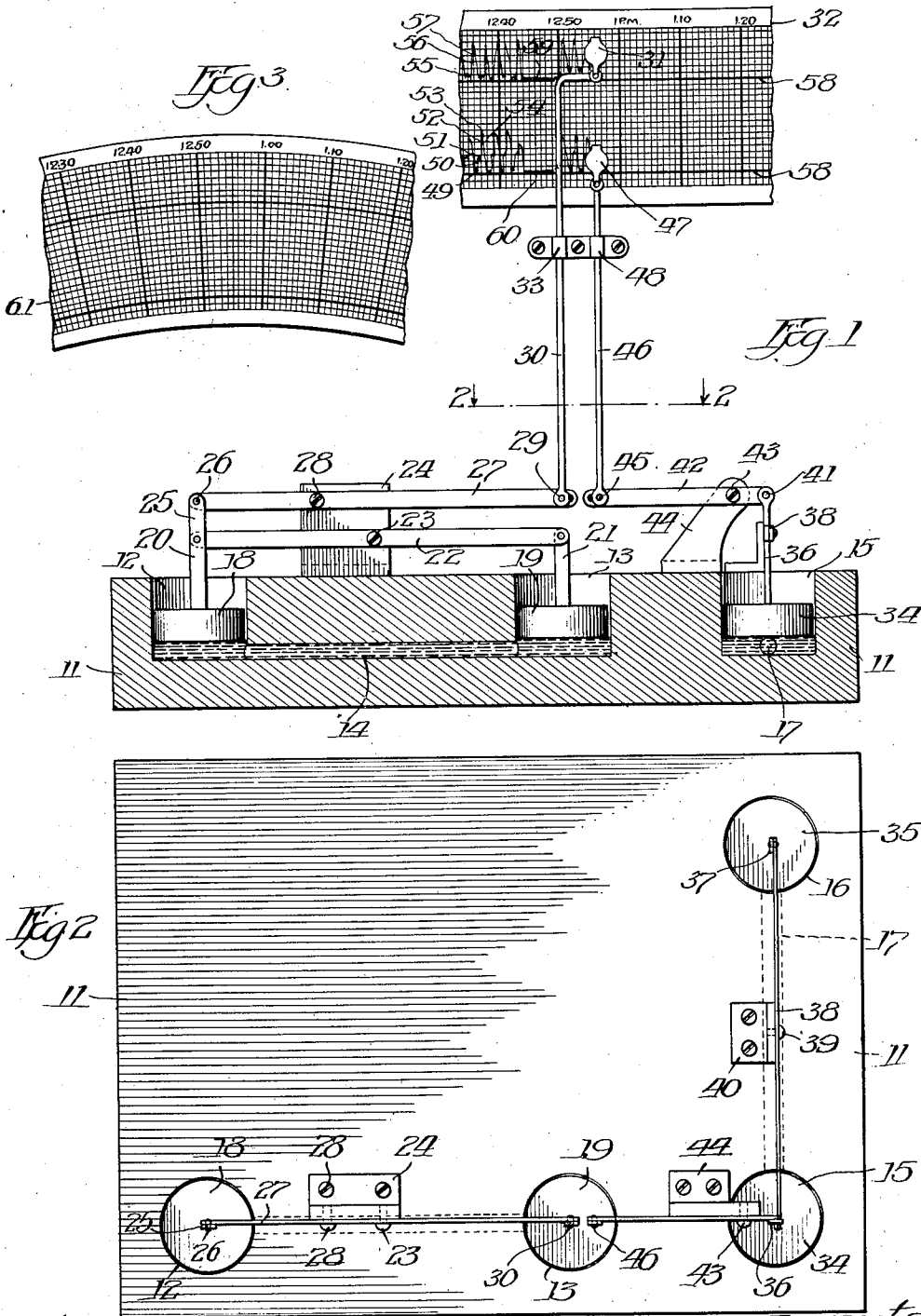


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Witnesses:

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UNITED STATES PATENT OFFICE.

THEODORE EDER, OF SACRAMENTO, AND DANIEL T. OWEN, OF PERKINS, CALIFORNIA.

DREDGE-METER.

1,181,511.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, THEODORE EDER and DANIEL T. OWEN, citizens of the United States, residing at Sacramento and Perkins respectively, in the county of Sacramento and State of California, have invented certain new and useful Improvements in Dredge-Meters, of which the following is a specification.

10 The invention has for its primary object the provision of a simple, reliable and wholly automatic device for recording, in the operation of a dredge, the number of loads handled, the time of handling, the
15 size of the loads, the points where dumped, and other data constituting a comprehensive work report covering the operation of the dredge throughout a given period of time.

20 While dredges are some times engaged to work on a yardage basis it is more customary to contract for such service upon a per diem arrangement. Such per diem arrangements usually provide for a period of
25 twenty-two hours' work out of twenty-four and all delays for oiling, repairs, etc., are deducted and charged against the dredge owner. The rates paid vary according to the size of bucket and length of boom. The contracts provide for working full capacity with
30 changing shifts of men and it is important to have a reliable check upon not only the number of loads handled, but the size of the loads and points at which they are
35 dumped. According to the system hitherto in vogue a time-keeper is assigned to each dredge who is supposed to count the buckets handled during certain intervals and also to record the average size of the load and to
40 make a log of his records. He also keeps track of time lost in oiling, breakdowns, or from other causes during both day and night. In the effort to provide an automatic check various devices have been pro-
45 posed such as a push button arranged to be actuated by the lever as each load was dumped, or an electrical control to be made by the swinging boom, but all of these devices are open to the objections that they can
50 be operated independently of the dumping mechanism and, moreover, they at best indicate only the number of loads and register no information as to the size of the load or the place where dumped.

55 A very large proportion of dredging work

is performed by floating dredges, either of the clam shell type, the steam shovel type, the suction type or the endless bucket line type, and particularly by dredges of the clam shell and steam shovel type in the
60 order named.

The present invention is adapted for making a complete detailed and reliable record of the work done by any type of floating dredge, minor modifications only being re-
65 quired to adapt the instrument for one or the other type of dredges. In making the record the list of the boat or floating bed of the dredge in a longitudinal or transverse direction due to the lifting and swinging of
70 the load is caused to make a graphic record upon a scale, and the scale being under the control of clock mechanism, the record constitutes a perfectly accurate measure of the work performed by the dredge throughout
75 a given period of time.

In order that the invention and its manner of operation may be readily understood, a preferred embodiment of the same adapted to a dredge of the clam shell type is set
80 forth in the accompanying drawing and in the following detailed description based thereon. As, however, the invention is obviously susceptible of embodiment in other and varied constructional forms and capable
85 of modification within a wide range in order to adapt the same to dredges of other types, the drawing and description are to be taken in an illustrative and not in an unnecessarily limiting sense.
90

In the drawings Figure 1 is a front elevation of the meter; Fig. 2 is a horizontal sectional view on the line 2—2 of Fig. 1 showing the arrangement of the meter base; and Fig. 3 is a fragmentary view of a disk
95 scale adapted for use in connection with the meter.

In any convenient position upon the floating bed of the dredge, for instance on the wall of the pilot house or upon a shelf provided for the purpose, is fixed the base 11
100 of the meter so that the same shall be in a horizontal plane when the dredge is at rest with the bucket suspended in the air. In the base 11, as shown, a pair of wells 12 and
105 13 are provided which are in line with the transverse axis of the dredge. These wells being connected in their lower portion by a passageway 14, they are adapted to be filled to a level above that of the passage 14 with
110

a liquid such as mercury, although any non-evaporating fluid may be used which responds quickly to gravity. Mercury is well suited to the purpose not only because of its great specific gravity, which tends to prevent splashing in rough water, but also because of the small degree of friction in passing from one well to the other. Another similar pair of wells 15 and 16 are arranged in the base 11 in line with the longitudinal axis of the dredge and consequently at right angles to a line passing through the wells 12 and 13. The wells 15 and 16 are likewise connected by a passage 17. A pair of floats 18 and 19 are mounted within the wells 12 and 13 and rest upon the surface of the fluid therein. The stems 20 and 21 of these floats are connected by an equalizer arm 22 pivoted at 23 upon the bracket 24 and an upper extension 25 of the stem 20 has pivoted thereto at 26 one arm of the lever 27 which is fulcrumed at 28, the other arm of the lever being attached at 29 to the rod 30 of a pen 31 arranged in operative relation to the upper portion of the scale 32 disposed in vertical fixed relation to the inner wall of the meter case but which is actuated by clock mechanism (not shown) so as to travel horizontally with reference to the pen in a manner well known in connection with recording devices.

It will be readily understood that the side list of the dredge will be transmitted to the base 11 and that, as the liquid within the two wells maintains a constant level under the influence of gravity, the float in one well will rise as the other sinks to a corresponding extent and this vertical movement of the floats will be transmitted through the lever connections and to the pen rod 30 which, being slidable within the guide 33, will cause the pen to vertically traverse the scale, the extent of vertical movement of the pen being proportioned to the side list of the dredge.

Within the wells 15 and 16 arranged longitudinally of the dredge axis are a pair of floats 34 and 35, the stems 36 and 37 of which are likewise connected by an equalizer 38 pivoted at 39 to the bracket 40, the stem 36 being also connected at 41 to one arm of the lever 42 fulcrumed at 43 upon a bracket 44, the other arm of the lever 42 being attached at 45 to the rod 46 of a pen 47, said rod being slidable within a guide 48. The end list of the dredge is, in the same manner as that previously described with reference to the side list, transmitted through connecting levers to the pen 47 which is thereby caused to traverse the scale 32 in a vertical direction. The pen 31 is slightly offset laterally from its rod 30 so as to bring the two pens 31 and 47 in vertical alinement. As the scale 32 is advanced by its clock mechanism beneath the pens 31 and 47 the time

and duration of the movement of the pens over the scale is indicated according to the hour and minute at which it takes place.

The bucket supporting boom being mounted centrally of the dredge and projecting normally in advance thereof during the loading of the bucket and adapted to swing to one side to dump the load upon the bank of the canal, the dredge is caused to list longitudinally as the bucket is loaded and lifted clear of the water and it is likewise caused to list transversely as the bucket is swung to one side for dumping, the boat assuming an even keel when the load is dumped and the boom is swung to its normal position in the air in advance of the dredge.

The longitudinal list of the dredge, its extent and its duration is recorded by the pen 47, the wavering portion 49 of the line indicating the biting moment when the bucket is being loaded at the bottom of the canal, the ascending portion 50 of the line representing the movement to the surface of the water, the intermediate wavering portion 51 of the ascending line indicating the moment at which the load leaves the water, the next ascending portion 52 of the line representing the period during which the load is suspended above the water endwise of the dredge, and the apex 53 of the line representing the maximum longitudinal list of the dredge and the period during which such list continued, while the descending line 54 represents the period during which the bucket was returned to the bed of the canal for another load. Similarly the side list of the dredge is recorded by the pen 31, the wavering line 55 at the bottom of the stroke indicating the biting moment, the ascending portion 56 of the line representing the time consumed in swinging the bucket to the dumping point and the descending portion 57 of the line representing the time consumed in swinging the bucket back into the loading position. The height of the strokes made by the pen 31 measure the maximum side list of the dredge and indicate the weight of the load, but more especially the point at which it was dumped, that is to say, the higher the apex of the stroke the farther away the dirt was deposited.

It will be understood that the record shown in the drawing indicates that the material was dumped at the right hand side of the dredge. If dumped to the left the strokes would descend below the normal line instead of ascending above the same. Likewise if the dirt were picked up at either side of the dredge and dumped in the center or at the opposite side the pen stroke would indicate this fact in its relation to the normal line 58.

As the meter would be inclosed within a locked and sealed case, the record is proof

against interference on the part of anyone and preserves a faithful record of the work done by the dredge. As the scale-tape is moved by clock mechanism it not only presents a graphic record of each load handled by the dredge but also shows the period of time consumed in handling that load and also, by the horizontal lines 59, 60, indicates the time and duration of rest periods when the dredge was not in operation.

Obviously instead of employing a scale in the form of continuous tape 32, the scale may be upon a circular disk 61 covering a stated period of time and mounted to rotate in operative relation to the pens 31 and 47, in which case the lines described by the two pens would be in radial alinement.

Throughout the foregoing description and also in the claims it will be understood that the terms employed are chosen with reference to the means illustrated and are to be construed in a general rather than a specific sense except as may be rendered necessary by the prior art. For example, the term "pen" is intended to include a pointed pencil, stylus or other element for indicating a scale-reading or producing a record.

We claim:

1. The combination with a support adapted to be secured to the tiltable bed of a dredge provided with load handling means extending to one side of the center thereof, of means to measure the loads comprising a level, and a scale and a pen adapted for relative traverse, one having a fixed relation to the bed and the other to the level, whereby the number and extent of the dips of the bed due to loads handled will be indicated on the scale.

2. The combination with a support adapted to be secured to the tiltable bed of a dredge provided with load handling means supported by and extending to one side of the center thereof, of means to measure the loads comprising a scale, pens arranged to traverse the scale, a pair of levels singularly arranged, and a connection between the levels and pens whereby the number and extent of the longitudinal and lateral dips of the bed due to loads handled will be indicated on the scale.

3. The combination with a support adapted to be secured to the tiltable bed of a dredge provided with load handling means supported by and extending to one side of the center thereof, of means to measure the loads comprising a scale vertically fixed with relation to the tiltable bed, pens arranged to vertically traverse the scale, clock mechanism to advance the scale horizontally with reference to the pen, levels arranged at an angle to each other, and a connection between the levels and pens whereby the number and duration of the longitudinal and

transverse dips of the bed due to loads handled in a given time will be recorded on the scale.

4. The combination with a support adapted to be secured to the tiltable bed of a dredge provided with load handling means extending to one side of the center thereof, of means to measure the loads comprising a body of liquid supported on the bed, a float thereon, a scale carried by the bed, pens arranged to vertically traverse the scale, and a lever having one arm connected to the float and the other to the pen whereby the number and extent of the dips of the bed due to loads handled will be indicated on the scale.

5. The combination with a support adapted to be secured to the tiltable bed of a dredge provided with load handling means extending to one side of the center thereof, of means to measure the loads comprising a body of liquid supported on the bed, a pair of floats thereon, a scale carried by the bed, a pen arranged to traverse the scale an equalizing member connecting the two floats, a lever having one arm connected to the floats and the other to the pen, and clock mechanism to advance the scale horizontally with reference to the pen whereby the number and duration of the dips of the bed due to loads handled in a given time will be recorded on the scale.

6. The combination with a support adapted to be secured to the tiltable bed of a dredge provided with load handling means extending to one side of the center thereof, of means to measure the loads comprising a body of liquid, a pair of floats disposed thereon in line with the longitudinal axis of the bed, a second pair of floats disposed in line with the transverse axis of the bed, a scale having fixed vertical relation to the bed, clock mechanism for advancing the scale horizontally, a pair of pens arranged to vertically traverse the scale, and a series of levers connecting each pair of the floats with one of the pens whereby the number and duration of the longitudinal and transverse dips of the bed will be recorded on the scale by the respective pens.

7. The combination with a support adapted to be secured to the tiltable bed of a dredge provided with load handling means extending to one side of the center thereof, of means to measure the loads comprising a pair of connected wells of liquid arranged in line with the longitudinal axis of the bed, a second pair of connected wells of liquid arranged in line with the transverse axis of the bed, a float in each of the wells, the floats connected in longitudinal and transverse pairs, a scale vertically fixed in relation to the bed, a pair of pens arranged to vertically traverse the scale, and a pair of levers each having one arm

connected to a member of a pair of floats and its other arm to one of the pens, whereby the number and extent of the longitudinal and transverse dips of the bed due to loads handled will be indicated on the scale.

8. The combination with a support adapted to be secured to the tiltable bed of a dredge provided with load handling means extending to one side of the center thereof, of means to measure the loads comprising a pair of connected wells of liquid arranged in line with the longitudinal axis of the bed, a second pair of connected wells of liquid arranged in line with the transverse axis of the bed, a float in each of the wells, the floats connected in longitudinal and transverse pairs, a scale vertically fixed in relation to the bed, clock mechanism to advance the scale horizontally, and a pair of pens arranged to vertically traverse the scale, and a pair of levers each having one arm connected to a member of a pair of floats and its other arm to one of the pens, whereby the number, extent and duration of the longitu-

dinal and transverse dips of the bed due to loads handled in a given time will be recorded on the scale.

9. The combination with a support adapted to be secured to the tiltable bed of a dredge provided with load-handling means extending to one side of the center thereof, of means to measure the loads comprising a level arranged longitudinally of the bed, a second level arranged transversely of the bed, a scale having fixed relation to the bed, and pens having fixed relation to the levels and adapted to traverse the scale, whereby the number and extent of the longitudinal and transverse dips of the bed due to loads handled will be indicated on the scale.

In witness whereof we have hereunto signed our names in the presence of two subscribing witnesses.

THEODORE EDER.
DANIEL T. OWEN.

Witnesses:

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