Jan. 10, 1967 L. CAGNO 3,296,946

TROWELLING BLADE ASSEMBLIES

Filed Oct. 21, 1964 2 Sheets-Sheet 1

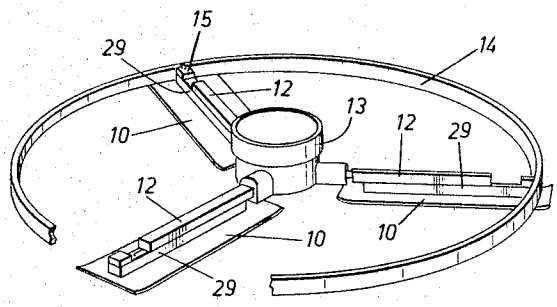


FIG. 1

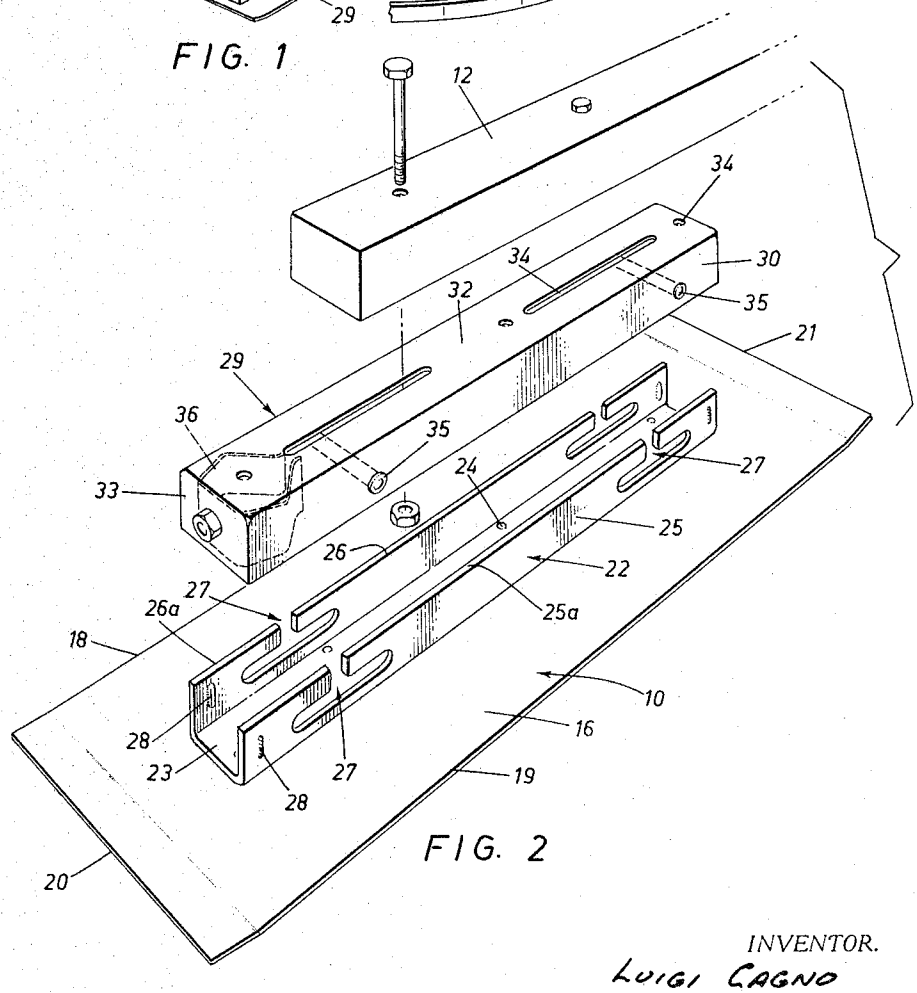


FIG. 2

INVENTOR.
LUIGI CAGNO
BY
Peter W. McSweeney
AGENT

Jan. 10, 1967 L. CAGNO 3,296,946

TROWELLING BLADE ASSEMBLIES

Filed Oct. 21, 1964 2 Sheets-Sheet 2

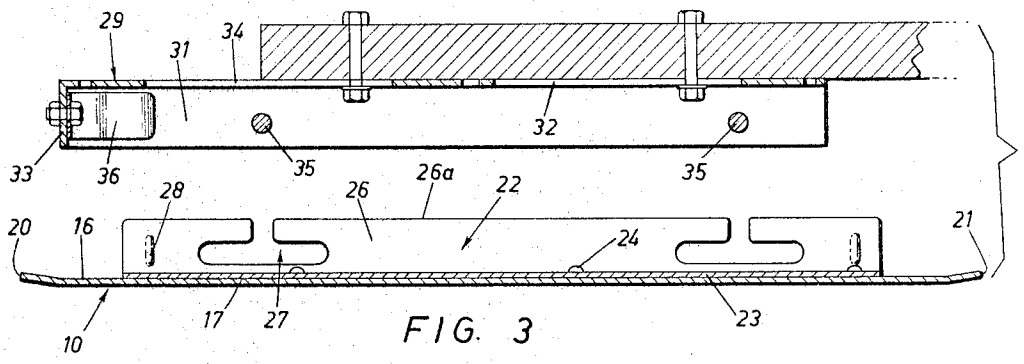


FIG. 3

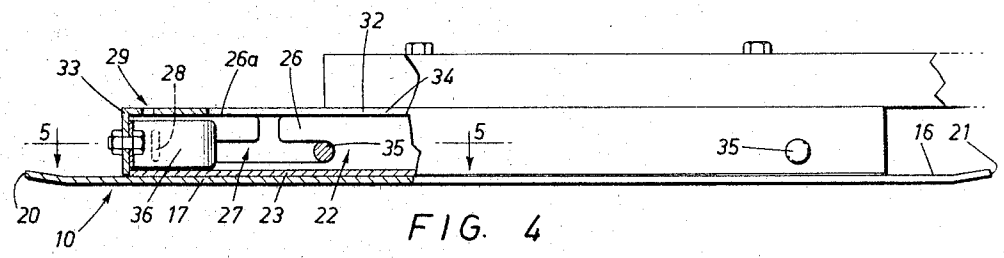


FIG. 4

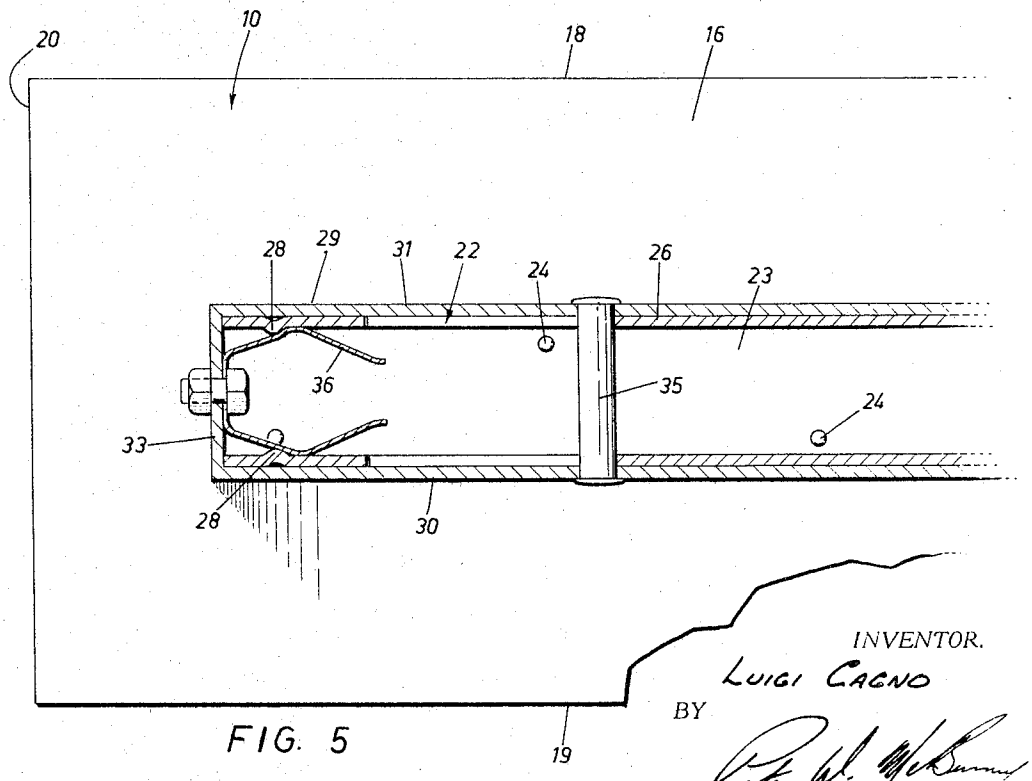


FIG. 5

INVENTOR.
LUIGI CAGNO
BY
AGENT

United States Patent Office 3,296,946 Patented Jan. 10, 1967

3,296,946

TROWELLING BLADE ASSEMBLIES

Luigi Cagno, Hamilton, Ontario, Canada, assignor to Hamilton Float & Trowel Limited, Hamilton, Ontario, Canada

Filed Oct. 21, 1964, Ser. No. 405,552
14 Claims. (Cl. 94—45)

This invention relates to trowelling blade assemblies for use with a trowelling machine. More particularly, this invention relates to devices which enable trowelling blades to be quickly and easily attached to and detached from power trowelling machines.

Trowelling machines, which also are known as concrete finishing machines, are well known devices in widespread use. Typical of such trowelling machines are those described in the following United States patents:

2,605,683, August 5, 1952, H. S. Boulton;
2,689,507, September 21, 1954, H. E. McCrery;
2,888,863, June 2, 1959, G. G. Eisenbeis;
2,662,454, December 15, 1953, M. E. Whiteman.

It is common practice with present day trowelling machines to bolt the trowelling blades to a blade holder, the latter being rotated by the motor of the machine. Thus, in aforementioned Patent 2,662,454, for example, there is shown a trowelling machine having the usual three blades with three bolts per blade being employed. When it is desired to replace or reverse the trowelling blades, these being operations that are performed quite frequently, it is necessary to unbolt these various bolts, replace or reverse the blades, and finally bolt the blades in place. This is a time-consuming operation in any event, but particularly with machines that require removal of the guard ring extending around the blades in order to replace or reverse the blades. In this connection, the guard often becomes bent, and in many cases it is difficult to reinstall because of its bent condition.

Accordingly, in accordance with this invention there is provided a device which permits the quick and easy removal, installation and reversal of trowelling blades, and which does not employ any fastening devices such as bolts.

In accordance with a preferred embodiment of this invention the aforementioned device is designed so as to permit the removal, installation or reversal of a trowelling blade without removal of the guard ring.

A further feature of a preferred embodiment of this invention is that the device is designed to prevent concrete from entering thereinto so that the possibility of concrete interfering with the proper operation of the device is minimized.

In accordance with one embodiment of this invention there is provided a trowelling blade and attaching means for detachably attaching the same to a trowelling machine. The trowelling blade has an upper surface, a working surface opposite to the upper surface, two ends and two sides. The attaching means comprise a first part fixed to the blade and a second part attachable with and detachable from the first part. One of these parts comprises two spaced-apart members with means maintaining these members in fixed spaced-apart relationship with respect to each other. The members each have a free edge and two ends. Formed in each of the members are two spaced-apart slots which commence at the free edges of the members, have an entry portion extending away from the edge into the member, and branch inwardly of the free edges towards both ends of the members to constitute two corresponding retaining portions that permit reversing end-for-end of the attachment of the blade to the machine. The other of the parts includes two pins with means holding the pins in fixed

spaced-apart relationship with respect to each other. When the parts are attached the pins extend between the members and into the slots in the members. Means are provided for securing the first part to the upper surface of the blade. When the parts are attached the aforementioned members are positioned between the sides of the blade and extend generally towards the ends of the blade, whereby the branched parts of the slots extend generally towards the ends of the blade.

The invention will become more apparent from the following detailed description taken in conjunction with the appended drawings in which:

FIGURE 1 is a perspective view showing a plurality of trowelling blades mounted on blade holders, which, in turn, carry a guard ring, and which are connected to a collar that is adapted to be driven by the driving shaft of the motor of a trowelling machine;

FIGURE 2 is an exploded perspective view showing a trowelling blade assembly embodying this invention;

FIGURES 3 and 4 are side views, in section, illustrating how to attach a trowelling blade embodying this invention to its blade holder; and

FIGURE 5 is a section taken along line 5—5 in FIGURE 4.

Referring to FIGURE 1, there is shown a plurality of trowelling blades 10 which may be of the float blade, finishing blade or combination blade type. Each of these blades is detachably connected to a generally U-shaped inverted channel member 29 which, in turn, is securely fastened to an arm 12. Arms 12 project outwardly from a collar 13 and are securely fastened thereto at 120° intervals for a three blade machine (90° for a four blade machine) by any suitable means. Each of channel members 29 is detachably connected to a guard ring 14 by any suitable means 15.

It will be appreciated, of course, that collar 13 is adapted to be connected to the output shaft of the motor of a trowelling machine, whereby blades 10 may be rotated in a horizontal plane.

Referring now to FIGURES 2–5 inclusive, it will be seen that blade 10 is generally rectangular in nature and has an upper surface 16, a working surface 17 disposed opposite to and therefore underneath upper surface 16, two straight parallel sides 18 and 19 and two parallel ends 20 and 21. It will be seen that the end portions of blade 10 are inclined slightly upwardly.

Positioned centrally between the two sides 18 and 19 of blade 10 is a generally U-shaped channel member 22. This member extends towards ends 20 and 21 of blade 10 and indeed is perpendicular thereto. The base or cross-piece 23 of channel member 22 is secured to upper surface 16 of blade 10 by means of suitable fastening devices 24 such as rivets. As best shown in FIGURE 5, rivets 24 are disposed in a zig-zag pattern. This is an important feature of a preferred embodiment of this invention, since this disposition of rivets 24 has been found to make the blade assembly more rigid than if a single row of fastening devices are employed, as has been the case in the past, and consequently a diminishing in machine vibration has been realized. The fact that member 22 is positioned centrally with respect to both the sides and ends of blade 10, particularly the former, rather than being offset, as has been the case in the past, also is an important feature of a preferred embodiment of this invention, as the force acting on blade 10 is constrained to act along the centerline thereof rather than along a line offset from this centerline.

Member 22 includes two upstanding plates or side walls 25 and 26, each of which has a free edge 25*a* and 26*a* respectively, these free edges being spaced from upper surface 16 of blade 10. Provided in each of side walls 25 and 26 are two, spaced-apart, inverted, generally T-

shaped slots **27**. It will be seen that the foot or entry portion of each of these slots **27** commences at the free edge of its respective side wall, extends away from the free edge and towards upper surface **16** of blade **10**, while the head or cross-piece of the T-shaped slot branches inwardly of the free edge of its respective side walls towards the ends of channel member **22** and blade ends **20** and **21** to constitute two respective retaining portions.

At both ends of channel **22** detents **28** are provided in side walls **25** and **26**.

As also shown in FIGURES 2–5 another generally U-shaped channel member **29** is provided. This member has side walls or pates **30** and **31**, a cross-piece **32**, and one end thereof is closed by an end wall **33**. A plurality of slots **34** of varying configuration are provided in cross-piece **32** so as to permit member **29** to be bolted or otherwise affixed to arm **12**. The configuration of the slots is such that member **29** may be bolted to the arms of different types of commercially available trowelling machines.

Extending between side walls **30** and **31** and fixed thereto by any suitable means, e.g. by heading, are pins **35**, which, of course, are held in fixed spaced-apart relationship with respect to each other. The spacing between pins **35** is the same as the spacing between corresponding points of adjacent slots **27**, as is best seen in FIGURE 3.

Fastened to end wall **33** by means of a nut and bolt is a spring clip **36**.

Reference now will be made to FIGURES 3–5 inclusive for a description of how trowelling blade **10** may be attached to or detached from channel member **29**, which, as aforementioned, is bolted to arm **12**. In order to secure blade **10** to the trowelling machine channel member **22** is inserted between side walls **30** and **31** of channel member **29** with pins **35** passing into and through the entry portions of the respective slots **27**. Blade **10** and channel member **22** then are moved forwardly, i.e. to the left in FIGURES 3 and 4, so that pins **35** become positioned in the righthand retaining portions of slots **27**. Blade **10** and channel member **22** thus are prevented from falling from channel member **29** when blade **10** is in its normal horizontal position, and centrifugal force, which throws blade **10** outwardly, causes blade **10** to remain in the position shown in FIGURE 4 when the machine is operating. If the trowelling machine is tilted, however, as when the trowelling machine is taken from job to job, blades **10** may become accidentally detached by virtue of member **22** sliding relative to member **29** and pins **35** slipping from slots **27**. It is for this reason that spring clip **36** is provided. This spring clip engages detents **28**, as shown in FIGURE 5, and prevents any sliding movement of blade **10** and member **22** relative to channel member **29**. Thus, spring clip **36** detachably holds channel members **22** and **29** in fixed positions with respect to each other insofar as sliding movement is concerned. It should be appreciated, however, that other means may be substituted for spring clip **36**, and that spring clip **36** is not essential to the operation of the device, but serves only the useful function hereinbefore noted.

When it is desired to reverse blade **10**, this can be done simply by reversing the aforementioned steps so as to remove the blade from channel member **29**, turning the blade end for end, and re-attaching it to channel member **29** in the aforementioned manner. Pins **35** then will be positioned in the other ends of slots **27**.

Aside from the ease with which blades may be changed or reversed using apparatus embodying this invention, another important feature of the invention is that cross-piece **32**, extending as it does over the open top and free edges of channel member **22**, covers the top of channel member **22**, while end wall **33** closes one open end of channel member **22**, and side walls **30** and **31** extend outside of side walls **25** and **26** and cover slots **27**. In this way the possibility of concrete entering channel member **22** and hindering the correct operation of the attaching device is minimized. While channel member **22** is open at one end thereof, this is unimportant as this is the end of the blade assembly positioned closest to the axis of rotation.

As noted in connection with FIGURE 1, guard ring **14** is detachably secured to channel member **29**. It therefore is apparent that guard ring **14** need not be removed to install, replace or reverse blades.

While channel member **22** has been shown as being secured to blade **10**, it should be appreciated that channel members **22** and **29** may be reversed so that the latter is secured to blade **10** and the former is secured to arm **12**.

It will be appreciated that it would not depart from this invention to make channel member **22** in the form of a solid block having slots **27** therein. The block should be of sufficient width to provide good bearing surfaces for pins **35** and may have spaced side walls at either end thereof to accommodate detents **28**.

What I claim as my invention is:

1. In a trowelling machine comprising a motor-driven member rotatable about a generally vertical axis, and at least one trowelling blade carrying arm carried by the member and extending radially therefrom whereby a blade carried by the arm is rotated in a generally horizontal plane upon rotation of the member and the arm about the said axis, the provision of a trowelling blade and attaching means for detachably attaching the same to the said rotatable arm; said trowelling blade having an upper surface, a working surface opposite to said upper surface, two ends and two sides; said attaching means comprising an attaching portion secured to the upper surface of the trowelling blade and a cooperating attaching portion secured to the said rotatable arm, one of said attaching portions comprising two spaced straddling members and the other attaching portion being interposed between said spaced straddling members of the said one attaching portion, each member attached to the blade being positioned between the sides of the blade and extending generally towards the ends of the blade, one of the two attaching portions having for each member thereof a free edge with two spaced slots formed therein, each slot commencing at said free edge of the associated member, having an entry portion extending into the member away from the free edge, and branching inwardly of the free edge towards both of the ends of the member to constitute two corresponding retaining portions and thereby permit reversing end-for-end of the attachment of the blade to the said rotatable arm, the other of said two attaching portions having secured thereto two transversely extending pins spaced apart a distance corresponding to the spacing of the said slots, the said pins being engaged in the said slot entry portions by movement of the trowelling blade toward the said arm and thereafter engaged in respective retaining portions of the slots to retain the blade on the said arm by longitudinal sliding of the said two attaching portions relative to one another upon corresponding endwise movement of the blade relative to the said arm.

2. The invention according to claim **1**, and including means for detachably holding the said two attaching portions in fixed position relative to one another, comprising a spring clip secured to one of the attaching portions and cooperating detent means on the other of the attaching portions.

3. In a trowelling machine comprising a motor-driven member rotatable about a generally vertical axis, and at least one trowelling blade carrying arm carried by the member and extending radially therefrom whereby a blade carried by the arm is rotated in a generally horizontal plane upon rotation of the member and the arm about the said axis, the provision of a trowelling blade and attaching means for detachably attaching the same to the said rotatable arm; said trowelling blade having an upper surface, a working surface opposite to said upper surface, two ends and two sides; said attaching

means comprising an attaching portion secured to the upper surface of the trowelling blade and a cooperating attaching portion secured to the said rotatable arm, one of said attaching portions comprising two spaced straddling members and the other attaching portion being interposed between said spaced straddling members of the said one attaching portion, each member of the attaching portion secured to the blade being positioned between the sides of the blade, extending generally towards the ends of the blade and having a free edge spaced from said blade upper surface with two spaced slots formed therein, each slot commencing at said free edge, having an entry portion extending into the member away from the free edge, and branching inwardly of the free edge towards both of the ends of the member to constitute two corresponding retaining portions and thereby permit reversing end-for-end of the attachment of the blade to the said rotatable arm, the said cooperating attaching portion secured to the said rotatable arm having secured thereto two transversely extending pins spaced apart a distance corresponding to the spacing of the said slots, the said pins being engaged in the said slot entry portions by movement of the trowelling blade toward the rotatable arm and thereafter engaged in respective retaining portions of the slots to retain the blade on the rotatable arm by longitudinal sliding of the said two attaching portions relative to one another upon corresponding endwise movement of the blade relative to the rotatable arm.

4. The invention according to claim 3, and including means for detachably holding the said two attaching portions in fixed position relative to one another, comprising a spring clip secured to one of the attaching portions and cooperating detent means on the other of the attaching portions.

5. A trowelling blade sub-assembly for use in the invention according to claim 3, comprising the said blade, and the said attaching portion secured to and upstanding from the said upper surface of the blade, each member of the blade attaching portion having the said free edge with the said two spaced slots formed therein.

6. In a trowelling machine comprising a motor-driven member rotatable about a generally vertical axis, and at least one trowelling blade carrying arm carried by the member and extending radially therefrom whereby a blade carried by the arm is rotated in a generally horizontal plane upon rotation of the member and the arm about the said axis, the provision of a trowelling blade and attaching means for detachably attaching the same to the said rotatable arm; said trowelling blade having an upper surface, a working surface opposite to said upper surface, two ends and two sides; said attaching means comprising an attaching portion secured to the upper surface of the trowelling blade and a cooperating attaching portion secured to the said rotatable arm, said attaching portion secured to the said rotatable arm comprising two spaced straddling members upstanding from the rotatable arm, and the said attaching portion secured to the blade comprising at least one cooperating straddled member interposed between said spaced straddling members and upstanding from the blade, each straddled member upstanding from the blade being positioned between the sides of the blade, extending generally towards the ends of the blade, and having for each member a free edge spaced from said blade upper surface with two spaced slots formed therein, each slot commencing at said free edge of the associated member, having an entry portion extending into the member away from the free edge, and branching inwardly of the free edge towards both of the ends of the member to constitute two corresponding retaining portions and thereby permit reversing end-for-end of the attachment of the blade to the rotatable arm, the said straddling members upstanding from the rotatable arm having secured thereto and extending transversely between the two pins spaced apart a distance corresponding to the spacing of the said slots, the said pins being engaged in the said slot entry portions by movement of the trowelling blade toward the rotatable arm and thereafter engaged in respective retaining portions of the slots to retain the blade on the rotatable arm by longitudinal sliding of the said two attaching portions relative to one another upon corresponding endwise movement of the blade relative to the rotatable arm.

7. The invention according to claim 6, and including means for detachably holding the said two attaching portions in fixed position relative to one another, comprising a spring clip secured to one of the attaching portions and cooperating detent means on the other of the attaching portions.

8. The invention according to claim 6, wherein the said spaced straddling sidewall members upstanding from the rotatable arm are constituted by the upstanding arms of a generally U-shaped inverted channel member having its crosspiece attached to the rotatable arm, the radially outer end of said channel member having an end wall extending between said upstanding arms.

9. In a trowelling machine comprising a motor driven member rotatable about a generally vertical axis, and at least one trowelling blade carrying arm carried by the member and extending radially therefrom whereby a blade carried by the arm is rotated in a generally horizontal plane upon rotation of the member and the arm about the said axis, the provision of a trowelling blade and attaching means for detachably attaching the same to the said rotatable arm; said trowelling blade having an upper surface, a working surface opposite to said upper surface, two ends and two sides; said attaching means comprising an attaching portion secured to the upper surface of the trowelling blade and a cooperating attaching portion secured to the said rotatable arm, said attaching portion secured to the said rotatable arm, two spaced parallel straddling sidewall members upstanding from the rotatable arm and the said attaching portion secured to the blade comprising two cooperating spaced parallel straddled sidewall members interposed between said straddling members and upstanding from the blade, the straddled sidewall members being positioned between the sides of the blade, extending generally towards the end of the blade, and having for each member a free edge spaced from said blade upper surface with two spaced slots formed therein, each slot commencing at said free edge of the associated member, having an entry portion extending into the members away from the free edge, and branching inwardly of the free edge towards both of the ends of the member to constitute two corresponding retaining portions and thereby permit reversing end-for-end of the attachment of the blade to the rotatable arm, the said straddling members secured to the rotatable arm having secured thereto and extending transversely between them two pins spaced apart a distance corresponding to the spacing of said slots, the said pins being engaged in the said slot entry portions by movement of the trowelling blade toward the rotatable arm and thereafter engaged in respective retaining portions of the slots to retain the blade on the rotatable arm by longitudinal sliding of the said two attaching portions relative to one another upon corresponding endwise movement of the blade relative to the rotatable arm.

10. The invention according to claim 9, wherein the said spaced parallel straddling sidewall members upstanding from the rotatable arm are constituted by the upstanding arms of a generally U-shaped inverted channel member having its crosspiece attached to the rotatable arm, and the said spaced parallel straddled sidewall members are constituted by the upstanding arms of another generally U-shaped channel member having its crosspiece attached to the said upper surface of the blade.

11. The invention according to claim 10, and including means for detachably holding the said two attaching portions in fixed position relative to one another, comprising

a spring clip secured to one of the attaching portions and cooperating detent means on the other of the attaching portions.

12. A trowelling blade sub-assembly for use in the invention according to claim **9**, comprising the said blade, and the said two cooperating spaced parallel straddled sidewall members secured to and upstanding from the said upper surface of the blade, each said straddled member having the said free edge and the said two spaced slots formed therein.

13. A trowelling blade sub-assembly for use in the invention according to claim **10**, comprising the said blade, and the said generally U-shaped channel member having its crosspiece attached to the said upper surface of the blade, so that its spaced parallel upstanding arms extend from the said blade upper surface, each arm having the said free edge and the said two spaced slots formed therein.

14. The invention according to claim **9**, wherein the said spaced straddling sidewall members upstanding from the rotatable arm are constituted by the upstanding arms of a generally U-shaped inverted channel member having its crosspiece attached to the rotatable arm, the radially outer end of the said channel member having an end wall extending between said upstanding arms.

References Cited by the Examiner

UNITED STATES PATENTS

2,662,545	12/1953	Whiteman	94—45
2,667,824	2/1954	McCrery	94—45
2,878,730	3/1959	Barnes	94—45

FOREIGN PATENTS

691,732	7/1930	France.

References Cited by the Applicant

UNITED STATES PATENTS

2,605,683	8/1952	Boulton.
2,662,545	12/1953	Whiteman.
2,689,507	9/1954	McCrery.
2,888,863	6/1959	Eisenbeis.

JACOB L. NACKENOFF, *Primary Examiner.*