

April 19, 1960

E. BUTCHER

2,932,875

UNIT FOR MOULDING CONCRETE MIX OR THE LIKE

Filed Aug. 1, 1955

2 Sheets-Sheet 1

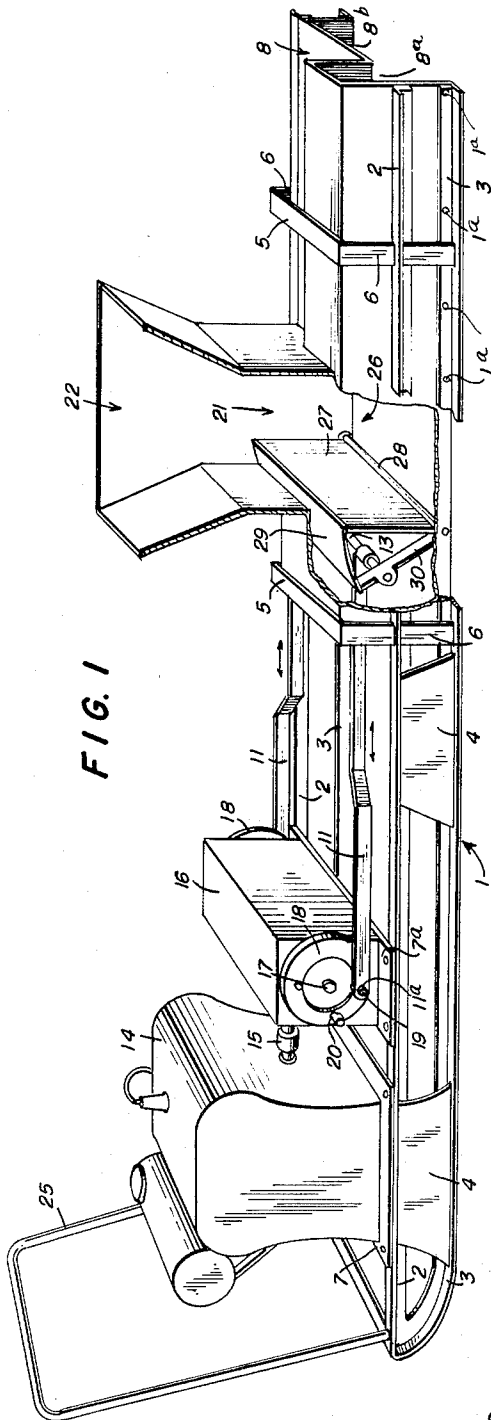


FIG. 1

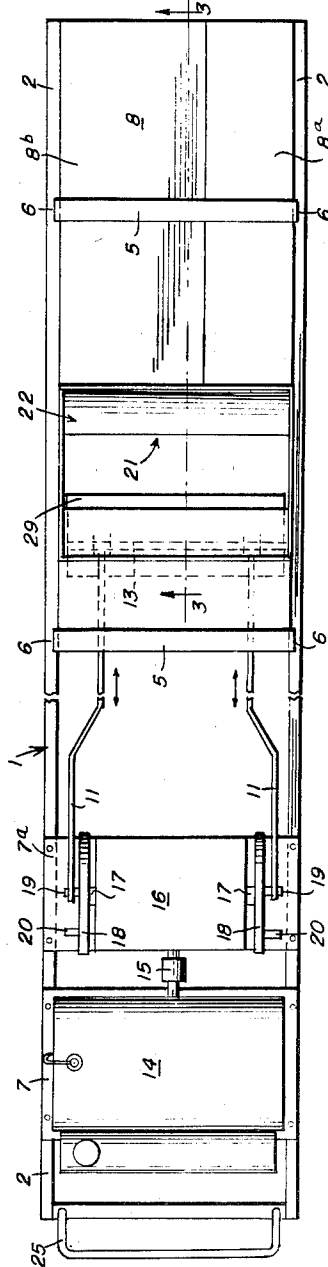


FIG. 2

INVENTOR
EWEN BUTCHER

BY *Howard Downing Seible*
ATTORNEYS

April 19, 1960

E. BUTCHER

2,932,875

UNIT FOR MOULDING CONCRETE MIX OR THE LIKE

Filed Aug. 1, 1955

2 Sheets-Sheet 2

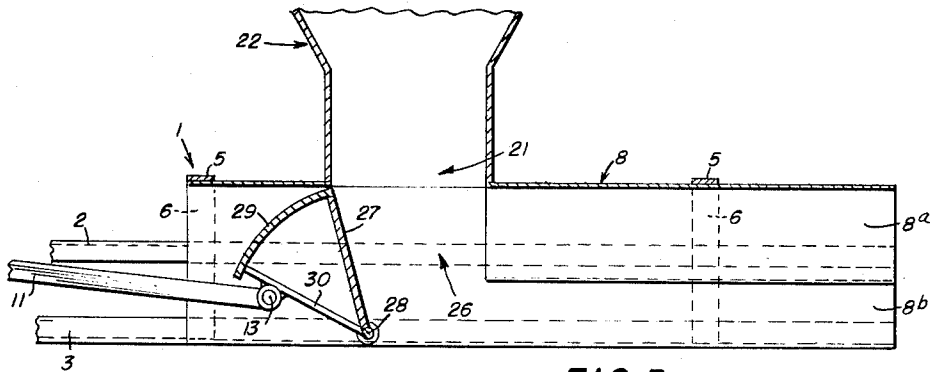


FIG. 3

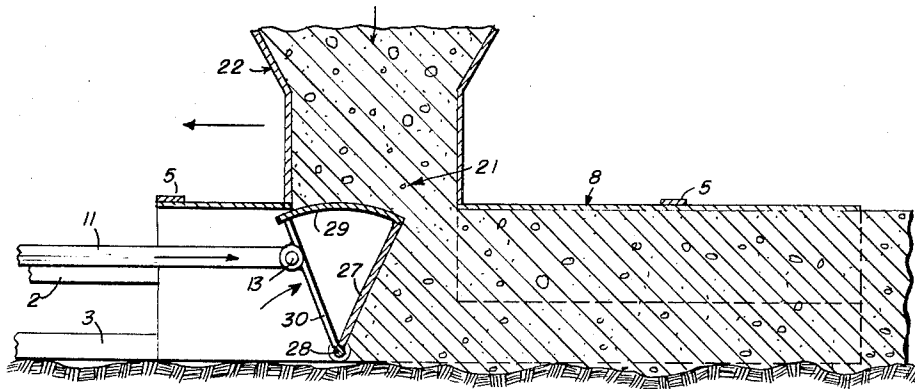


FIG. 4

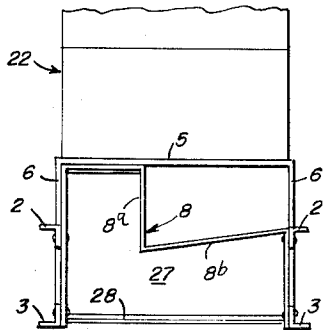


FIG. 5



FIG. 6

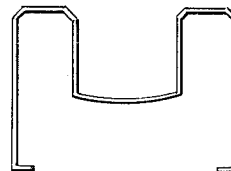


FIG. 7

INVENTOR
EWEN BUTCHER

BY *Shaw & Dowling*
ATTORNEYS

1

2,932,875

UNIT FOR MOULDING CONCRETE MIX OR THE LIKE

Ewen Butcher, Kawerau, New Zealand

Application August 1, 1955, Serial No. 525,678

Claims priority, application New Zealand August 6, 1954

4 Claims. (Cl. 25—32)

The invention relates to units for moulding concrete mix or the like and in particular has reference to the moulding of "laid" concrete formations, such as path-kerbs, channel and kerb combinations or like formations.

The generally accepted practice at present used in the formation of path-kerbs, channels or the like, usually consists in constructing boxing along the site on which the kerb, or channel or the like, is to be laid, then pouring concrete mix within the boxing, allowing the mix to settle and conform to the shape of the boxing then removing the boxing. However it is generally recognized that not only does such a method of kerb or channel construction require both considerable time and labour but of paramount importance, skilled labour is usually necessary in assembling the boxing to pre-determined measurements.

With the afordescribed points in mind it is an object of the invention to provide an improved unit for moulding concrete mix whereby these afordescribed disadvantages are overcome and concrete mix in semi-liquid or "dry" condition may be quickly laid and moulded to a selected formation in a continuous operation with a minimum of effort and without the necessity of providing a pre-laid boxing construction.

The improved unit is particularly suited to forming long continuous moulded kerb and channel, drains or path edges or other like similar formations of concrete required in path or street constructions, and by maintaining a regular supply of concrete mix to the unit, a kerb and channel formation for instance, may be rapidly formed in a manner facilitating a substantial saving in both time and labour.

According to the invention the improved unit comprises, a mould box provided with an open rear end, and open lower side and mounted on a base, a consolidating and propelling means mounted on the base adapted to consolidate and mould concrete mix placed within the mould box to the shape of the mould box and at the same time move the unit from the newly consolidated and moulded formation.

The invention will now be described with reference to the accompanying drawings in which:

Fig. 1 is a perspective view of the improved unit.

Fig. 2 is a plan view of the improved unit.

Fig. 3 is a part elevation in section showing the consolidating and propelling means.

Fig. 4 is a similar view to Fig. 3 but with the consolidating and propelling means in a different position,

Fig. 5 is an end elevation of Fig. 2.

Figs. 6 and 7 illustrate examples of alternative forms of mould boxes.

It will be understood that the improved unit may be used to shape formations of varying shapes, for example, low walls, path edges, road centre divisions as well as kerb and channel, and drain formations as have previously been referred to, according to the shape of the particular mould box used, but for the sake of convenience the main portion of the description hereinafter outlined

2

will refer to a mould box of the kerb and channel formation.

The base comprises a pair of longitudinal skids or runners generally indicated at 1 on which the unit is mounted. Each skid is formed by an upper member 2 and a lower member 3 of angle iron formation joined by struts 4. The lower member 3 of each skid 1 provides the actual contact of the unit with the ground and to aid movement of the unit during operation, the ends of the lower members 3 forming one end of the unit (hereinafter referred to as the forward end of the unit) are curved upwardly to join the upper members 2.

Towards the rear end of the unit the skids 1 are joined by cross members 5 secured between the upper ends of uprights 6 attached to the skids 1 and projecting above the upper members 2 of the skids 1, while towards the forward end of the unit the skids 1 are further braced from one another by bed plates 7 and 7a provided for the purpose of carrying integers of the unit as will be described.

The mould box which is indicated at 8 (see Fig. 1) is open along its underside and is provided with an open rear end and an open front end. The mould box 8 is secured between the skids 1 toward the rear end of the unit with the lower edges of its open underside in line with the lower edges of the lower members 2 of the skids 1 and with the edges of the open rear end in line with the rear ends of the skids 1 (see Fig. 1). The mould box 8 is secured to the skids 1, preferably by suitable detachable means, such as bolts and nuts 1a passed through the mould box 8 and the skids 1, the bolts and nuts 1a enabling the mould box 8 to be detached from the unit and a further mould box of different shape substituted.

In this instance the mould box 8 consists of a vertical leg 8a providing for the formation of a kerb, and a lateral leg 8b providing for the formation of a channel or gutter extending from the kerb.

As illustrated in the drawings, the unit is provided with a ramming chamber 26 which forms an extension of the mould box 8, the mould box 8 proper being in communication with the ramming chamber 26 and forming a continuation of the latter and extending rearwardly from the ramming chamber 26. The ramming chamber 26 which is of corresponding width to the mould box 8, houses a consolidating and propelling means, and concrete mix in a semi-liquid or "dry" condition adapted to be delivered into the ramming chamber 26 to enable the consolidating and propelling means to force the delivered mix into the mould box 8 to mould the mix to the shape of the interior of the mould box 8 and at the same time move the unit from the newly moulded mix, as will be described. A supply bin or chute 22 is mounted over the ramming chamber 26 and is in communication with the ramming chamber 26 by way of a supply port 21.

The consolidating and propelling means includes a ram plate 27 pivotally mounted across the width of the ramming chamber 26. Pivotal mounting of the plate 27 is provided by an axis shaft 28 on which the bottom edge of the plate 27 is secured, the ends of the shaft 28 being pivotally retained in suitable bearings in the walls of the ramming chamber 26 so that the shaft 28 and ram plate 27 extending upwardly therefrom are disposed across the ramming chamber 26. The ram plate 27 which is rectangular in formation extends across the width and height of the ramming chamber 26 so that the plate 27 may be pivoted in neat engagement within the ramming chamber 26 and immediately beneath the supply bin 22. Secured on the upper edge of the ram plate 27 is a curved deflecting guard 29, the deflecting guard 29 being arcuate in formation and curving downwardly and forwardly from the upper edge of the plate 27. The deflecting guard

29 is supported from the ram plate 27 by angle braces 30.

The braces 30 besides serving as supports for the deflecting guard 29 also serve as supports for the pivotal connection of the piston shaft to the ram plate 27 and in this direction the ends of the rods 11 constituting the piston shaft, are pivotally connected to each brace 30 approximately midway of the length of the latter (see Fig. 4).

The curved deflecting guard 29 forms an arc of an imaginary circle about the axis shaft 28 while the height of the ram plate 27 forms the radius of the same circle (see Fig. 4). During pivotal movement of the ram plate 27, the deflecting guard 29 passes in close proximity to the forward edge of the supply port 21 so that concrete mix in the supply bin 22 will be prevented from passing to the forward side of the ram plate 27 and will thus be directed to the rear side of the latter for consolidating within the mould box 8. Continued pivotal movement of the ram plate 27 against the concrete mix consolidated within the mould box 8 acts to prevent the ram plate 27 from completing its stroke with a result that the unit itself is forced forwardly on the ram plate 27 and rods 11, as the rods 11 straighten to their fully extended position, as has previously been described.

A prime mover such as a benzine motor 14 which is mounted on the forward bed plate 7 is provided for the purpose of driving the ram plate 27 through a drive shaft 15, and a gear reduction assembly 16, to which the drive shaft 15 is drivably connected. The gear reduction assembly 16 which is mounted on the rearmost bed plate 7a, besides serving as a means of providing a desired ratio of movement between the drive shaft 15 and the ram plate also serves as a means for applying reciprocal movement to the ram plate as will now be described.

A shaft 17 which is driven from the gear reduction assembly 16, is located in the latter at right angles to the drive shaft 15 so that its ends protrude beyond each side of the housing containing the gear reduction assembly 16 and plates 18 preferably of circular formation, are secured on each projecting end of the shaft 17. The free ends 11a of the rods 11 constituting the piston shaft are then brought to a position at each side of the gear reduction assembly 16, so that each said free end 11a may be pivotally connected to each plate 18 in off centre relationship to the latter by means of pivotal connection stub shafts or bolts 19.

Thus upon the motor 14 being set in motion to drive the gear reduction assembly 16 through the drive shaft 15, the shaft 17 is rotated to turn the plates 18 and move the free ends 11a of the piston rods 11 in circular motion and thus in turn apply an oscillating motion to the ram plate 27 within the ramming chamber 26.

It will be observed from the drawings that the length of the stroke of the ram plate 27 is governed by the distance of the pivotal connections 19 from the centres of the plates 18, and to facilitate limited adjustment to the length of the stroke, a series of apertures 20, capable of receiving the pivotal connections 19, are provided through each plate 18 at varying distances from the centre of each plate 18. The provision of the series of apertures 20 enables the position of each pivotal connection 19 to be varied and the length of the stroke of the piston head 12 within the mould box 8 thus varied accordingly.

A concrete mix supply port 21 for supplying mix to the mould box 8 is formed through the upper surface of the ramming chamber 26 at a point near the front end of the mould box 8, but within the range of the stroke of the ram plate 27.

The port 21 is in the form of a slot of a width less than the length of the stroke of the ram plate 27 so that when the ram plate 27 is in its extended position the port 21 will be substantially closed by the deflecting

guard 29 while when the ram plate 27 is in its retracted position, the port 21 will be open.

As indicated in the drawings an open bottomed supply bin 22 may be mounted over the supply port 21, so that a quantity of mix contained within the bin 22 may be fed into the mould box 8 at each retracted stroke of the piston head 12.

To commence operation the open rear end of the mould box 8 is butted against boxing or the like forming the end of the kerb and channel formation to be formed, and the motor 14 set in motion to reciprocate the ram plate 27 in front of the mould box 8 through the intermediary of the reduction gearing assembly 16 and the piston rods 11. At each retracted stroke of the ram plate 27 the port 21 is opened by the latter to permit a quantity of concrete mix 23 in the supply bin 22 to fall within the ramming chamber 26 and within the range of the stroke of the ram plate 27.

The mix 23 is contacted by the ram plate 27 and pushed along the mould box 8 (see Fig. 4) as the ram plate is thrust toward the mould box. A repetition of such an operation packs or builds up the mix 23 within the mould box 8 from the rear end of the latter to approximately the extended stroke limit of the ram plate 27 so that further mix 23 pouring through the supply port 21 during the retraction stroke of the ram plate 27, will be forced by the ram plate at the next stroke against the mix 24 already packed in the rearward portion of the mould box 8 and so act to cause the mould box 8 and unit to be forced forwardly as the ram plate moves rearwardly (see arrow Fig. 4). Thus by maintaining a steady supply of concrete mix 23 through the supply port 21 to the mould box 8, it will be readily observed that the reciprocating movement of the ram plate 27 will serve both to ram or consolidate the mix 23 and at the same time propel the unit along on the now moulded kerb and channel formation 24 so that concrete mix 24 newly moulded to the shape of the mould box 8 will be revealed at the rear of the mould box 8 as the unit is propelled along.

To assist in operating the unit a guide handle 25 of bifurcated formation is mounted on the front portion of the unit; the handle serving as a guide for an operator during moulding operations of the unit.

Figs. 6 and 7 of the drawings illustrate by way of example only, other forms of the mould box 8, Fig. 6 illustrating a mould box 8 providing for the formation of a concave gutter while Fig. 7 illustrates a mould box 8 providing for the formation of a gutter flanked by vertical walls. As previously mentioned where a mould box 8 of selected formation is mounted on the unit, a piston head 12 corresponding to the shape of the interior of the mould box 8 is attached to the end of the piston shaft 11 for sliding reciprocal movement within the mould box 8.

I claim:

1. A unit for molding concrete mix comprising a mold box provided with open ends and an open bottom, a base on which said mold box is mounted, a supply port leading through the upper surface of said mold box at one end, a ram plate closing the end of said mold box adjacent said supply port pivotally mounted by its lower edge at the bottom of said mold box, the upper edge of said ram plate being swingable toward said mold box partially across said supply port, a deflecting guard mounted on said ram plate to prevent concrete mix from falling behind said ram plate, and means to oscillate said ram plate on said pivot to compact and mold concrete mix introduced through said supply port and to move the unit from the newly compacted and molded concrete mix.

2. A unit for molding concrete mix comprising a mold box provided with an open forward and an open rear end, and an open bottom, skids extending parallel to the axis of said mold box on which said mold box is mounted, an engine mounted on said skids; means driven by said

5

engine to produce reciprocating motion generally axially of said mold box, a ramming chamber open at the top mounted at the forward end of said mold box and extending thereacross, a supply chute to supply concrete mix to said ramming chamber, a ram means closing the lower forward side of said ramming chamber, said ram means being formed as a sector of a cylinder of less arc than the axial dimension of said molding chamber, and being pivotally mounted to pivot about its apex at the bottom of said ramming chamber, said ram means being connected to said means driven by said engine to oscillate said ramming means under the influence of said reciprocating motion, to compact and mold concrete flowing into said ramming chamber from said supply chute, and to create a force against the molded concrete mix in said mold box to move said unit forward.

3. A unit for molding concrete mix comprising a mold box provided with an open forward end, an open rear end and an open underside, skids on which said mold box is mounted, a supply port leading through the upper surface of the mold box, a supply chute leading to the supply port, a ramming chamber forming a forward extension of the mold box and positioned immediately beneath the supply port, a ram plate secured on a shaft pivotally mounted across the bottom of the ramming chamber to close the forward side of said ramming chamber, a deflector plate secured to the top edge of the ram plate and extending toward the forward end of the mold box, a piston shaft pivotally connected by one end to the ram plate at a predetermined distance from the bottom of the ram plate, a prime mover mounted on the base and to which the opposing end of the piston shaft is pivotally connected, to effect reciprocal movement of the piston shaft and thus impart angular movement to the ram plate in order that concrete mix entering the ramming chamber through the supply port will be compacted and molded by the ram plate to the shape of the

6

mold box, the ram plate at the same time moving the unit from the newly compacted and molded mix.

4. A unit for molding concrete mix comprising a mold box provided with an open forward end, an open rear end and an open under surface, skids on which said mold box is mounted in a manner facilitating detachment of the mold box from the skids, a supply port leading through the upper surface of the mold box at the forward end of the mold box, a supply chute mounted on the mold box and leading to the supply port, a ramming chamber forming a forward extension of the interior of the mold box and situated immediately beneath the supply port, a ram plate formed as a sector of a cylinder extending across the ramming chamber and secured at its apex to a shaft pivotally mounted across the bottom of the ramming chamber, an engine mounted on the skids, reciprocating rod means actuated by said engine, the ram means being connected to said rod means to be angularly pivoted under the action of the engine to compact and mold concrete mix entering the ramming chamber through the supply port and at the same time move the unit from the newly compacted and molded mix.

References Cited in the file of this patent

UNITED STATES PATENTS

25	239,449	Coleman	Mar. 29, 1881
	286,861	Speed	Oct. 16, 1883
	288,034	Detrick	Nov. 6, 1883
30	615,085	Martin et al.	Nov. 29, 1898
	772,319	Wilson	Oct. 11, 1904
	1,303,566	Lance	May 13, 1919
	1,606,160	Foster	Nov. 9, 1926
	2,727,457	Hedtke	Dec. 20, 1955

FOREIGN PATENTS

35	713,812	France	Aug. 24, 1931
	397,882	Great Britain	Sept. 1, 1933
	688,154	Great Britain	Feb. 25, 1953