Oct. 11, 1932. W. LEHMAN 1,882,079

BANK GRADER

Filed May 9, 1930 2 Sheets-Sheet 1

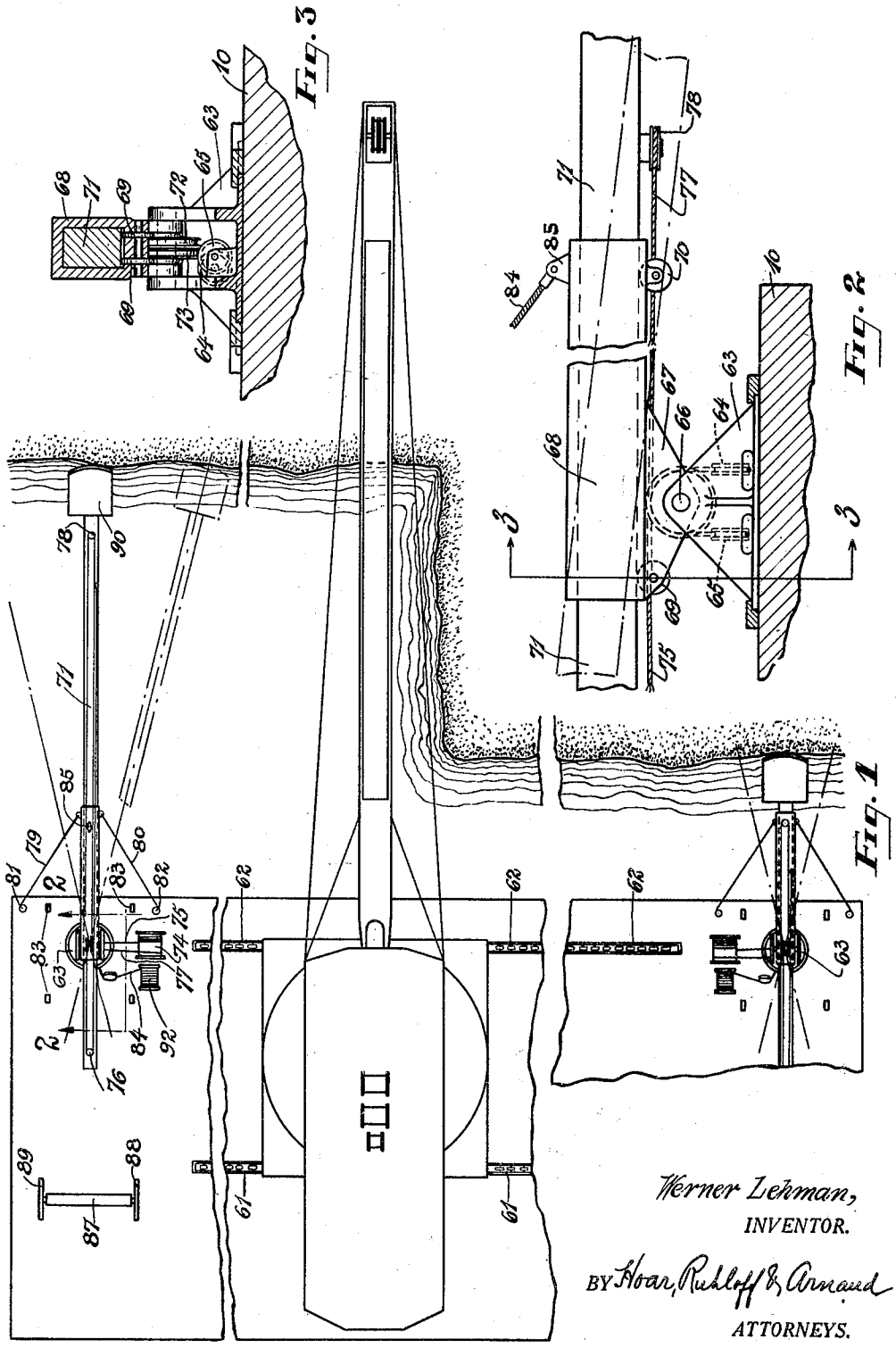


Fig. 3

Fig. 2

Fig. 1

Werner Lehman,
INVENTOR.

BY Hoar, Rublee & Arnaud
ATTORNEYS.

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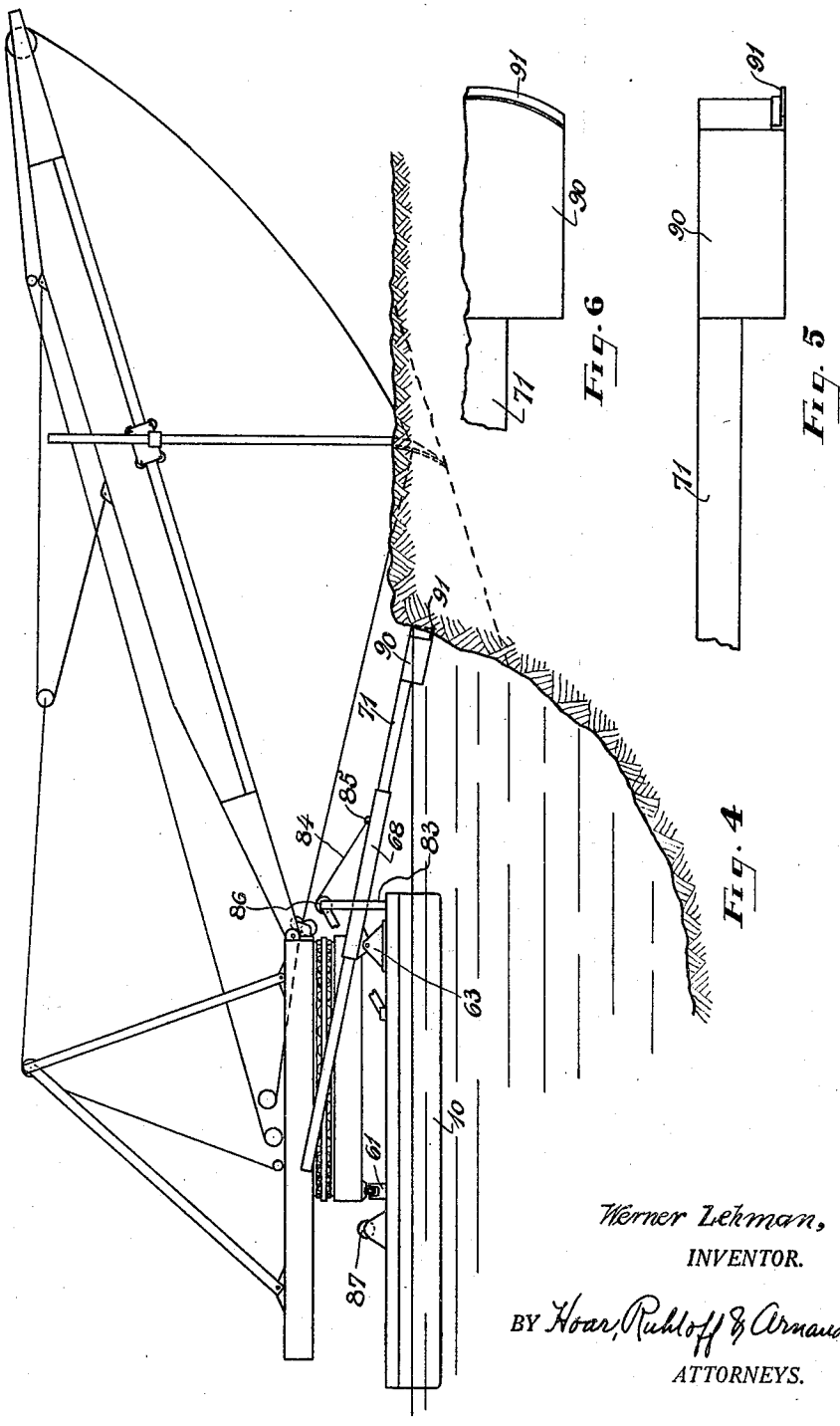


Fig. 6

Fig. 5

Fig. 4

Werner Lehman,
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Patented Oct. 11, 1932 1,882,079

UNITED STATES PATENT OFFICE

WERNER LEHMAN, OF SOUTH MILWAUKEE, WISCONSIN, ASSIGNOR TO BUCYRUS-ERIE COMPANY, OF SOUTH MILWAUKEE, WISCONSIN, A CORPORATION OF DELAWARE

BANK GRADER

Application filed May 9, 1930. Serial No. 450,987.

My invention relates to new and useful improvements in bank graders.

My invention is primarily designed for use in connection with Mississippi River flood prevention work, in which it is necessary to grade the banks to a long and rather gentle slope, extending this slope below the water line, and covering it with concrete slabs, which are laid like clapboards, with the overlying edges down-stream.

Heretofore it has been possible to grade only above the water line, and hence only at low water. The principal object of my invention is to provide a bank grader which can be used accurately under water, and hence at all times. This I accomplish by means of a gauge on the boom, and by setting the boom to the slope of the desired bank, and by holding my grader at a fixed distance from the bank. Hence I do not have to see into the muddy water, and can use my grader at all times.

My invention is an improvement over U. S. Patent 1,748,931, to myself and Ballentine and Dahlgren, dated February 25, 1930, for "bank grader", and more particularly over the pontoons of that patent.

In addition to my principal object, I have worked out a number of novel and useful details, which will be readily evident as the description progresses.

The invention consists in the novel parts, and in the combinations and arrangements thereof, which are defined in the appended claims; and of which one embodiment is exemplified in the accompanying drawings, which are hereinafter particularly described and explained.

Throughout the description, the same reference number is applied to the same member or to similar members.

Figure 1 is a plan view of a bank grader embodying my invention, parts of the scow being cut away to eliminate excessive width in the figure.

Figure 2 is a side elevation of the support for one of my spuds, a part of the carriage being cut away. It is taken along the line 2—2 of Figure 1.

Figure 3 is a vertical section, taken along the line 3—3 of Figure 2.

Figure 4 is a side elevation of a bank grader embodying my invention.

Figure 5 is an enlarged side elevation of the head of one of my spuds.

Figure 6 is a correspondingly enlarged plan view of the right half of said head, the left half being symmetrical.

In view of the U. S. patent, above referred to, I deem it unnecessary to explain the working of my bank grader or to number and describe its elements, except insofar as they differ from those of the patent. For simplicity in comparing, I shall begin my numbering at a number above the highest used in the patent.

The chief differences between my device and the device of the patent, lie in my employing two series of rollers 61 and 62, in place of the tracks 13 and 14 of the patent; and in my employing a certain sort of spuds (to be now described) in place of the pontoons 11 and 12 of the patent, which also enables me to use a longer and hence more stable scow than that of the patent.

On each end of the shore side of my scow 10, there is mounted a swiveling bracket 63. This bracket does not have to be very readily swivelable, as in practice it is rotated only slightly (as shown by the dotted positions of the spud in Figure 1), so as to resist the effect of the current. As the brackets and the rest of the associated mounting are identical, they are numbered in only one of the two places in which they occur in Figur 1.

On this bracket are mounted two vertical sheaves 64 and 65, and a horizontal pivot 66 for a corresponding bracket 67 on the under side of a carriage 68. In this carriage, on rollers 69 and 70, slides the spud arm 71.

The horizontal pivot 66 carries two sheaves 72 and 73.

From a winch-drum 74, mounted nearby on the deck, a rope 75 runs over sheaves 64 and 73, around a sheave 76 on the rear end of the handle 71, and back to an anchorage on the carriage 68. From the same drum, but wound the opposite way thereon, there runs a rope 77 over sheaves 65 and 72, around a

sheave 78 on the front end of the handle 71, and back to an anchorage on the carriage 68. These two ropes thus serve to thrust and to retract the spud.

The desired angularity of the spud in a horizontal plane is maintained by two lines 79 and 80, moored to two cleats 81 and 82 on the deck.

As the head of the spud will greatly overbalance the rear end of its handle, when thrust out, there is provided an A-frame 83, and a line 84, which passes from an anchorage 85, over a sheave 86 at the apex of the A-frame 83, to a winch drum 92. When the rear end of the spud overbalances the front end, the rear end is supported on a roller 87, mounted on two brackets 88 and 89.

The head 90 of the spud is detailed in Figures 5 and 6. It is large and hollow, so as to float, and is provided with a sharp lip 91 to jam into the bank, as shown in Figure 4. This lip, as shown in Figures 5 and 6, may be made from a single angle-iron, convexly curved to fit the end of the spud.

Having now described and illustrated one form of my invention, I wish it to be understood that my invention is not to be limited to the specific form or arrangement of parts hereinbefore described, except in so far as such limitations are specified in the appended claims.

I claim:

1. In a spud for a grader, the combination of: a support, swivelable about a vertical axis; means to secure the support against such swiveling; a carriage, supported by the support, and tiltable about a horizontal axis; a handle, reciprocable in the carriage; means to reciprocate the handle; and a bank-engaging head, carried by the handle.

2. In a spud for a grader, the combination of: a support, swivelable about a vertical axis; means to secure the support against such swiveling; a carriage, supported by the support, and tiltable about a horizontal axis; a handle, reciprocable in the carriage; means for supporting each end of the carriage against tilting; means to reciprocate the handle; and a bank-engaging head, carried by the handle.

3. In a spud for a grader, the combination of: a support, swivelable about a vertical axis; means to secure the support against such swiveling; a carriage, supported by the support, and tiltable about a horizontal axis; a handle, reciprocable in the carriage; a winch, an A-frame, a sheave on the A-frame, and a rope, all combining to support the front end of the carriage against tilting; and a roller, to support the rear end of the carriage against tilting; means to reciprocate the handle; and a bank-engaging head, carried by the handle.

4. In a spud for a grader, the combination of: a support, swivelable about a vertical axis; means to secure the support against such swiveling; a carriage, supported by the support, and tiltable about a horizontal axis; a handle, reciprocable in the carriage; means to reciprocate the handle; and a bank-engaging head, carried by the handle, said head being buoyant and provided with a sharp lip for engaging the bank.

5. In a spud for a grader, the combination of: a support, swivelable about a vertical axis; means to secure the support against such swiveling; a carriage, supported by the support, and tiltable about a horizontal axis; a handle, reciprocable in the carriage; means for supporting each end of the carriage against tilting; means to reciprocate the handle; and a bank-engaging head, carried by the handle, said head being buoyant and provided with a sharp lip for engaging the bank.

6. In a spud for a grader, the combination of: a support, swivelable about a vertical axis; means to secure the support against such swiveling; a carriage, supported by the support, and tiltable about a horizontal axis; a handle, reciprocable in the carriage; a winch, an A-frame, a sheave on the A-frame, and a rope, all combining to support the front end of the carriage against tilting; a roller, to support the rear end of the carriage against tilting; means to reciprocate the handle; and a bank-engaging head, carried by the handle, said head being buoyant and provided with a sharp lip for engaging the bank.

7. In a spud for a grader, the combination of: supporting means; a handle reciprocable with respect to such supporting means; means for reciprocating the handle, and for holding it against reciprocation; means for swinging the handle horizontally, and for holding it against such swinging; means for tilting the handle vertically, and for holding it against such tilting; a buoyant head carried by the handle; and a cutting lip carried by the head, for engagement with the bank.

8. In a spud for a grader, the combination of: a handle, a buoyant head, carried by the handle, and having its surface, furthest from the handle, convexly curved; and an angle-iron, curved to fit such surface, and secured thereto in a substantially horizontal plane, for engagement with the bank.

9. In a spud for a grader, the combination of: a handle; a hollow head, carried by the handle, and having its surface, furthest from the handle, convexly curved; and an angle-iron, curved to fit such surface, and secured thereto in a substantially horizontal plane, for engagement with the bank.

In testimony whereof I affix my signature.

WERNER LEHMAN.