Sept. 21, 1954 H. E. McCRERY 2,689,507

BLADE ASSEMBLY

Filed June 3, 1948

3 Sheets-Sheet 1

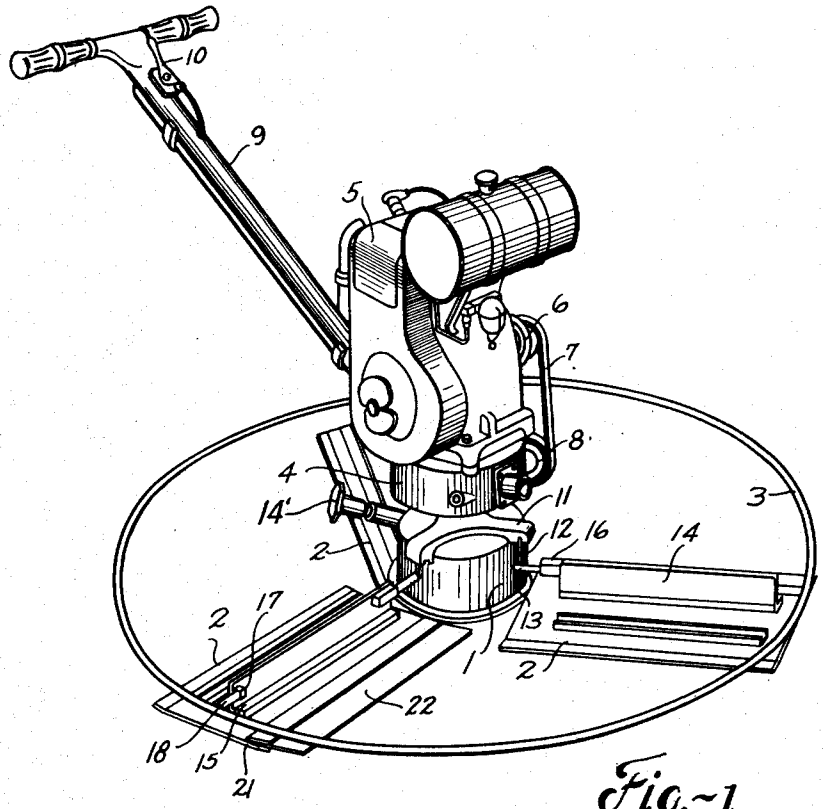


Fig.-1

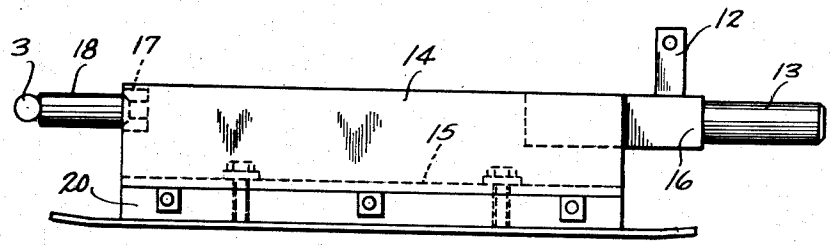


Fig.-2

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BLADE ASSEMBLY

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3 Sheets-Sheet 2

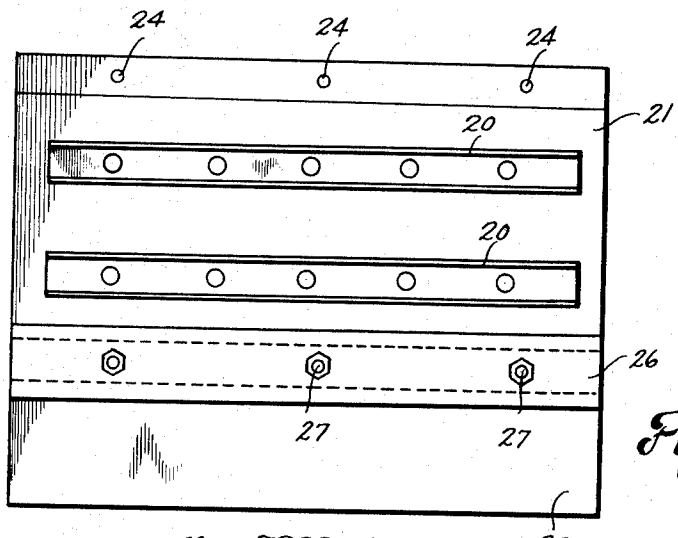


Fig.-3

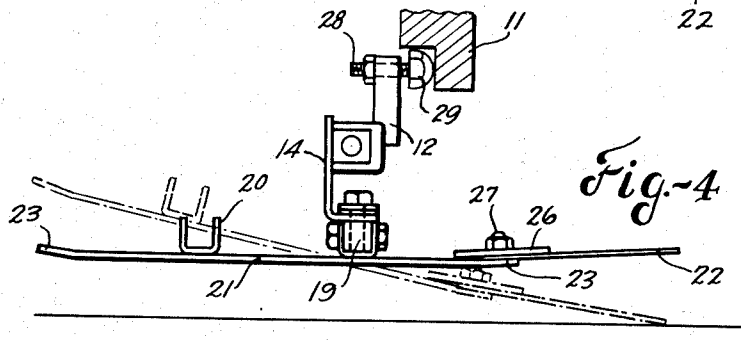


Fig.-4

Fig.-5

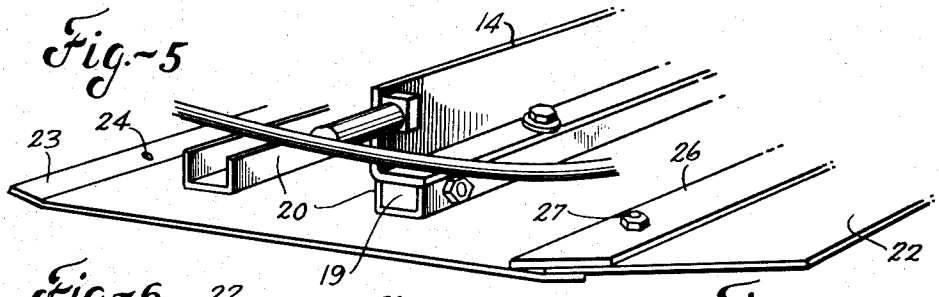


Fig.-6

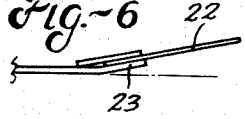


Fig.-7



Fig.-8

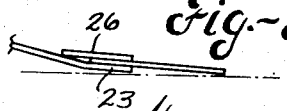
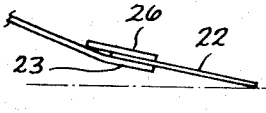


Fig.-9



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BLADE ASSEMBLY

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Fig.-10

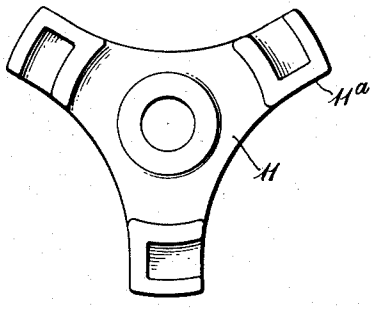
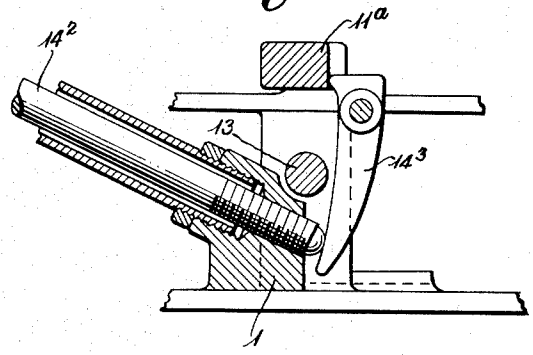


Fig.-11



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UNITED STATES PATENT OFFICE

2,689,507

BLADE ASSEMBLY

Harold E. McCrery, Dayton, Ohio, assignor to Master Vibrator Company, Dayton, Ohio, a corporation of Ohio

Application June 3, 1948, Serial No. 30,869

3 Claims. (Cl. 94—45)

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This invention pertains to rotary power driven surfacing implements, and more particularly to a blade assembly for use in such implements.

While for illustrative purposes the invention is herein shown and described as embodied in a concrete troweling machine or float for finishing concrete surfaces and hard or mastic toppings for concrete sub-bases, such as shown and claimed in my copending companion application, Serial No. 681,771, filed July 6, 1946, now matured into Letters Patent No. 2,594,331, issued April 29, 1952, it is not necessarily limited to such a machine for use.

The blade assembly forming the subject matter hereof permits the rotary power driven apparatus with which they are used to be easily and quickly converted from a "floating" operation to a "finishing" operation, and represents a modification of the double blade assembly shown and claimed in my above-identified copending application.

The object of the invention is to improve the construction as well as the means and mode of operation of rotary surface treating apparatus, whereby it may not only be economically constructed, but will be more efficient in use, uniform in action, having a minimum number of working parts and be unlikely to get out of repair.

A further object of the invention is to provide a dual purpose blade, which may be used for both "floating" and "finishing" a surface without the necessity of reversing such blade.

A further object of the invention is to provide a surfacing blade having a pair of angularly disposed working surfaces, which surfaces may be brought into working engagement with the surface being treated by rotation of the blade about its pivotal mounting.

A further object of the invention is to minimize the cost of such blades, and simultaneously therewith minimize the change-over time, thereby providing a more efficient and economical assembly.

A further object of the invention is to provide a blade assembly which may be reversed upon its mounting while remaining in its original plane to present a new working surface upon wear of the original surface.

A further object of the invention is to provide a blade assembly embodying the advantageous structural features, the inherent meritorious characteristics and the mode of operation herein set forth, or their equivalents.

With the above primary and other incidental objects in view as will more fully appear in the specification, the invention intended to be protected by Letters Patent consists of the features of

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construction, the parts and combinations thereof, and the mode of operation, as hereinafter described or illustrated in the accompanying drawings, or their equivalents.

In the accompanying drawings, wherein is shown the preferred but obviously not necessarily the only form of embodiment of the invention,

Fig. 1 is a perspective view of a power driven rotary concrete finishing machine embodying the present invention.

Fig. 2 is a side view of the blade assembly removed from the finishing machine.

Fig. 3 is a top view of the blade assembly per se, removed from its mounting member.

Fig. 4 is an end view of the blade assembly in cooperation with the adjusting spider.

Fig. 5 is a fragmentary perspective view of the end of the blade assembly when installed in the finishing machine.

Figs. 6 to 9, inclusive, are diagrammatic views showing various operating positions of the blade assembly.

Fig. 10 is a bottom plan view of the sweep control spider.

Fig. 11 is a detail showing of the sweep adjusting means.

Like parts are indicated by similar characters of reference throughout the several views.

The present invention is a further development of those shown in my above-identified copending application, the copending application of Harold S. Boulton, Serial No. 721,574, filed January 11, 1947, now matured into Letters Patent No. 2,605,683, issued August 5, 1952, and another copending application of mine, Serial No. 735,627, filed March 19, 1947, to all of which cross reference is made, pertinent portions thereof being shown and described herein for illustrative purposes only, but which per se, form no part of the present invention.

Referring to the accompanying drawings, the rotary surfacing machine in Fig. 1, comprises a rotary base 1 from which radiate a plurality of rotatably adjustable sweeps 2—2, surrounded by a guard ring 3 upon which the outer ends of the sweeps 2 are pivoted. Located in axial relation above the revoluble base 1 is a gear housing 4 surmounted by a driving motor 5. The motor shown in Fig. 1 is a conventional explosive engine or hydrocarbon motor. An electric motor may be substituted for the explosive engine 5. A driving pulley 6 of the motor, of whatever type, is connected by a V belt with a driven pulley 8 of the gear driving mechanism within the housing 4. A handle 9 extends upwardly and radially from

the housing 4 for controlling and guiding the machine. Manually operated control devices 10 mounted on the handle 9 within easy reach of the operator, are connected through the handle shaft with the actuating motor 5.

The power transmission, driving and adjusting features of the instant machine are substantially those of my Patent No. 2,594,331, to which reference is made. In brief, the means for adjusting the sweeps or blades about their oscillatory axes comprise a spider 11 journaled upon the central supporting member immediately above the base 1, for limited relative oscillatory movement. The radial arms of the spider extend into overhanging relation with the periphery of the base 1 and have in their under sides pockets or recesses into which project the ends of rock arms 12 fast upon sweep shafts 13. By rotatively adjusting the spider 11, the rock arms 12 can be minutely adjusted simultaneously to slightly rock the shaft 13 and with them the work blades to correspondingly vary their pitch.

The spider 11 is rotatably adjusted relative to the base 1 by a hand wheel 14^1, the shaft 14^2 of which is threadedly supported within the base 1 for longitudinal motion relative thereto. The end of the shaft 14^2 has thrust engagement with a lever 14^3 within the base 1, the opposite end of the lever projecting above the base 1 into thrust engagement with one of the radial arms 11^a of the spider 11.

The instant sweeps comprise a blade supporting angle bar 14 having a laterally projecting bottom flange 15 to the inner end of which is welded a short rectangular bar 16, which extend beyond the angle bar as the cylindrical trunnion or sweep shaft 13. The rock arm 12 is welded to the rectangular portion 16 of the shaft. At the opposite end of the angle bar 14 there is welded in axial alignment with the trunnion 13 a rectangular collar 17 within which trunnion studs 18 welded to the surrounding guard ring 3 are engageable.

The vertical portion of the angle bar 14 is disposed substantially coincident with the radii of the axis about which the sweeps rotate. Attached to the flange 15 of the angle bar 14 is a rectangular bar 19, to which in turn is attached a channel member 20 carried by the blade assembly 21–22.

As shown in Fig. 3, a pair of channels 20 are secured to the larger or "float" blade 21 in equally spaced relation on opposite sides of the center line thereof. Only one of said channels are used at a time, but the other channel is assembled to the blade so that the blade may be reversed in its own plane and the second channel mounted on the bar 19 to present a new and unused contact area in engagement with the concrete being worked. The opposite areas 23 are slightly inclined relative to the main area of the blade, such inclination serving the dual purpose of preventing "digging" of the concrete surface being worked, and also providing means for mounting the second of "finishing" blade 22 on the "float" blade 21 with the contact areas of the two blades being in divergent, angular relation one with the other.

A series of equally spaced holes 24 are provided in the inclined edge areas 23 of the "float" blade 21 by means of which the "finishing" blade 22 is mounted on the "float" blade.

Mounted on the trailing edge of the "float" blade 21 is a somewhat smaller "finish" blade 22, one edge of which has a series of holes therein corresponding to the holes 24 in the "float" blade. Overlying the "finish" blade 22 is a backing or stiffening strip 26, the "float" blade 21, the "finish" blade 22 and the strip 26 being fixedly secured together by bolts 27. The "finish" blade 22 is slightly inclined relative to the "float" blade 21 and is not in contact with the concrete surface during the "floating" operation as shown in Fig. 4.

The "finish" blade 22 is also symmetrical and may be turned upside down upon excessive wear of the lower surface, thereby providing a new and unworn surface for further productive work. Upon change of the "float" blade by use of the other channel 20, the "finish" blade 22 may be secured to the opposite edge of the "float" blade, and work continued. Thus, both blades are so constructed that double wear may be obtained therefrom before it becomes necessary to completely replace the blade assembly.

The medial line of the "finish" blade 22 is like the medial line of the "float" blade 21, offset relative to the oscillatory axis of the sweep assembly.

In operation the machine is initially set with the "float" blade 21 in a substantially horizontal position as shown in full lines in Fig. 4. For some type of surfacing the floating operation is best performed with the float blade 21 in a slightly inclined position, i. e., with the leading edge thereof (to the left of Fig. 4) slightly elevated in relation to the working surface substantially as shown in Fig. 7. Whether in slightly inclined or substantially horizontal position, the "finish" blade 22 carried by the "float" blade 21 is so positioned as to be in upwardly inclined spaced relation with the working surface. The mounting of the "finish" blade 22 upon the inclined trailing edge 23 of the "float" blade 21 provides for maintenance of the "finish" blade in inoperative position during periods of use of the "float" blade 21.

To change the machine from a "floating" to a "finishing" operation, it is only necessary to adjust the hand wheel 14^1 to further oscillate the sweep assembly about its oscillatory axis. By so doing, the sweep assembly is brought into the "finishing" position, shown in dotted lines in Fig. 4, whereby the "finish" blade 22 is brought into operative position and the "float" blade 21 is placed in inoperative position.

The change from "floating" to "finishing" is thereby greatly simplified since the necessity of completely reversing the sweep assembly is completely eliminated. Both the "finish" blade 22 and the "float" blade 21 are so related that either may be brought into operative position by a slight adjustment of the hand wheel 14^1.

By reducing the distance between the mounting channel 20 and the trailing edge of the "float" blade 21, flexibility of the blade is reduced, although not eliminated. A relatively stiff float blade has been found to be highly advantageous in the working of cementitious surfaces. Upon movement of the "finish" blade 22 into operative position, however, the distance between the mounting channel 20 and the trailing edge of the blade is greatly increased, which permits greater flexing of the blade assembly during the "finishing" operation. Increased flexibility in the "finishing" operation has been found to be of advantage in that it produces a better surface in less time. The backing strip 26 prevents excessive flexing of the blade assembly through the joint area, and confines the flexing to the essen-

tial area of the blade assembly, namely in the "finish" blade 22.

The backing strip 26 also serves to reduce the flexing of the "float" blade 21 while in use, thus assisting minimization of flexing in the blade.

To compensate for any inequalities in the assembly of the sweep units, an adjustable thrust member 28 is engaged in the upstanding rock arm 12, the cap 29 of which is engageable within the recesses in the adjusting spider 11. By movement of the thrust member 28 relative to the rock arm 12, each sweep assembly may be adjusted individually into corresponding planes so that upon adjustment of the hand wheel 14[1] each sweep assembly will assume a corresponding position in relation to the work surface.

The present construction provides what is in effect a single blade having a pair of working surfaces divergently inclined one relative to the other, which surfaces may be optionally selected for operation to the exclusion of the other surface. Each of the pair of work surfaces may be easily brought into operative position by a slight adjustment of the hand wheel 14[1] without necessitating removal of the guard ring 3, change of blades, or disturbance to the adjusting mechanism. The overall weight of the sweep assembly is greatly reduced, while providing a more efficient and advantageous structure, especially one in which the blades may be easily interchanged or reversed to permit the maximum use thereof before replacement.

It has been found beneficial on certain types of concrete to use the surfacing blade in an intermediate position, i. e., with a portion of both the float blade 21 and finish blade 22 in operative engagement with the surface being worked. In such position the blade has spaced contact with the surface coincident with the heel or trailing edge of the float blade and the trailing edge of the finish blade.

Examples of various blade positions are diagrammatically shown in Figs. 6 to 9, inclusive. Fig. 6 shows the initial position with the float blade 21 in substantially horizontal position contacting the work surface throughout its entire area. Fig. 7 shows the first stage of adjustment after the initial floating operation. The float blade 21 is inclined slightly and the finish blade 22 is lowered somewhat toward the work surface. Several different positions of adjustment intermediate the positions of Figs. 6 and 8 may be used sequentially, or any one desired position may be utilized for performing this step in the surfacing operation.

Fig. 8 shows the intermediate position wherein both the float and finish blade are in working contact with the concrete surface. As is shown therein, the blade assembly has operative engagement with the work surface at relatively spaced points producing a double troweling action during one pass over the work surface. The inclined area 23 of the float blade is in engagement with the work surface along its trailing edge, while the trailing edge of the finish blade 22 is also in engagement with the surface being worked. The offset in the assembly resulting from the overlapped engagement of the finish and float blades permits the simultaneous engagement of the two blades with the work surface at relatively spaced points. This same result may be achieved in a single piece blade by forming a slight offset therein intermediate the two points of desired contact.

Fig. 9 shows the final or "finish" position of the blade assembly in which only the trailing edge of the finish blade 22 is in engagement with the work surface to complete the final or finishing operation thereon.

From the above description it will be apparent that there is thus provided a device of the character described possessing the particular features of advantage before enumerated as desirable, but which obviously is susceptible of modification in its form, proportions, detail construction and arrangement of parts without departing from the principle involved or sacrificing any of its advantages.

While in order to comply with the statute the invention has been described in language more or less specific as to structural features, it is to be understood that the invention is not limited to the specific features shown, but that the means and construction herein disclosed comprise but one of several modes of putting the invention into effect.

Having thus described my invention, I claim:

1. A sweep assembly for a surfacing machine, having a revolving plurality of surfacing sweeps, including an oscillatory blade supporting member, a rotatably mounted adjusting member carried by the machine and engageable with a portion of the blade supporting member to oscillate said member upon rotation of the adjusting member relative to the machine, means for varying the angular position of the supporting member relative to the adjusting member, and a duofunctional blade assembly mounted upon the bottom of said supporting member including a float blade, the longitudinal axis of which is in relatively spaced relation with the supporting member ahead of such member, upwardly inclined marginal areas thereon, a finish blade detachably secured to the trailing one of said inclined marginal areas of the float blade, the finish blade being disposed in inclined divergent relation with the float blade, and a backing member overlying the joint between the finish and float blades and extending in overlapping relation with each of said blades for engagement therewith under pressure, the construction and arrangement being such that flexing of the float blade while in operative position is minimized and flexing of the finish blade when brought into operative position by movement of the adjusting member is facilitated while maintaining minimum flexibility in the float blade.

2. A sweep assembly for a surfacing machine, having a revolving plurality of surfacing sweeps, including an oscillatory blade supporting member, a rotatably mounted adjusting member carried by the machine and engageable with a portion of the blade supporting member to oscillate said member upon rotation of the adjusting member relative to the machine, means for varying the angular position of the supporting member relative to the adjusting member, and a duofunctional blade assembly mounted upon the bottom of said supporting member including a blade member having a pair of optionally usable working surfaces disposed in inclined divergent relation one to the other, a reinforcing member overlapping the juncture between the inclined working surfaces and engaged therewith under pressure, and means for detachably securing the blade member to the supporting member with the longitudinal axes of both of said working surfaces on opposite sides of the supporting member.

3. A troweling machine for working cementitious surfaces comprising a rotatable blade carrier, a multipurpose troweling blade having a substantially rectangular floating portion and a substantially rectangular finishing portion upwardly inclined from the trailing edge of said floating portion, said blade being mounted on said blade carrier with the longitudinal margins of said blade portions parallel thereto, and means for oscillating said carrier about its axis for selective engagement of either of the blade portions with the cementitious surface.

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