No. 659,489. Patented Oct. 9, 1900.

R. R. OSGOOD.

DREDGE.

(Application filed June 4, 1900.)

(No Model.) 3 Sheets—Sheet 1.

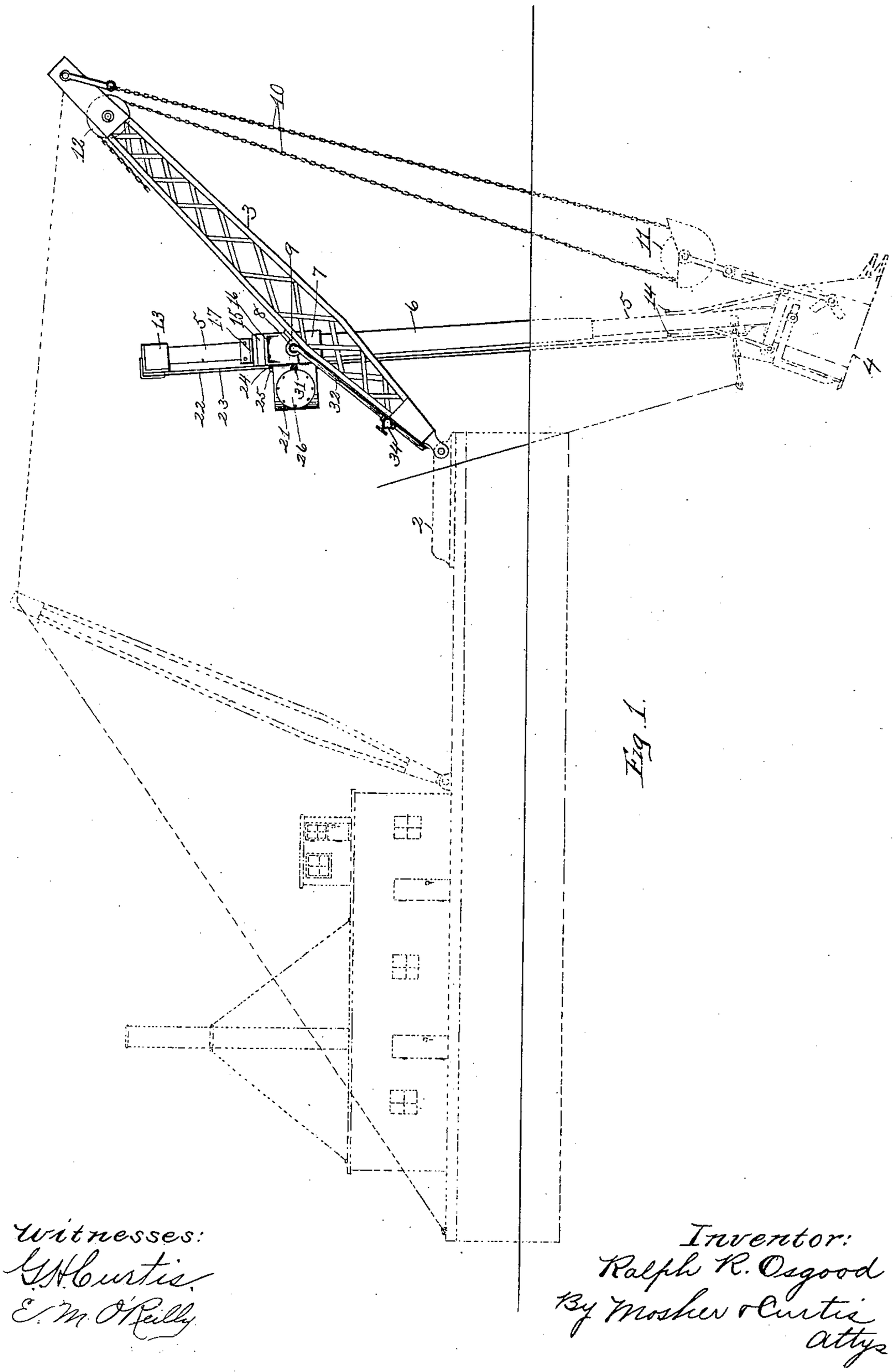

Fig. 1.

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E. M. O'Reilly

Inventor:
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3 Sheets—Sheet 2.

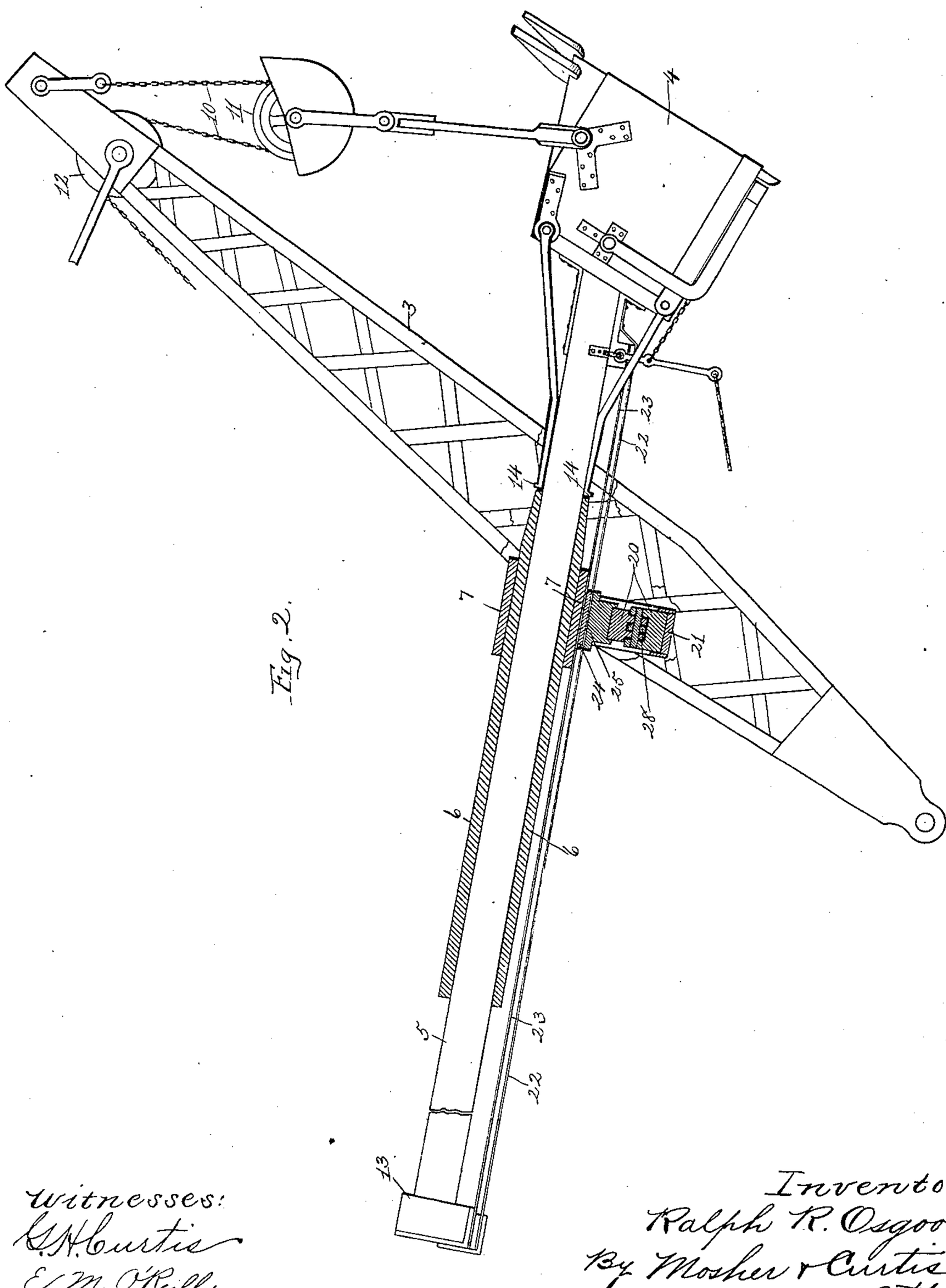

Fig. 2.

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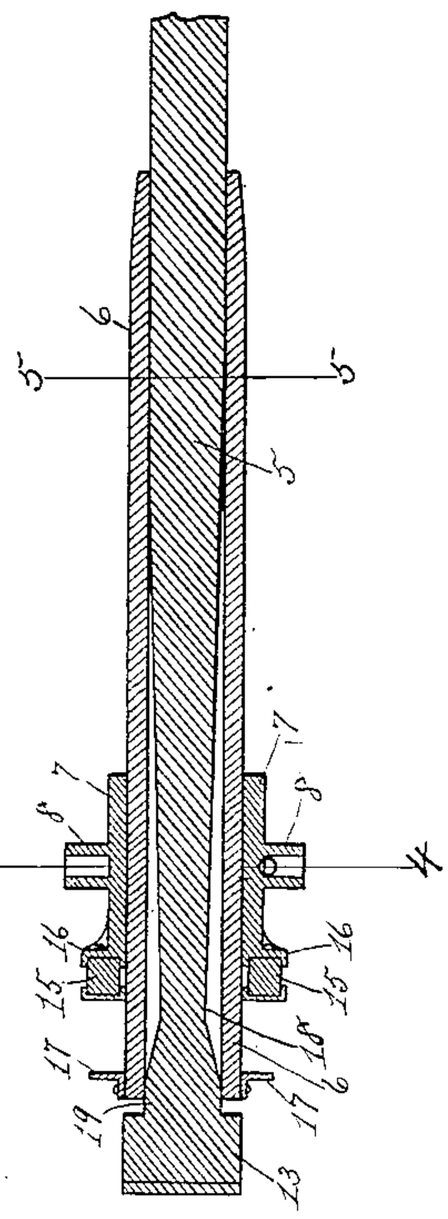
(No Model.) 3 Sheets—Sheet 3.

Fig. 3.



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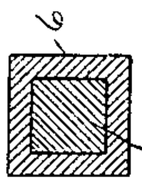


Fig. 6.

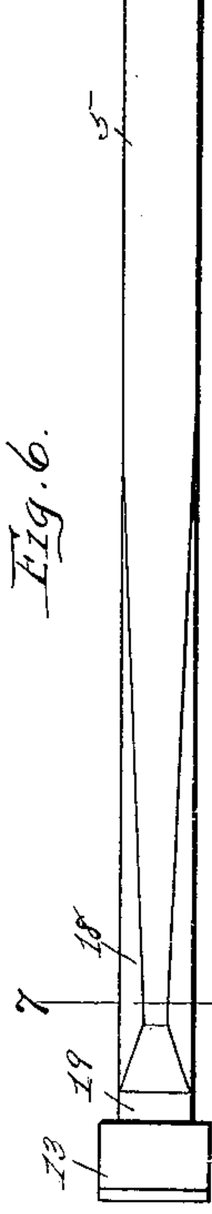


Fig. 8.

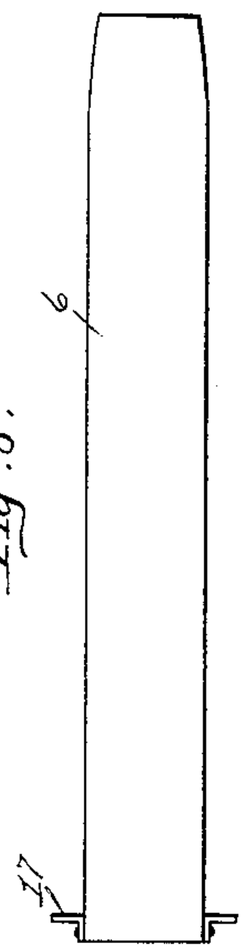


Fig. 10.

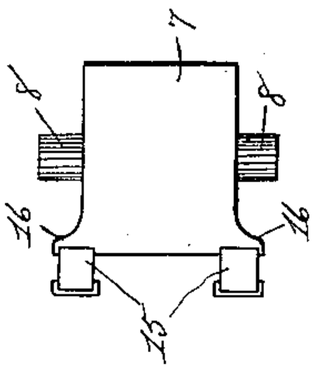


Fig. 4.

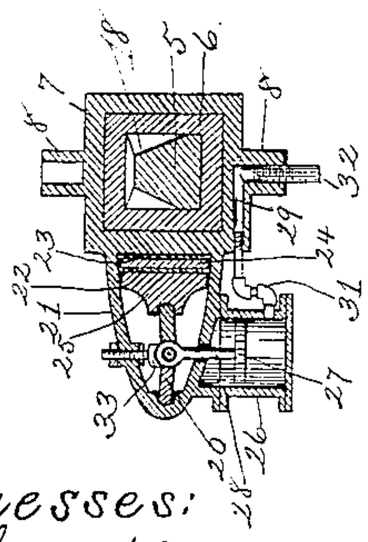


Fig. 7.

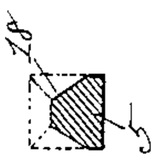


Fig. 9.

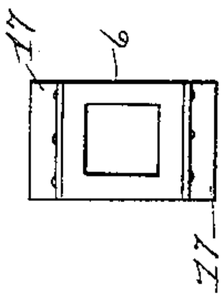
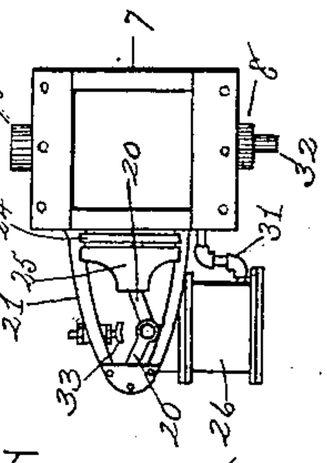


Fig. 11.



Witnesses:
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E. M. O'Reilly

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UNITED STATES PATENT OFFICE.

RALPH R. OSGOOD, OF LANSINGBURG, NEW YORK.

DREDGE.

SPECIFICATION forming part of Letters Patent No. 659,489, dated October 9, 1900.

Application filed June 4, 1900. Serial No. 18,989. (No model.)

To all whom it may concern:

Be it known that I, RALPH R. OSGOOD, a citizen of the United States, residing at Lansingburg, county of Rensselaer, and State of New York, have invented certain new and useful Improvements in Dredges, of which the following is a specification.

The invention relates to such improvements; and it consists of the novel construction and combination of parts hereinafter described and subsequently claimed.

Reference may be had to the accompanying drawings and the reference characters marked thereon, which form a part of this specification.

Similar characters refer to similar parts in the several figures.

The object of my invention is to reinforce, reduce the weight of, and facilitate the manipulation of a dipper-handle of an excavator.

In the operation of excavators, such as dredges, the excavating-dipper is fixed upon and supported and operated by a shaft or handle adapted in length to the distance from the body of the excavator at which the dipper is to operate. When the dipper shaft or handle is thus increased in length, as in a dredge for operating in comparatively-deep water, it is necessary to increase the strength of the handle to withstand the increased transverse strain. This has heretofore been accomplished by increasing the cross-sectional dimensions. Handles have thus been made as large as seventy-five feet in length and three feet square, and such a handle built up of timber, as is the common practice, weighs about thirty tons. Each time the dipper is operated it is necessary to operate this massive structure, and in operating the dipper many times a day the loss of time and force required in moving the massive handle is great. Furthermore, the increased size and weight of the handle necessitates increasing the weight and strength of the dipper itself in order to enable it to withstand the downward thrust or crushing force of the handle when the dipper is forced into engagement with the subjacent soil.

The purpose of my invention is to obviate the disadvantages of such form of construction as has heretofore been used for supporting and operating the dipper in such excavating-machines and to facilitate the manipulation of the dipper supporting and operating mechanism of excavators, and particularly of such supporting and operating mechanism as forms part of this invention.

Figure 1 of the drawings is a view, in side elevation, of the dipper supporting and operating mechanism of a dredge provided with my invention, the outlines of portions of the dredge and immersed portions of the mechanism being represented by dotted lines. Fig. 2 is an enlarged view, partly in side elevation and partly in section, of the dipper in an elevated position and its supporting and operating mechanism. Fig. 3 is a central longitudinal section of the dipper-arm, reinforcing-sleeve, and trunnion-supporting sleeve. Fig. 4 is a cross-section of the same taken centrally through the trunnions on the broken line 4 4 in Fig. 3. Fig. 5 is a cross-section of the dipper-handle and reinforcing-sleeve, taken on the broken line 5 5 in Fig. 3. Fig. 6 is a top plan view of the dipper-handle partly broken away. Fig. 7 is a cross-section of the tapered portion of the handle, taken on the broken line 7 7 in Fig. 6. Fig. 8 is a plan view of the reinforcing-sleeve. Fig. 9 is an end view of the same. Fig. 10 is a plan view of the trunnion-supporting sleeve. Fig. 11 is an end view of the same.

The body of the dredge is represented by dotted lines 1 in Fig. 1.

Supported upon a turn-table 2 in the usual manner to project from the front end of the body or boat is the boom 3, which supports the dipper mechanism. The dipper 4 is fixed upon the lower end of the shaft or arm 5 in the usual manner. This handle is made of comparatively-small cross-sectional dimensions and is inserted within a reinforcing-sleeve 6, which is located within the trunnion-supporting sleeve 7, having the laterally-projecting trunnions 8, and forming a slideway-support for the handle and its reinforcing-sleeve. The trunnion-supporting sleeve is mounted upon the boom 3, which is provided with bearings 9 for the trunnions, whereby the trunnion-sleeve with the inclosed dipper-arm and reinforcing-sleeve are supported and adapted to oscillate in a vertical plane.

Reciprocating and oscillating movements

may be imparted to the dipper and dipper-handle in any known manner. The dipper-handle is adapted to reciprocate in its slideway-support, and I have devised means for securely locking the handle at any desired point in its reciprocating path, which form a part of this invention and will be hereinafter fully described. The dipper and handle when thus locked against reciprocatory movement in the slideway-support may be caused to oscillate in a vertical plane on the axis of the trunnions by means of the chain 10, connected at one end with the outer end of the boom and passing thence downwardly and around a sheave or pulley 11, connected with the dipper, and thence upwardly over a sheave or pulley 12, mounted in the outer end of the boom, the other end of said chain being connected with a power-actuated drum or windlass. (Not shown.) When the dipper-handle is released and left free to reciprocate in its slideway-support, reciprocating movements can be imparted thereto by means of said chain 10 and its connections, as described.

The reinforcing-sleeve 6 may be made of any desired material and dimensions and is preferably reciprocatory in the trunnion-sleeve, while the handle is reciprocatory in said reinforcing-sleeve.

The dipper-handle is provided on its outer or upper end with an offset or abutment 13, which limits the relative movement of the handle and reinforcing-sleeve in one direction, while near the other end of the handle are other offsets or stops 14, formed by the dipper connections, which limit their relative movement in the other direction. The reinforcing-sleeve is thus loosely confined upon the arm and is adapted to be raised by engagement with the stops 14 when the dipper is raised to the position shown in Fig. 2. When the dipper is lowered, gravity or engagement with the abutment or stop 13 will also cause the reinforcing-sleeve to descend to the position shown in Fig. 1.

The upper end of the trunnion-sleeve is provided with cushions or buffers 15, formed of rubber or other yielding material, supported by offset brackets or flanges 16 and located in the path of offsets or brackets 17, fixed upon the upper end of the reinforcing-sleeve. Such buffers tend to relieve the concussion caused by the sudden stopping of the reinforcing-sleeve when it reaches the limit of its downward movement in the trunnion-sleeve as well as that caused by the engagement of the abutment 13 on the end of the dipper-arm with the trunnion-sleeve or the interposed offsetting portions of the reinforcing-sleeve.

By the use of the above-described features of my invention it is possible to employ a dipper-arm of extreme length, but of comparatively small weight, which can be easily and quickly manipulated in the operation of the dipper, and at the same time, by means of the reinforcing-sleeve, to make such an arm equal in strength to those formerly employed of extreme size. When desired, the dipper-arm can be further diminished in bulk and weight by contracting or tapering the upper portion of the shaft or handle, as shown at 18, from a point near the upper end to a point near the lower end of the reinforcing-sleeve and within said sleeve when the parts are in or near their lowermost position, as shown in Fig. 3. At the upper end of such tapered portion, at 19, the handle is left of normal dimensions adapted to fit the interior of the reinforcing-sleeve and afford a secure support for the upper end of the handle, while its intermediate portion at the upper end of the tapered portion also fits the sleeve, thus affording ample support to enable the handle to sustain all necessary strains, while relieving the same from unnecessary weight. My improved construction also permits of the dipper itself being made comparatively light in weight by reason of the great reduction in the weight of the handle secured thereby.

To permit the dipper and handle to be properly manipulated by means of the chain 10 and its connections in the dredging operation, it is necessary that the dipper-arm should during such operation be held from reciprocating movement in its slideway-support, and I have heretofore invented various devices for this purpose adapted to act directly upon the arm, such as shown and described in Letters Patent granted to me therefor, No. 162,849, dated May 4, 1875, and No. 362,587, dated May 10, 1887.

With my present construction of dipper supporting and operating mechanism it is difficult to apply clamping or friction devices to act directly upon the dipper-arm on account of the reinforcing-sleeve which incloses the arm. I have shown in the drawings mechanism adapted for this purpose which is particularly applicable to the sleeve-reinforced handle above described, but which can also be used with other forms of handle, if desired. Such mechanism comprises one or more links located outside of the trunnion-sleeve or slideway-support for the handle and adapted to reciprocate in unison with said handle and clamping mechanism for said link or links mounted upon said trunnion-sleeve or slideway-support. I have shown the trunnion-sleeve provided with a yoke 21, fixed thereon, and two links 22 23, extending through said yoke outside the trunnion-sleeve and reinforcing-sleeve and attached at their opposite ends to the dipper-handle near its opposite ends. These links are preferably formed of metal plates or straps. Between these links within the yoke is inserted a friction plate or gib 24. The inner link is adapted to bear upon the outer side of the trunnion-sleeve and the outer link is adapted to be engaged by a clamping plate or gib 25. As a means for operating the clamping mechanism I have shown a toggle-joint 20, interposed between said plate

25 and the outer portion of the yoke 21 in such manner that the joint can be operated to tightly compress the links and friction-plate 24 between the clamping-plate 25 and the outer side of the trunnion-sleeve. The toggle-joint is preferably operated by means of fluid-pressure applied through a piston and cylinder operatively connected with the hinge of the toggle-joint. I have shown a cylinder 26, fixed upon the yoke 21 and provided with a reciprocatory piston 27, having a piston-rod 28 connecting with the hinge of the toggle-joint.

Fluid-pressure, as in the form of steam, may be supplied to the cylinder in any known manner, preferably so as to not be interfered with by the oscillating movements of the trunnion-sleeve. I have shown the trunnion-sleeve provided with a fluid passage-way 29, communicating with a hollow trunnion 8 and connected by the pipe 31 with the cylinder 26. The supply-pipe 32, leading from a source of supply not shown, such as a steam-boiler on the boat, is inserted in the outer end of the hollow trunnion 8 and secured therein by a screw-threaded connection which permits a relative rotary motion of the trunnion and pipe, thus permitting the trunnion-sleeve to be oscillated without interfering with the fluid-supply.

Any number of links connected with the dipper-handle may be employed.

The adjustable stop 33 prevents the toggle-joint from assuming a fully-expanded form, thus assuring the release of the clamps when the fluid-pressure is removed from the piston.

The supply of fluid-pressure to the piston and cylinder can be controlled by a valve 34 in the supply-pipe.

What I claim as new, and desire to secure by Letters Patent, is—

1. In an excavator, the combination with a dipper-handle; of a reciprocatory handle inclosing and reinforcing sleeve.

2. In an excavator, the combination with a dipper-handle; stops located near its opposite ends and means for raising and supporting said handle; of a handle inclosing and reinforcing sleeve reciprocatory between said stops.

3. In an excavator, the combination with a dipper-handle; of a handle inclosing and reinforcing sleeve; and a trunnion-supporting sleeve, said handle and reinforcing sleeve being reciprocatory in said trunnion-supporting sleeve, substantially as described.

4. In an excavator, the combination with a tapered dipper-handle, of a reciprocatory handle inclosing and reinforcing sleeve.

5. In an excavator, the combination with an inclosing sleeve; of a dipper-handle reciprocatory within said sleeve, and having its end portions corresponding in cross-sectional form with the interior of said sleeve and having a transversely-contracted portion of less length than the sleeve and terminating near the top of the arm, substantially as described.

6. In an excavator, the combination with a dipper-handle; and means for operating said handle; of a reinforcing-sleeve inclosing and reciprocatory upon said handle; a trunnion-supporting sleeve; and a yielding buffer interposed between overlapping portions of said sleeves, substantially as described.

7. In an excavator, the combination with a dipper-handle; and means for operating the same; of a trunnion-supporting sleeve inclosing said handle; and a yielding buffer so located as to relieve concussion caused by the sudden stopping of the dipper-handle upon reaching the limit of its downward movement through said sleeve, substantially as described.

8. In an excavator, the combination with the boom, and a slideway-support mounted upon the boom; of a dipper-handle reciprocatory through said slideway-support; a handle-supporting link reciprocatory outside of said slideway-support; and clamping mechanism for said link mounted upon said slideway-support, and supported thereby independently of said boom.

9. In an excavator, the combination with a trunnion-sleeve; of a dipper-handle reciprocatory in said sleeve; a handle-supporting link reciprocatory outside said sleeve; and clamping mechanism for said link carried by said sleeve.

10. In an excavator, the combination with a trunnion-sleeve; of a dipper-handle reciprocatory in said sleeve; a link connected with said handle and reciprocatory outside said sleeve in unison with said handle; and toggle-actuated mechanism supported by said sleeve and adapted to engage and clamp said link.

11. In an excavator, the combination with a trunnion-sleeve; of a dipper-handle reciprocatory therein; a link connected with said handle and reciprocatory outside said sleeve in unison with said handle; clamping mechanism adapted to engage said link; a cylinder and piston carried by said sleeve and operatively connected with said clamping mechanism; and means for supplying to said cylinder and piston fluid under pressure.

12. In an excavator, the combination with a trunnion-sleeve; of a dipper-handle reciprocatory therein; a plurality of links connected with said handle, and reciprocatory outside said sleeve in unison with said handle; a friction-plate inserted between adjacent links; and means for clamping said links and plate to said sleeve.

13. In an excavator, the combination with a trunnion-sleeve; of a dipper-handle reciprocatory in said sleeve, a yoke fixed upon the outer side of said sleeve; a link located outside said sleeve and connected with and reciprocatory through said yoke in unison with said handle; clamping mechanism for said link; a toggle-joint mounted within said yoke for operating said clamping mechanism; a piston and cylinder mounted upon said yoke

and operatively connected with the hinge of said toggle-joint; and means for supplying fluid under pressure to said piston and cylinder.

14. In an excavator, the combination with a slideway-support; of a dipper-handle and a handle-inclosing reinforcing-sleeve both reciprocatory in said slideway-support; a link located outside of said sleeve and slideway-support and connected and reciprocatory in unison with said handle; and clamping mechanism for said link mounted upon said slideway-support.

In testimony whereof I have hereunto set my hand this 31st day of May, 1900.

RALPH R. OSGOOD.

Witnesses:
FRANK C. CURTIS,
E. M. O'REILLY.