C. W. DIEHL.

DREDGE.

APPLICATION FILED NOV. 11, 1908.

939,227.

Patented Nov. 9, 1909.

3 SHEETS—SHEET 1.

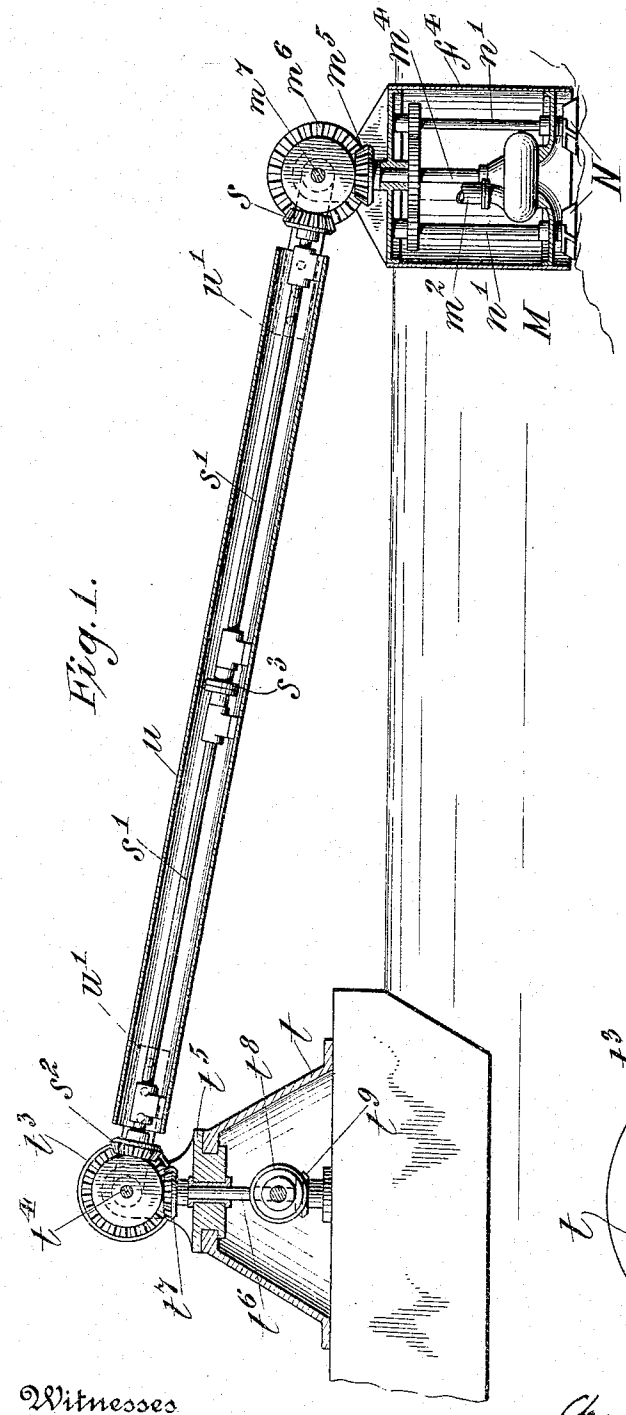

Fig. 1.

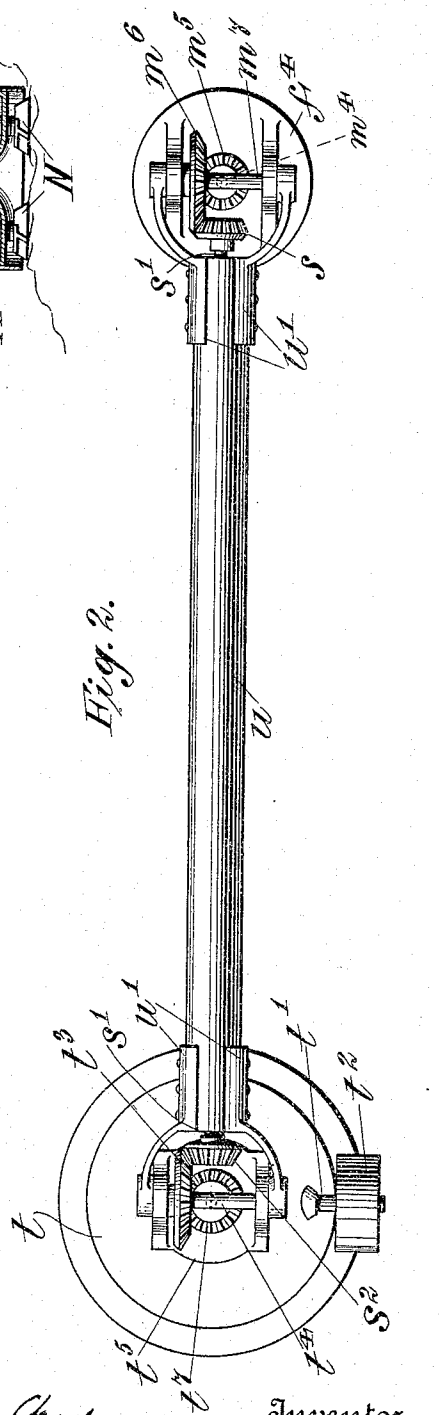

Fig. 2.

Witnesses

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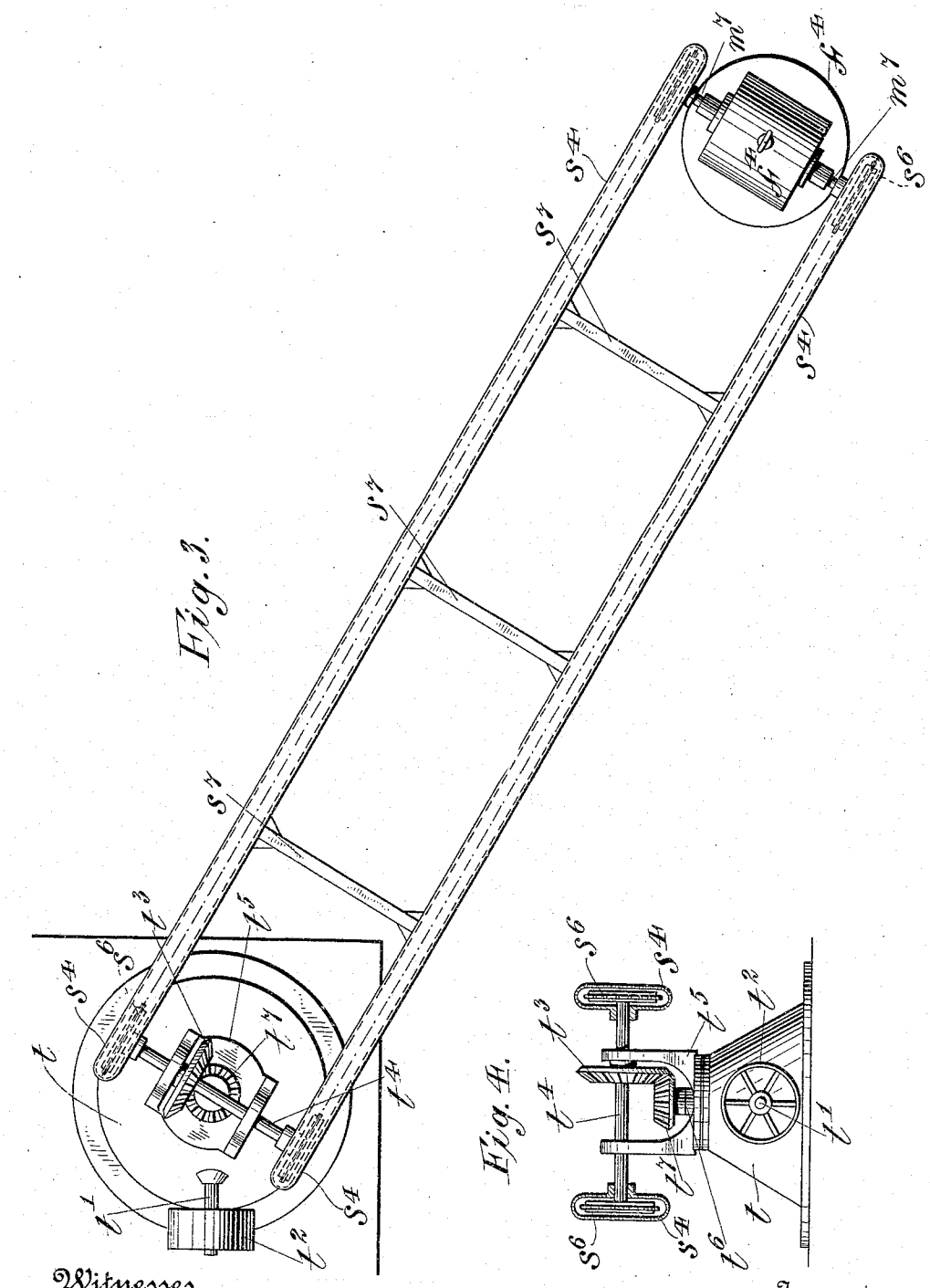

Fig. 3.

Fig. 4.

Witnesses

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3 SHEETS—SHEET 3.

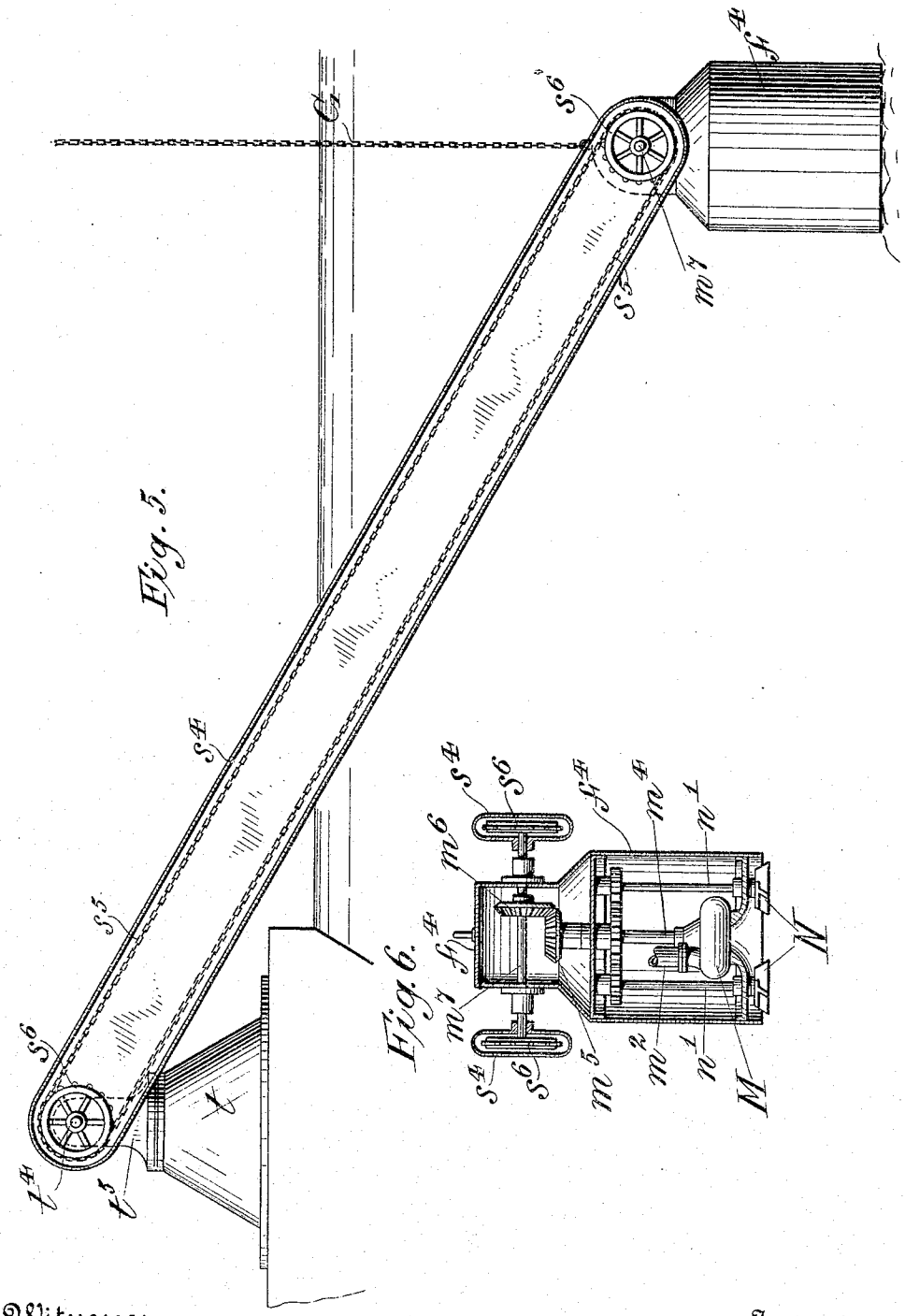

Fig. 5.

Fig. 6.

Witnesses

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UNITED STATES PATENT OFFICE.

CHARLES W. DIEHL, OF NEW YORK, N. Y.

DREDGE.

939,227. Specification of Letters Patent. Patented Nov. 9, 1909.

Application filed November 11, 1908. Serial No. 462,003.

To all whom it may concern:

Be it known that I, CHARLES W. DIEHL, a citizen of the United States, and a resident of the borough of the Bronx, of the city of New York, in the county and State of New York, have invented certain new and useful Improvements in Dredges, of which the following is a specification, reference being had to the accompanying drawings, forming a part hereof.

The invention relates particularly to dredges of the type illustrated and described in Letters Patent of the United States No. 822,865, granted June 5, 1906 to Thomas P. Payne. In such a dredge, there is a movable excavating element which, by means of suitable supports and hoisting machinery, can be brought into various positions where work is to be performed. This excavating element, as illustrated in the Letters Patent above referred to, includes a pump and excavating tool inclosed within a casing or chamber, and the latter also contains a motor for driving the tool and furnishing power to operate the pump.

Aside from the difficulty of providing a thoroughly water proof casing for the motor, which is necessary under the conditions of practical use, it has proven to be a matter of considerable expense to build an excavating element of this sort with a motor included as a part of the movable unit. For this reason it is proposed, in accordance with the present invention, to supply power to the excavating element from a stationary motor, which may be located upon the scow referred to in the Letters Patent before mentioned or in any other suitable place, instead of upon and as a part of the movable excavating unit or element as shown in said Letters Patent.

Furthermore and in accordance with the present invention, a mechanical means is provided to transmit power from a stationary element to the excavating element in a simple, practical and convenient manner, all of which will be described hereinafter with reference to the accompanying drawings.

In said drawings, Figure 1 is a view in side elevation of an apparatus embodying the invention, some of the parts being shown in section. Fig. 2 is a plan view thereof. Fig. 3 is a plan view of a modification. Fig. 4 is a detail view of what may be referred to as the stationary element of Fig. 3. Fig. 5 is a view in side elevation, with some parts broken away, of the form shown in Fig. 3, and, Fig. 6 is a detail view of the excavating element, showing the power connections therewith, in accordance with the form illustrated in Fig. 3.

The element or chamber forming the excavating unit is indicated at f^4 in the drawings and, as shown, contains a pump M having a discharge pipe m^2, and excavating tools N suitably mounted in a frame provided therein. The pump, as will be understood, is arranged so that it will receive the material which is stirred up by the excavating tools or in some other way and which it discharges through the pipe m^2 which is, of course, led up through the chamber and to a suitable point of discharge (not shown). Moreover, the pump will be seen to be driven from a vertical shaft m^4 from which also, through the medium of intermeshing gears, the shafts n' may be turned upon which the tools N are secured. The shaft m^4 is provided with a bevel gear m^5 which meshes with another bevel gear m^6 provided upon a horizontal shaft m^7 journaled in the top of the excavating element. In Figs. 1 and 2, the gear m^5 is provided upon the outside of the casing inclosing the excavating element and is operatively engaged by a bevel gear s upon a shaft s' through which it will be possible to transmit power to the excavating element and to permit the excavating element to be moved about at the same time. Such power may in turn be transmitted to the shaft from a stationary element indicated in the drawings by the character t. This element embodies a suitable source of power which is represented by a shaft t', the latter receiving its power from the ultimate source through the medium of a pulley t^2. From this shaft t' suitable connections are made with the upper end of the shaft s'. In the present case, to enable the shaft s' to have a universal motion, that is to enable it to be moved up and down and from side to side and to assume any desired position, the upper end of the shaft s' is provided with a bevel gear s^2 which meshes with another bevel gear t^3 upon a shaft t^4 journaled in a turntable t^5 which is mounted upon the stationary member t. Through the medium of a vertical shaft t^6 and gears t^7, t^8 and t^9, the shaft t' is opera-

tively connected with the gear t^3. The stationary member t may, of course, be mounted in any suitable position with reference to the matter to be excavated, and may be placed upon a scow or other vessel where subaqueous excavations are to be made.

It will be understood that suitable arrangments must be made for the raising and lowering and the moving about of the excavating element, but any suitable means may be adopted for this purpose and as such means are so common and well known in the art and as the structure of such means does not concern the present invention, they are sufficiently illustrated in the drawings by being indicated by a cable G in Fig. 5. It will be necessary however to maintain the stationary element and the excavating element always the same distance apart and for this purpose and as incidentally furnishing suitable bearings for the shaft s' a boom u is interposed between these two elements and its ends are pivoted to the shafts t' and m^7 respectively through the medium of steel connecting pieces u' provided upon the boom u, as shown in Figs. 1 and 2. Moreover, the shaft s' is preferably made in two parts which are connected by means of a universal joint s^3 to permit this shaft to bend more or less without seriously affecting the transmission of power and without injury to the shaft. It will be obvious that such mechanism will permit power to be transmitted freely to the excavating element while the latter is being moved about to different operating positions, and it will be observed that the excavating element may be placed in any position within the range of the boom with the exception of a small area directly underneath the stationary element. In order to make the area underneath the stationary element which cannot be reached by the boom, as small as possible, the gear s^2 is made relatively small while the gear t^3 is made relatively large so as to permit the boom u to approach as nearly as possible to a vertical position.

The alternative form shown in Figs. 3 and 5 illustrates the employment of a driving chain in lieu of a shaft as a medium of power transmission between the stationary and excavating elements. One driving chain will, of course, be sufficient for such power transmission, although the provision of two driving chains or two shafts will enable the boom to assume a more nearly vertical position and such a construction, moreover, lends itself more readily to the addition of a casing to cover up the gearing and other connections between the lower end of the shaft or chain and the excavating element.

Referring to Figs. 3 to 6 inclusive, where the double chain drive is illustrated, it will be seen that a casing s^4 is provided which entirely covers the chains s^5 and their sprocket connections s^6 and that these casings are provided with cross braces s^7 which together with the casings constitute the boom. The casing f^4 around the excavating element is enlarged sufficiently to inclose the gears m^5 and m^6, the sprocket wheels s^6 being placed upon the shafts m^7 and t^4 respectively. It will be seen how such connections enable the complete protection of the mechanism from grit and any other material which would possibly tend to wear them out or interfere with their proper action.

Various changes may be made in the embodiment of the improvements without departing from the invention.

I claim as my invention:

1. In a dredge, the combination of a movable excavating element, a stationary power-supply element, a boom connecting the two elements, means to transmit power along the boom from one element to the other and means to discharge the excavated matter from a point near the excavating element.

2. In a dredge, the combination of an excavating element including a pump, a stationary element having a source of power, means to maintain a constant distance between the two elements, and means to transmit power from one element to the other.

3. In a dredge, the combination of an excavating element including a pump, a stationary element having a source of power, a boom connecting the two elements, and means to transmit power along the boom from one element to the other.

4. In a dredge, the combination of a movable excavating element, a stationary power-supply element, a turntable upon the power-supply element, a boom connecting the two elements, means to transmit power along the boom from one element to the other and means to discharge the excavated matter from a point near the excavating element.

5. In a dredge, the combination of a movable excavating element, a stationary power-supply element, a boom pivotally related to the two elements, means to transmit power along the boom from one element to the other and means to discharge the excavated matter from a point near the excavating element.

6. In a dredge, the combination of a movable excavating element, a stationary power-supply element, a boom connecting the two elements, means to transmit power along the boom from one element to the other, means to raise and lower the excavating element and means to discharge the excavated matter from a point near the excavating element.

7. In a dredge, the combination of a movable excavating element, a stationary power-supply element, a boom connecting the two elements, a shaft extending along the boom to transmit power from one element to the

other and means to discharge the excavated matter from a point near the excavating element.

8. In a dredge, the combination of a movable excavating element, a stationary power-supply element, a boom connecting the two elements, a shaft arranged along the boom to transmit power from one element to the other, a relatively large bevel gear mounted upon the power-supply element, a relatively small bevel gear mounted upon the shaft in operative engagement with the first named gear and means to discharge the excavated matter from a point near the excavating element.

9. In a dredge, the combination of a movable excavating element, a stationary power-supply element, a boom connecting the two elements, and means on each side of the boom to transmit power from one element to the other.

10. In a dredge, the combination of a movable excavating element, a stationary power-supply element, a boom connecting the two elements, means on each side of the boom to transmit power from one element to the other, connections between said means and the excavating element, and a casing to inclose said connections.

This specification signed and witnessed this 4th day of November, A. D., 1908.

CHARLES W. DIEHL.

Signed in the presence of:
G. McGRANN,
LUCIUS E. VARNEY.