J. E. RUNNER & I. M. ABRAM.

TROWEL.

APPLICATION FILED JAN. 6, 1911.

1,074,646.

Patented Oct. 7, 1913.

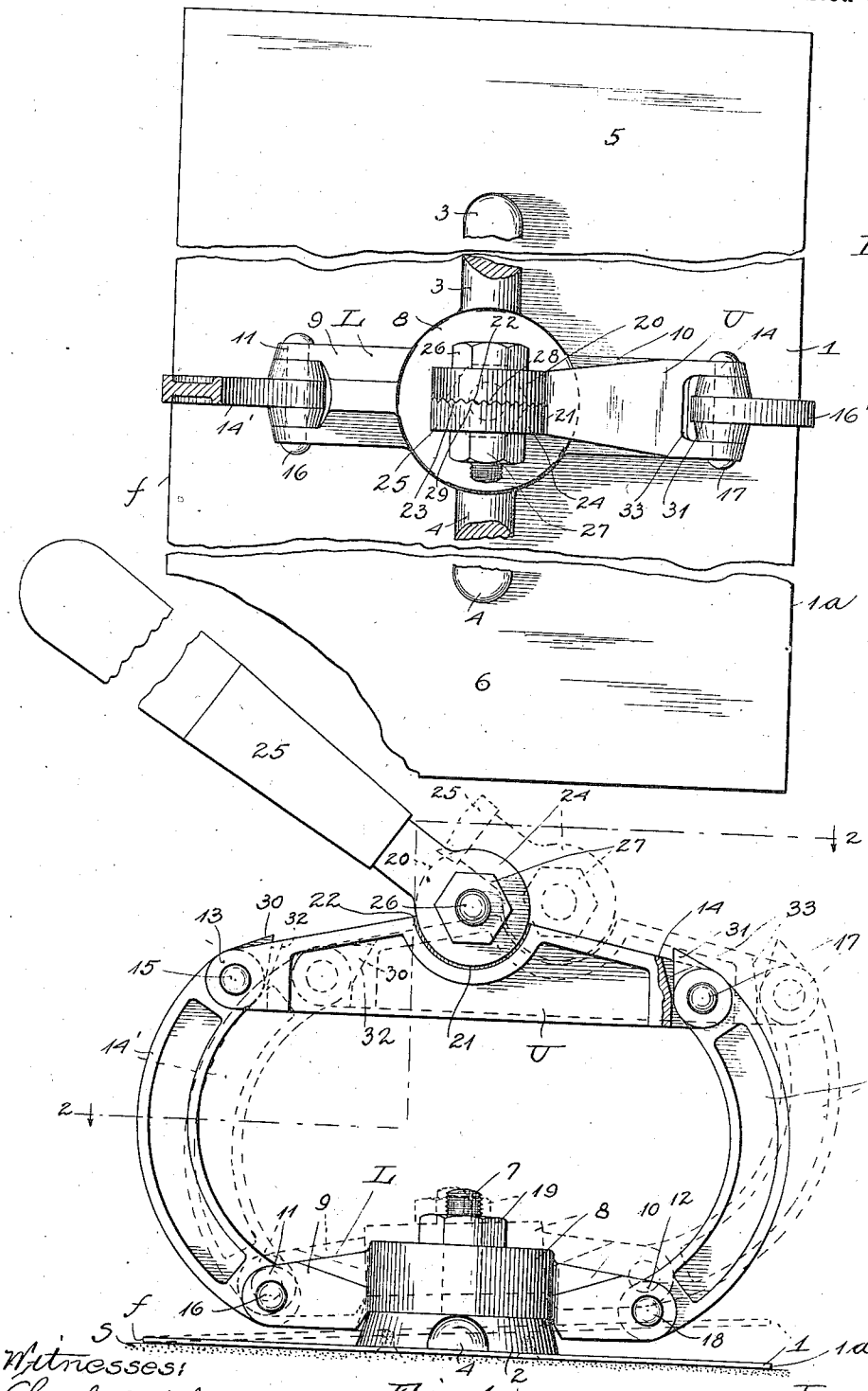


Fig. 2.

Fig. 1.

Witnesses:
Charles J. Schmidt,
Nellie B Dearborn

Inventors:
Joseph E. Runner
Ira M. Abram
By Offield, Towle, Graves & Offield
Attys.

UNITED STATES PATENT OFFICE.

JOSEPH E. RUNNER AND IRA M. ABRAM, OF DUGGER, INDIANA, ASSIGNORS, BY DIRECT AND MESNE ASSIGNMENTS, TO IRA M. ABRAM, OF DUGGER, INDIANA.

TROWEL.

1,074,646. Specification of Letters Patent. Patented Oct. 7, 1913.

Application filed January 6, 1911. Serial No. 601,216.

To all whom it may concern:

Be it known that we, JOSEPH E. RUNNER and IRA M. ABRAM, residents of Dugger, in the county of Sullivan and State of Indiana, have invented certain new and useful Improvements in Trowels, of which the following is a full, clear, and precise specification.

Our invention relates to cement finishing tools, and contemplates improved construction and arrangement which will enable cement or allied surfaces to be finished with greater ease, rapidity, accuracy and efficiency.

The finishing of cement and allied surfaces has heretofore been done in greater part by hand. In finishing a cement walk, for example, the operator is usually on his knees and moves a trowel back and forth over the surface, and for each sweep he must turn the trowel to raise the advancing edge thereof, this method being very tedious, expensive, and therefore inefficient. In some instances the trowel has been provided with a longer handle rigidly connected thereto, which handle enabled the operator to stand when finishing a surface. With this arrangement, however, the operator must swing the trowel handle up and down to raise the advancing edge of the trowel.

One of the broad and important objects of our invention is to provide a connection or coupling between the finishing tool and the handle, which will automatically take care of proper upward tilting of the advancing edge of the tool without necessitating any vertical swing of the handle, so that all the operator has to do is to move the handle back and forth parallelly with itself; to provide a connecting means between the finishing tool and handle which can be inexpensively manufactured and which can be used in connection with any sort of finishing tool whose advancing edge or end must be raised or deflected upwardly during operation; to provide a construction which will enable the connecting mechanism to be adjusted with reference to the tool and to the handle; and in general to provide a connection between the finishing tool and handle which will effect the proper tilting of the tool during operation.

In the following specification and accompanying drawing we have shown and illustrated one embodiment of our invention.

In the drawing Figure 1 is a side elevational view of a trowel, and Fig. 2 is a plan view looking from plane 2—2, Fig. 1.

The trowel blade 1 is of the usual flexible steel construction and has secured at its center a substantially cylindrical block 2 from whose sides ribs 3 and 4 extend longitudinally along the blade to stiffen and strengthen the blade, these ribs terminating a distance short of the blade ends 5 and 6 to allow said ends to retain their full transverse flexibility. Extending upwardly from the block 2 is a threaded stud 7 forming a pivot for the block or body part 8, this block being substantially cylindrical and of the same diameter as the block 2. Extending radially from opposite sides of the block 8 are the arms 9 and 10 having the bifurcated ends 11 and 12 respectively, the block 8 and the arms 9 and 10 forming the lower frame L of the connecting mechanism. The upper frame U of this connecting mechanism has the bifurcated ends 13 and 14. The upper and lower ends of a link 14′ engage respectively in the bifurcated ends 13 and 11 of the upper and lower frames U and L, and are pivoted therein by means of pivot pins 15 and 16. Similarly, the upper and lower ends of the link 16′ engage respectively in the bifurcated ends 14 and 12 of the upper and lower frames and are pivoted therein by means of pins 17 and 18.

The distance between the links 14′ and 16′ at the pivots 16 and 18 is less than the distance between the links at the pivots 15 and 17, and as shown, the links are of the same length and may be curved outwardly.

The block 8 is held to the block 2 by a nut 19 engaging the threaded stud 7, and the angle of the vertical plane of frame L with reference to the vertical longitudinal central plane of the blade can thereby be adjusted. The frame U has an upwardly extending semi-cylindrical extension 20, and below this extension the frame has a semi-cylindrical pocket 21, the extension and pocket providing a substantially circular surface 22 for engaging with a corresponding surface 23 on the substantially cylindrical head 24 of a handle 25, a bolt 26 passing through the axis of the surfaces and having a nut 27. This pivot connection between the handle and the frame U enables the handle to be adjusted vertically to suit the different operators. In order to more securely hold the handle in adjusted position

one or more teeth 28 and 29 extend respectively from the engaging surfaces 22 and 23, which teeth mesh when the bolt is tightened and thereby securely lock the handle against displacement from its adjusted vertical position. The pivot line of the handle with the frame U is preferably midway between the centers of pivots 15 and 17, and the surfaces 22 and 23 preferably lie in the central vertical plane of the frame U. The full lines of Fig. 1 show the parts of the device in a neutral central position, the blade 1 coinciding with the surface S to be finished, and the frames L and U being parallel, the lines passing through the pivot centers of the links forming a trapezoid. When the handle is moved either to the right or left the positions of pivots 15 and 17 with reference to pivots 16 and 18 will be changed. This movement of the handle and frame U with reference to frame L is limited by means of stop extensions 30 and 31 at the top ends of links 14 and 16 respectively, and the stop abutments 32 and 33 between the arms of the bifurcated ends 13 and 14 respectively of the frame U. For example, the handle may be moved toward the right parallelly with itself until the stop extension 30 on link 14′ strikes the abutment surface 32, and the parts will assume the positions shown in dotted lines. In the neutral central position of the parts, as shown in full lines, the centers of pivots 15 and 17 are outside of the vertical planes of the centers of pivots 16 and 18 respectively. When the handle with the trowel blade is pushed toward the right, that is, forwardly, the link 16′ moves farther away from the perpendicular and thus the distance of the blade from the pivot 17 is decreased, while on the other hand, the link 14′ moves toward the perpendicular and the distance of the blade from the pivot 15 is correspondingly increased. Such increase is, however, very small, and as shown by dotted lines, Fig. 1, the link 14′ after such forward movement of the device will be just a short distance beyond the vertical perpendicular, the result being that the distance between the pivot 15 and the blade will change only slightly. The distance between the pivot 17 and the blade will be considerably lessened, and if the frame U is kept in horizontal position, the forward end of the blade will be raised as shown in dotted lines. Therefore, movement of the handle to the right parallelly with itself a distance shown in Fig. 1 will result in swing of the blade 1 about its follower edge *f* to a position at an angle with the surface S and to raise the advance edge 1^a of the blade. In the same manner, if the handle were moved parallelly with itself toward the left until stop extension 31 engaged abutment surface 33, *f* would be the advance edge and would be raised above the surface S. In other words, horizontal back and forth movement of the handle and frame U will cause the lines connecting the pivot centers of the links to form a trapezium in which the line through pivots 16 and 18 is out of parallelism with the line through pivots 15 and 17, and the line connecting pivots 15 and 17 being greater than the line connecting pivots 16 and 18, the inclination of the frame L and blade 1 upon horizontal movement of the handle will be such that the advance edge of the blade is raised. Therefore with a device embodying the features of our invention the operator need only move the handle horizontally back and forth, the connecting mechanism between the handle and the tool automatically performing the function of raising the advanced edge of the end of the tool. As absolutely no vertical swing of the handle is necessary to manipulate the device, the handle can be of any length, and a very large surface can be gone over and accurately finished in a very short time. The pivotal connection between the frame L and the tool enables the vertical longitudinal plane of the tool to be adjusted with relation to the vertical longitudinal plane of the frame L, and the adjustable pivot connection of the handle with the upper frame U enables the handle to be adjusted vertically so that the device may be more easily manipulated. During operation, of course, the handle and frame U are relatively rigid.

Other forms and constructions are, of course, possible, which would carry out the novel features of our invention. We do not, therefore, desire to be limited to the precise form and construction shown. So far as we know we are the first to produce a device of the class described in which means are provided for taking care of the proper raising of the advancing edge or end of the tool during operation of the device, such adjustment of the advancing edge or end being accomplished entirely independently of vertical movement or swing of the handle, and

We therefore desire to secure the following claims by Letters Patent:

1. In a device of the class described, an upper frame, a lower frame, a handle extending from the upper frame, a tool carried by the lower frame and extending parallelly therewith, and links connecting the ends of said upper and lower frames, an intermediate relative position of said frames and links causing said upper and lower frames and tool to be parallel, lateral movement of said upper frame to either side of its intermediate position causing said lower frame and tool to assume an angle with reference to the upper frame.

2. In combination, a tool supporting frame, a tool supported on said frame and

adapted to engage a surface to be finished, a link extending upwardly from each end of said supporting frame, a handle frame having pivotal connection with the upper ends of said links, a handle extending from said handle frame, said links being adapted, when said handle frame is moved parallelly with the surface to be finished, to swing the tool supporting frame upwardly into inclined position to carry the advancing end of the tool away from the surface to be finished.

3. In combination, a supporting frame, a finishing tool connected to said frame and adapted to engage a surface to be finished, a handle, a frame at the lower end of said handle, link mechanism pivotally connected with said tool supporting frame and said handle frame and allowing back and forth movement of the handle frame with relation to the tool supporting frame, and means for limiting such relative movement, said link mechanism being adapted, upon back and forth movement of the handle frame, to cause rocking of the tool supporting frame to swing the advancing end of the tool away from the surface to be finished.

4. In a finishing tool the combination with a trowel and a stud carried thereby, of a head block removably attached to said stud, means to hold the head block in adjusted positions on the stud, brackets carried by the head block, links pivotally attached to said brackets, a cross head pivoted to the opposite ends of said links and a handle adjustably attached to said cross head.

5. In a finishing tool, the combination with a trowel having a rib thereon and a stud projecting upwardly therefrom, of a head block removably attached to said stud, brackets having outwardly extending arms thereon, a cross head, links pivoted to said arms and cross head, whereby the cross head will have a swinging movement and a handle adjustably attached to said cross head.

6. In a finishing tool, the combination with a trowel, of a head block removably and adjustably attached thereto, brackets carried by the block having outwardly extending arms, links pivoted at one end between the ends of the arms, a cross head pivoted to the other ends of the links, a standard extending upwardly from the cross head and a handle adjustably attached to the standard.

7. In a trowel device, the combination with a trowel blade and a handle therefor, of blade rocking mechanism interposed between said blade and handle and operable by the handle to rock said blade relatively to the axis of the handle and in a direction to raise the advancing edge of the blade upon both forward and back movement of the device.

8. In a trowel device, the combination with a trowel blade and a handle therefor, of blade rocking mechanism interposed between said blade and handle and operating automatically by the force applied through the handle to push and pull the device over the surface to be finished, to rock said blade relatively to the axis of the handle upon both back and forth movement.

9. In a trowel device, the combination with a trowel blade and a handle therefor, of blade rocking mechanism interposed between said blade and handle and operable by the handle to rock said blade relatively to the axis of the handle and in a direction to raise the advancing edge of the blade upon both forward and back movement of the device, and means for limiting such rocking movement in each direction.

10. In a trowel device, the combination with a trowel blade and a handle therefor, of blade rocking mechanism including pivotal connections with said blade and handle respectively interposed between said blade and handle and operable by the handle to rock said blade relatively to the axis of the handle and in a direction to raise the advancing edge of the blade upon both forward and back movement of the device.

11. In a trowel device, the combination with a trowel blade and a handle therefor, of blade rocking mechanism including pivotally mounted links interposed between said blade and handle and operating automatically by the force applied through the handle to push and pull the device over the surface to be finished to rock said blade relatively to the axis of the handle upon both back and forth movement.

In witness hereof, we hereunto subscribe our names this 27 day of December, A. D., 1910.

JOSEPH E. RUNNER.
IRA M. ABRAM.

Witnesses:
EFFIE PIGG,
MAE TAYLOR.