Jan. 6, 1953 C. BIRD 2,624,250

APPARATUS FOR FLOATING AND FINISHING SOFT CONCRETE

Filed Feb. 14, 1950

2 SHEETS—SHEET 1

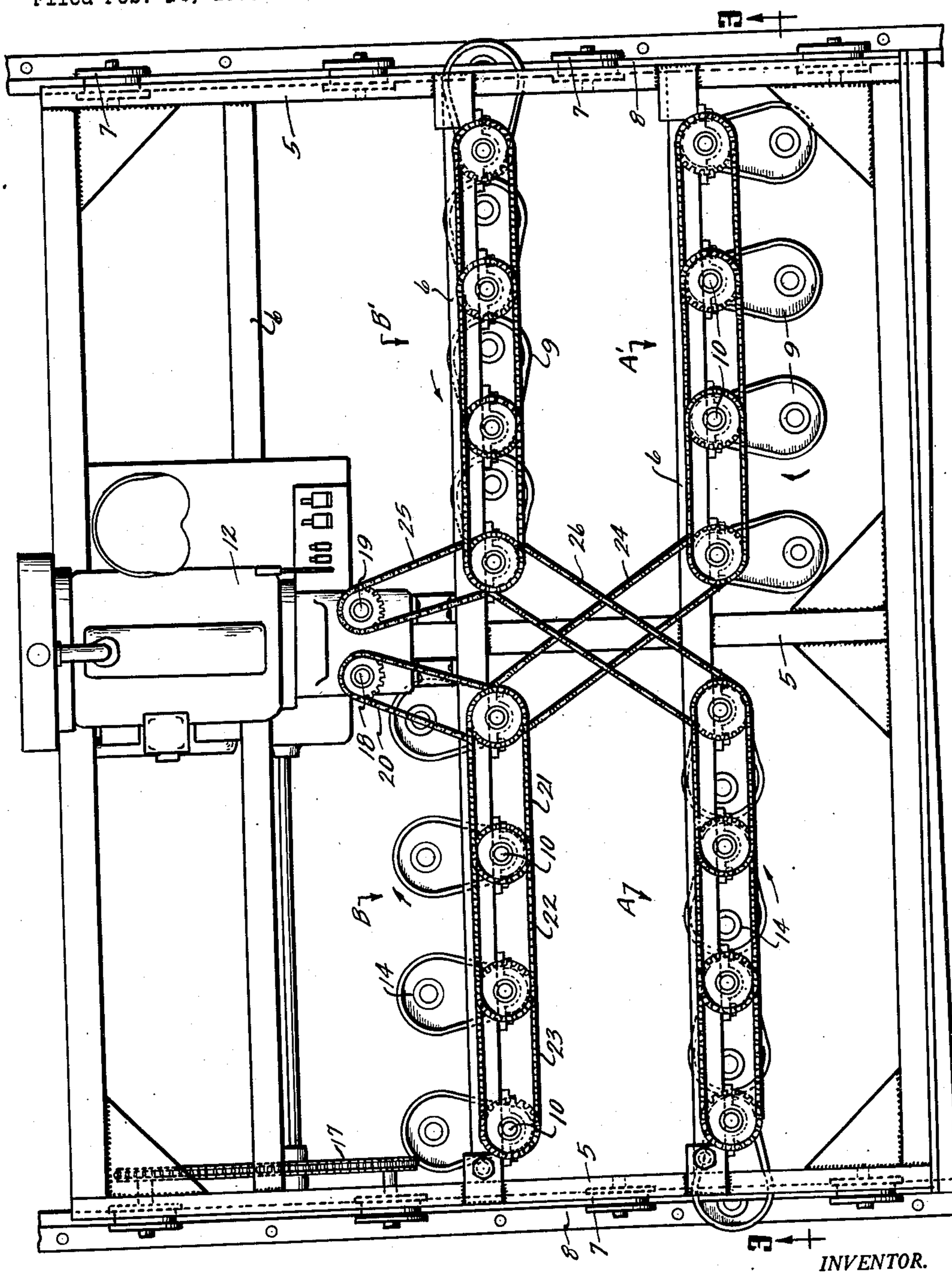

FIG. 1

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2 SHEETS—SHEET 2

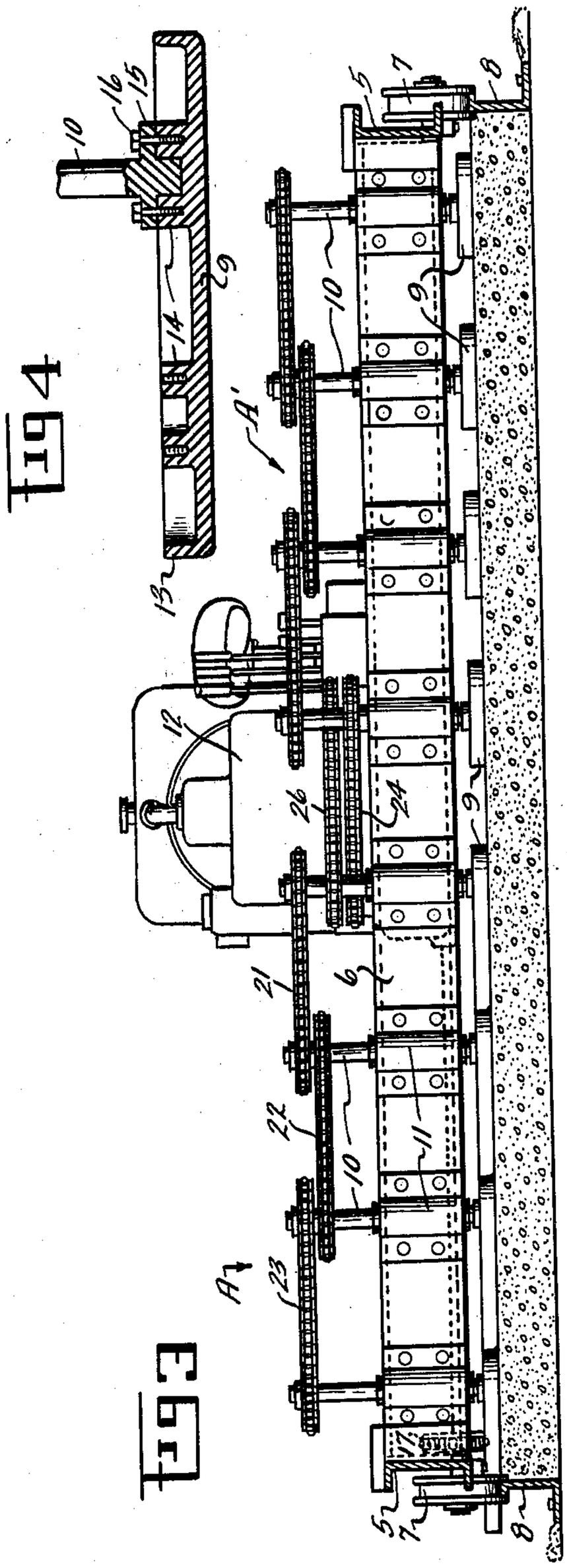

Fig 4

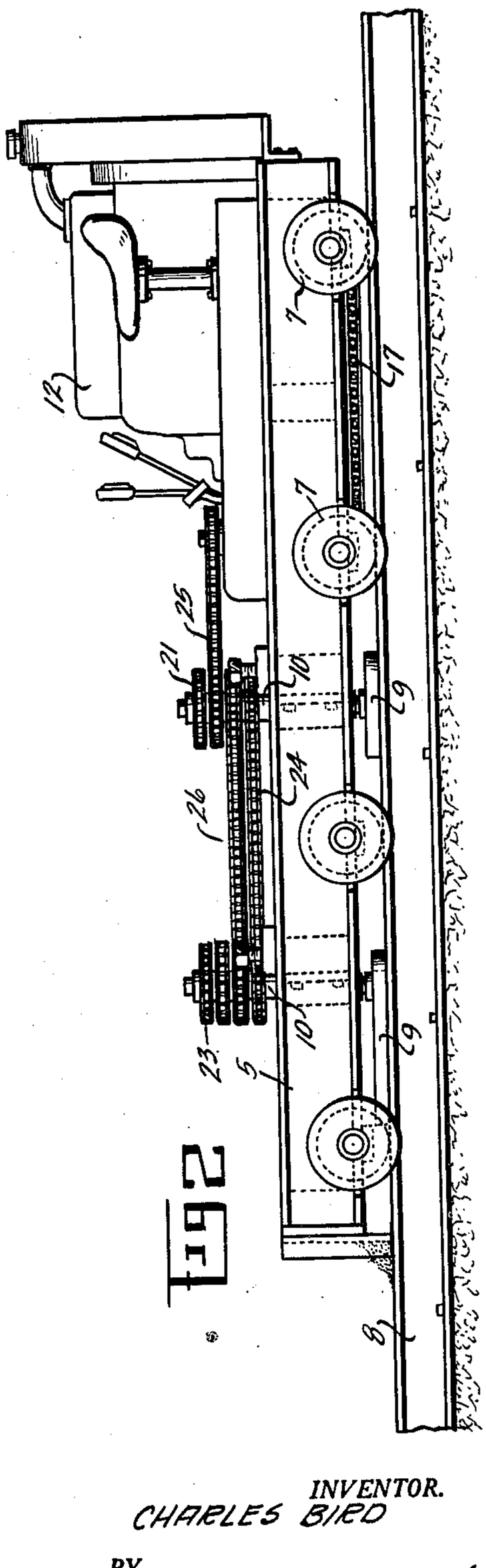

Fig 2

Fig 3

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APPARATUS FOR FLOATING AND FINISHING SOFT CONCRETE

Charles Bird, Dayton, Ohio

Application February 14, 1950, Serial No. 144,122

6 Claims. (Cl. 94—45)

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This invention relates to an apparatus for distributing and leveling soft concrete and more particularly to such an apparatus adapted to be supported above and moved over the concrete which is to be distributed, and comprising a plurality of individual rotatable elements for distributing and leveling the concrete and providing the same with a finished surface.

It has been proposed heertofore to provide an apparatus of this general type but these prior apparatus have been unsatisfactory and so far as I am informed none of them have gone into commercial use.

One object of the invention is to provide such an apparatus having a plurality of rotatable elements for floating the concrete and so arranged that the concrete will be leveled and all markings or rough portions on the surface removed.

A further object of the invention is to provide such an apparatus in which the floating elements will be of such a character and so arranged that the path of rotation of each element will overlap a portion of the path of rotation of an adjacent element, or elements.

A further object of the invention is to provide such an apparatus having a plurality of series of rotatable elements so arranged that the elements of each series will move excess material lengthwise of that series and a second series of elements will move that excess material to the edge of the pavement.

A further object of the invention is to provide a floating element of improved construction for operation in the manner described.

Other objects of the invention may appear as the apparatus is described in detail.

In the accompanying drawings, Fig. 1 is a plan view of an apparatus embodying the invention; Fig. 2 is a side elevation of such an apparatus; Fig. 3 is a section taken on the line 3—3 of Fig. 1; and Fig. 4 is a sectional detail view of one of the floating elements.

In these drawings I have illustrated one embodiment of the invention but this embodiment has been chosen for the purpose of illustration only and it is to be understood that the apparatus as a whole, as well as the several parts thereof, may take various forms and arrangements without departing from the spirit of the invention.

In the embodiment here illustrated the apparatus comprises a movable frame including three longitudinal bars 5, parallel with the line of movement of the frame, and a plurality of transverse cross bars 6 rigidly connected with the longitudinal bars and spaced one from the other. The outer longitudinal bars 5 are supported by rollers 7 adapted to engage and to travel on the upper edges of the longitudinal forms, or bars, 8 which confine the concrete and determine the width of the section of pavement being laid. The rollers are preferably grooved to embrace the upper edges of the bars 8 and prevent the lateral displacement of the apparatus.

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Mounted on the frame is a series, or a plurality of series, of rotatable elements 9 arranged to engage the cement, distribute and level the same and provide the leveled cement with a finished surface, these elements being herein referred to as floating elements. Each floating element is individually rotatable about a vertical axis. The floating elements of each series are mounted on a rigid structure, such as one of the cross bars 6, and constitute what is commonly called a screed. There may be any suitable number of screeds and in the present instance, there are four screeds which are preferably arranged in pairs, and the screeds of each pair are preferably arranged in a line transverse to the line of movement of the frame. The screeds of the front pair of screeds are designated as A and A', the two screeds being arranged on opposite sides of the longitudinal center line of the frame. The screeds of the rear pair of screeds are designated as B and B', and are also arranged on opposite sides of the center line of the frame. The floating elements of each screed rotate in the same direction and the floating elements of the screeds of each pair rotate in opposite directions. Preferably the floating elements of the two screeds on the same side of the center line rotate in opposite directions. Thus, the floating elements of screed A rotate counterclockwise and the floating elements of A' rotate clockwise and the floating elements of screed B rotate clockwise and the floating elements of screed B' rotate counterclockwise.

The floating elements of each screed are of such a character and are mounted for rotation about vertical axes so arranged that each element may make a complete rotation about its axis without contacting or interfering with the rotation of an adjacent element. For this purpose each floating element is mounted for rotation about an off-center axis and as here shown, each floating element is rigidly connected, adjacent one end thereof, with a shaft 10 which is rotatably mounted in a vertical bearing 11 on the supporting structure and is provided above the bearing means with means whereby it may be drivingly connected with a suitable source of

power, such as an internal combustion motor 12 mounted on the frame. The floating elements may be of any suitable shape and preferably each such element comprises an oblong or elongate body which decreases in width from one end thereof to the other end thereof. Each floating element is rigidly secured to its shaft 10 and the several shafts are so connected one with the other, as will appear hereinafter, that the floating elements of each screed extend at all times in the same radial direction from their respective shafts. The shafts are so spaced one from the other that the outer or larger end of each element will pass the inner or smaller end of the adjacent element, or elements, but will move close to that element, and thus, the path of rotation of each element intersects or overlaps a portion of the path of rotation of an adjacent element, or elements. The distance between shafts as measured in the transverse direction is slightly greater than the distance between the two spaced centers or axes on the rotatable element 9 plus the radii of the element at the smaller and larger ends. The elements, therefore, have an overall length which is slightly less than the distance between the shafts. Consequently, as each element rotates, the larger end of the element will describe a path about the axis of the smaller end, and has an outermost boundary which does not quite touch the radial surface of the smaller end of the adjacent element.

In the particular form here shown, the two ends of each floating element are approximately semi-circular but of different diameters and the lateral edges of the body converge toward the smaller end thereof. The shaft is connected with the body at a point between the smaller end thereof and the transverse center line of the body. Preferably the body of the floating element has a flat lower surface and is provided with a continuous upwardly extending flange 13, the edges of the body being rounded. While the shafts are here shown as connected with the body of the floating element adjacent the smaller end thereof, this shaft may be connected with either end portion of the body and will function in substantially the same manner when connected at either point, and preferably each floating element is provided with means whereby the shaft may be detachably connected with either end portion thereof. In the present instance, as best shown in Fig. 4, the body of each element is provided with two upwardly extending socket members, or bosses, 14, arranged adjacent the respective ends thereof, each boss having means whereby the shaft may be connected therewith. In the particular arrangement shown, the lower end of the shaft is adapted to fit snugly within either boss, the shaft is provided with a flange 15 to engage the upper end of the boss and this flange is provided with openings to receive screws 16 by which it may be detachably secured to the boss.

Movement is imparted to the frame by the motor 12 which is drivingly connected with a part of the rollers 7, as shown schematically at 17 in Fig. 2. The motor may be connected with the floating elements of the several screeds in any suitable manner. In the present arrangement there are provided two vertical shafts 18 and 19 which are connected in a conventional manner with the motor for rotation thereby in opposite directions. The shaft 18 is connected by a sprocket chain 20 with the shaft 10 of the

inner floating element of screed B and the shafts of the several floating elements of that screed are connected one with the other by sprocket chains 21, 22 and 23, as shown in Figs. 2 and 3. The shaft 10 of the inner floating element of screed B is connected by a sprocket chain 24 with the shaft 10 of the inner floating element of the screed A'. The vertical shaft 19 is connected by a sprocket chain 25 with the shaft 10 of the inner floating element of screed B' and that shaft is connected by a sprocket chain 26 with the shaft of the inner floating element of screed A, the several shafts of each screed being connected one with the other in the same manner as the shafts of screed B.

As the apparatus moves forwardly over the soft freshly laid concrete the floating elements of screed A', rotating in a clockwise direction, will distribute the concrete, level the same and move excess concrete transversely to the line of movement of the apparatus, and the excess concrete advanced by each floating element is engaged and further advanced by each succeeding floating element of that screed. The inner floating elements of the two screeds of the front pair A and A' also move in overlapping paths and any excess material advanced by the inner floating element of screed A' will be engaged and advanced by the inner floating element of screed A and the other elements of that screed will move excess material, if any, to and beyond the edge of the pavement. Inasmuch as each floating element of each screed moves over the adjacent portion of the path of rotation of the next preceding floating element it will remove any markings or rough places which may have remained after the preceding screed has moved over the material. It will be understood that the floating elements rotate at relatively high speed while the apparatus as a whole moves forward at a low speed, thus each floating element moves repeatedly over the same part of the concrete as the apparatus slowly advances. The floating elements of the rear screeds B and B' function in the same manner as the floating elements of the front screeds but the floating elements of the rear screeds rotate in directions opposite to the directions of rotation of the floating elements of the corresponding front screeds, and serve to eliminate any roughness and to fill any depressions which may have been left on or in the surface of the concrete levelled by the front floating elements, thus providing the pavement with a properly finished surface. The apparatus may move in either direction and usually moves forwardly and then rearwardly over each section of pavement and may make several passes over each section. When the apparatus moves in the reverse direction the rear screeds become the front screeds but the operation is the same as when the apparatus moves forwardly.

Due to the operation of the motor and the movement of the apparatus, a slight vertical vibration is imparted to the several floating elements which causes the aggregate of the concrete to settle more or less, thereby leaving the fines in the upper portion of the concrete and avoiding the presence of pebbles or the like in the finished surface.

While I have shown and described one embodiment of my invention, I wish it understood that I do not desire to be limited to the details thereof as various modifications may occur to a person skilled in the art.

Having fully shown and described my inven

tion, what I claim as new and useful and desire to secure by Letters Patent, is:

1. In an apparatus for floating and finishing soft concrete, a movable frame, a screed mounted on said frame and extending transversely to the line of movement thereof, said screed comprising a plurality of oblong floating elements, means for mounting each of said elements on a part fixed with relation to said frame for rotation about a vertical axis extending through an end portion of said element, the several axes being spaced one from the other lengthwise of said screed distances approximating the length of each element, and means for rotating said elements in unison and in the same direction.

2. In an apparatus for floating and finishing concrete, a movable frame, a screed on said frame extending transversely to the line of movement thereof, said screed comprising a plurality of oblong floating elements, each element decreasing in width toward one end thereof, means for mounting each of said elements on a part fixed with relation to said frame for rotation about a vertical axis extending through an end portion of said element, the several axes being spaced one from the other lengthwise of said series at distances approximating the length of said elements whereby the elements may move into longitudinal alinement without interference with adjacent elements, and means for rotating said elements in unison and in the same direction.

3. In an apparatus for floating and finishing concrete, a movable frame, a screed on said frame extending transversely to the line of movement thereof, said screed comprising a plurality of oblong floating elements, each element decreasing in width toward one end thereof and both end portions thereof being approximately semicircular, means for mounting each of said elements on a part fixed with relation to said frame for rotation about a vertical axis extending through an end portion of said element, the several axes being spaced one from the other lengthwise of said series at distances approximating the length of said elements whereby the elements may move into longitudinal alinement without interference with adjacent elements, and means for rotating said elements in unison and in the same direction.

4. An apparatus for floating and finishing soft concrete comprising a frame having means whereby it may be supported above the concrete which is to be floated and moved over the same, and a plurality of floating elements rotatably mounted on said frame substantially in a common plane about off-center axes arranged substantially in a line transverse to the line of movement of said frame, the axes about which said floating elements rotate being spaced apart distances approximating the length of the elements whereby that part of each floating element which is the farther removed from the axis of rotation thereof rotates in a path which overlaps the path of rotation of the corresponding part of an adjacent floating element, and means for rotating said floating elements at the same speed.

5. An apparatus for floating and finishing soft concrete comprising a frame having means whereby it may be supported above the concrete which is to be floated and moved over the same, two series of floating elements mounted on said frame and extending transversely to the line of movement thereof on opposite sides of a line extending in the direction of movement of said frame, the elements of each series being rotatable in the same direction and in unison about vertical off-center axes and the elements of each series being rotatable in unison in a direction opposite the direction of rotation of the elements of the other series, and the axes of adjacent elements of the two series being spaced at distances approximating the length of the elements, whereby the paths of rotation of adjacent elements overlap, and means for rotating the floating elements of both series.

6. An apparatus for floating and finishing soft concrete comprising a frame having means whereby it may be supported above the concrete which is to be floated and moved over the same, a pair of front screeds and a pair of rear screeds mounted on said frame, the screeds of each pair being mounted on opposite sides of a line extending in the direction of movement of said frame substantially in line one with another, each screed including a series of floating elements rotating in unison in the same direction about off-center axes, the elements of the screeds of each pair being rotatable in unison in opposite directions, and the elements of the screeds on the same side of said line being rotatable in opposite directions, and the axes of adjacent elements of each pair of screeds being spaced at distances approximating the length of the elements whereby the path of rotation of each floating element on each screed having a radius of a length greater than one-half the distance between the axes of adjacent floating elements on said screed whereby the paths of rotation of adjacent elements overlap, and means for rotating the floating elements on the several screeds.

CHARLES BIRD.

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