substantially equal in length and having combined a length that is greater than the length of said beam, said members having their other ends joined together over the central portion of the beam to form a truss structure, a rigid upright strut made fast between said joined together ends of said members and said beam and including jack means for adjusting the effective length of said strut whereby the contour of said beam may be adjusted, an elongate handle pivotally secured to said beam on each side of said strut and substantially midway between said strut and one of the ends of said beam, each

of said handles projecting laterally from said beam and being mounted on the forward side of said beam for pivotal movement about a horizontal axis extending lengthwise of said beam, vibrator means mounted on said beam adjacent each of said handles for vibrating said bottom surface, a pair of tie rod means each connected at one of its ends to said beam adjacent said vibrator means and having its other end connected to said truss structure adjacent said joined together ends of said members, said tie rod means bracing said beam portions against uncontrolled vibration and thereby spreading out the vibration generated by said vibrator means substantially uniformly along the length of the beam, and means for releasably securing said handles against pivotal movement at selected forwardly directed positions of inclination with respect to said beam whereby a worker may adjust a handle to his particular height, said beam being formed with an upwardly facing planar sight guide surface means along said forward face thereof for acting as a guide for positioning and leveling concrete in advance of said beam during operation thereof, with said sight guide surface means being in parellel relation with and above said bottom surface of said beam, whereby each of two workers standing in the poured concrete and grasping a handle may adjust said handle to his particular height and, when drawing the beam along the opposed forms in a forward direction and over the concrete as said bottom surface is vibrated to finish the surface of thepoured concrete, avoid twisting of said sight guide surface means.

2. A concrete finishing tool as claimed in claim 1 in which the width of said continuous planar bottom surface is not substantially less than five inches, the beam and truss members are formed of a material having a density of the order of that of magnesium, the vibrator means

moves the bottom surface of the beam in a vertical direction only, at a frequency of 2400 or more vibrations per minute, and the amplitude of vibration is of the order of one-eighth inch or less.

3. A concrete finishing tool as claimed in claim 2 in which the beam comprises an elongated channel member having closed ends and top and having a web forming the bottom of the beam and projecting forwardly beyond the forward wall of the channel to form a rib the bottom surface of which is continuously coplanar with the bottom surface of the beam and the top surface of which forms said upwardly facing planar sight guide surface means.

4. A concrete finishing tool as claimed in claim 1 in which each of said tie rod means includes means for adjusting its effective length.

References Cited in the file of this patent

UNITED STATES PATENTS

1,388,690	Baker	Aug. 23, 1921
1,741,459	Hetzel	Dec. 31, 1929
2,145,959	Venable	Feb. 7, 1939
2,214,093	Venable	Sept. 10, 1940
2,358,085	Millikin	Sept. 12, 1944
2,411,317	Day	Nov. 19, 1946
2,641,169	Ytterberg	June 9, 1953
2,693,136	Barnes	Nov. 2, 1954
2,757,588	Pollitz	Aug. 7, 1956
2,828,676	Steverman	Apr. 1, 1958
2,897,735	Alessio	Aug. 4, 1959

FOREIGN PATENTS

207,084	Great Britain	Nov. 22, 1923