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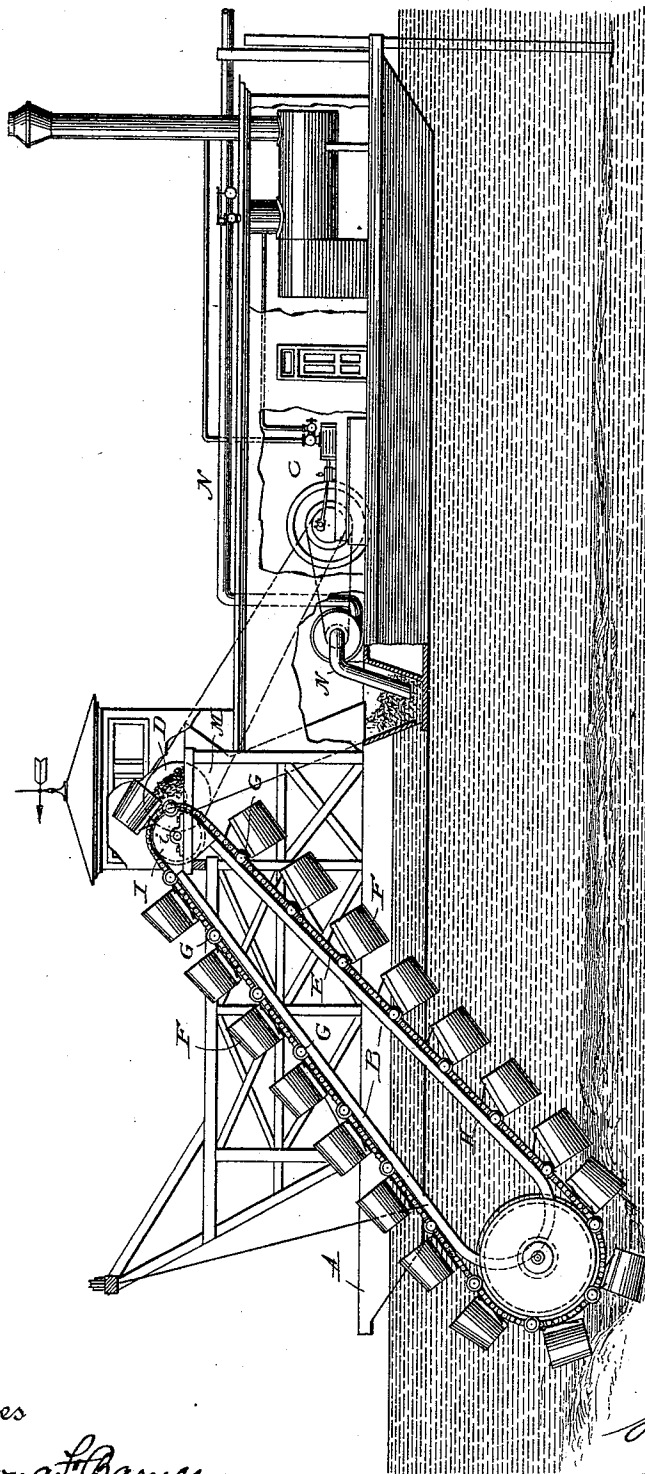
2 Sheets—Sheet 1.

W. T. URIE.
DREDGING MACHINE.

No. 498,143.

Patented May 23, 1893.

Fig. 1.



Witnesses

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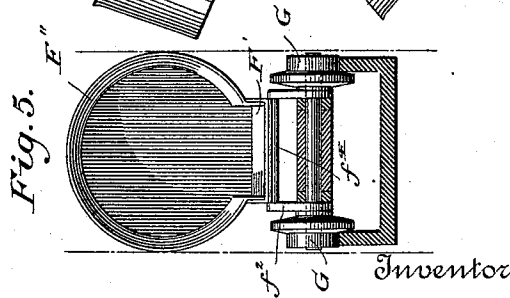
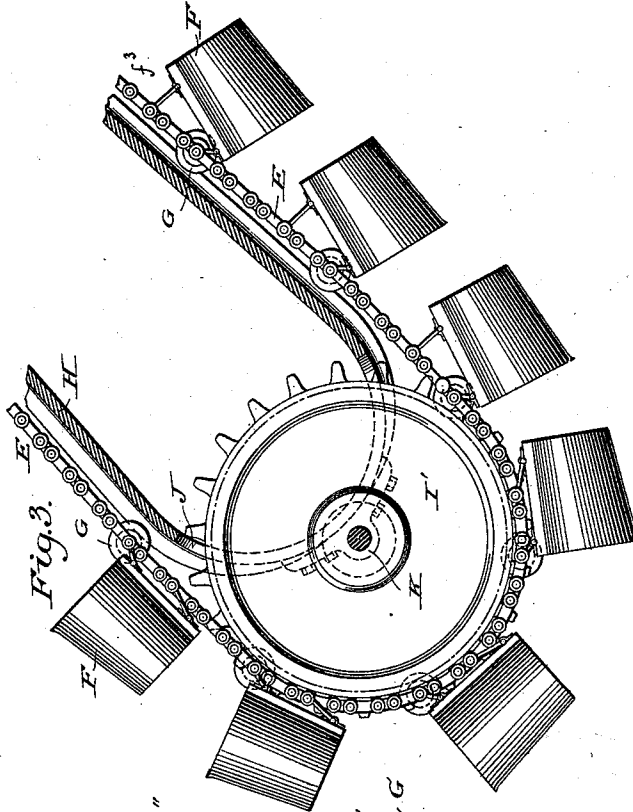
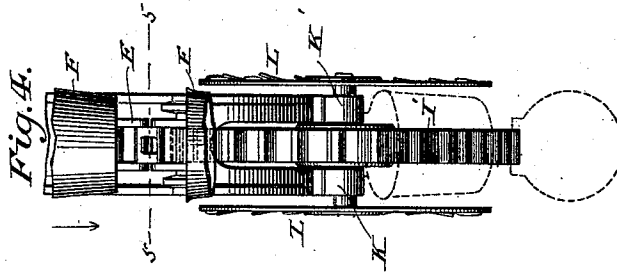
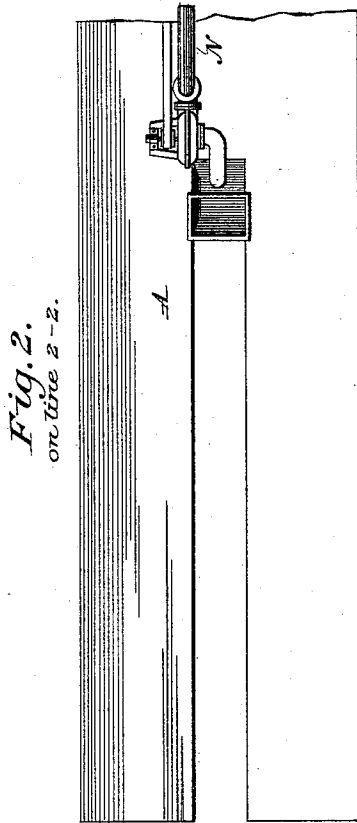
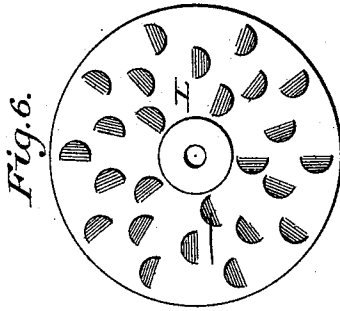
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2 Sheets—Sheet 2.

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J. J. Elmore.

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UNITED STATES PATENT OFFICE.

WILLIAM T. URIE, OF KANSAS CITY, MISSOURI.

DREDGING-MACHINE.

SPECIFICATION forming part of Letters Patent No 498,143, dated May 23, 1893.

Application filed October 18, 1892. Serial No. 439,301. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM T. URIE, of Kansas City, county of Jackson, and State of Missouri, have invented a new and useful Improvement in Dredging-Machines, of which the following is a specification.

This invention relates to dredgers or excavators, and has reference more particularly to that class of dredgers in which an endless chain of buckets is mounted on a frame or scow in such manner that they may be caused to dig and elevate the soil to the scow from which it may be removed by suitable means.

The invention consists,—first: in forming the ladder or frame which sustains the chain of buckets wider at the lower end than at the upper end in order that the chain may be supported rigidly throughout its length, and the objectionable sagging of the loaded section avoided; that the buckets may be presented in the most effectual positions to properly dig and elevate the soil, and that the wear on the chain may be reduced to a minimum owing to the extended bearing surface at the lower wide end of the frame. Secondly: In so connecting the buckets to the chain in the peculiar manner hereinafter set forth that as they pass around the lower guide wheel they will be caused to act with a scooping effect, and as they pass around the upper guide their rear ends will be tipped upwardly to effectually dump the contents; that they will be capable of a limited longitudinal motion with relation to the chain to assist in loosening their contents, and that they will withstand the severe lateral strains to which they are subjected in practice. Thirdly: In a cutter or agitator acting at one or both sides of the buckets, of such form that in the event of the earth caving in it will be prevented from clogging or injuring the buckets. Fourthly: In various details of construction of the several parts designed to render the machine strong and compact as a whole and its operation rapid and effectual.

Referring to the accompanying drawings,—Figure 1 is a longitudinal sectional elevation through a dredger having my improvements embodied therein. Fig. 2 is a horizontal section through the forward portion of the same

showing the relative location of the force-pump and well. Fig. 3 is a longitudinal section through the lower end of the ladder or elevator frame, and the chain and bucket. Fig. 4 is a top plan view of the parts represented in Fig. 3. Fig. 5 is a vertical transverse section on the line 5—5 of Fig. 4, and looking in the direction of the arrow. Fig. 6 is a side elevation of one of the cutters or agitators removed.

Referring to the drawings,—A, represents a scow or frame which is formed with a longitudinal channel or well communicating with the outside water, and extending to about midway of its length.

B, represents an excavator which is sustained at one end of the scow in such manner that it may be lowered and manipulated according as the nature of the work may demand. The excavator may receive motion from an engine C, through intermediate gearing D, at its upper end, or it may be driven in any other suitable manner.

The excavator proper consists of a single chain E, and a series of buckets F, secured at intervals thereon. The transverse pins, connecting the links of the chain, are at intervals extended beyond the sides of the same, and are provided with rollers G, which are adapted to travel upon the vertical flanged edges of a ladder or frame H, which is formed preferably, but not necessarily, of channel-iron, as more fully described hereinafter. Each of the buckets is composed of a flat side F', of channel iron, and a body and bottom F'' of sheet steel which is bent into suitable form, and has its edges riveted to the vertical edges of the side. The buckets are secured above the chains by means of two stirrups f^2 and f^3 , which have their horizontal portions mounted loosely in transverse journal boxes f^4 secured to the side of the bucket, and have their ends bent into the form of eyes; the stirrups at the forward end of the bucket being considerably shorter than those at the rear, the purpose of which will presently appear. The eyes of the stirrup at the forward end of the bucket encircle the extended ends of the transverse pins between the rollers and the links of the chain, while

the eyes of the stirrup at the rear of the bucket encircle the extended end of one of the transverse pins of the chain, and is prevented from escaping therefrom by means of washers. By sustaining the buckets on top of a single chain as distinguished from mounting them between two chains, during the cutting action they are sustained beyond the chain in such manner that the latter will not be brought in contact with the earth and subjected to wear. It is of advantage also in that the buckets will pass through a greater radius at the upper end of the frame which is favorable to the effectual discharge of its contents. The chain passes at its upper end over a sprocket wheel I, mounted in bearings i, secured to the ladder or frame, and at its lower end around a large sprocket wheel I' which is mounted in bearings secured to the lower end of the frame as more fully described hereinafter.

By connecting the buckets to the chain by means of the stirrups as above described, they will be capable of a limited longitudinal movement with relation to the chain, so that as the loaded buckets pass over the sprocket wheel at the upper end of the frame, the weight of the load will cause them to move quickly forward in relation to the chain, and on being suddenly arrested, will cause their contents to be forcibly discharged.

As a further advantage of connecting the buckets as described, and owing to the fact that an extended bearing surface is afforded for the horizontal portions of the stirrups, it is practically impossible for them to move laterally. This is of importance as the buckets in practice, are subjected to severe lateral strains when the frame is moved from side to side. In passing around the larger sprocket wheel the positions of the links of the chains are such that the forward end of the bucket will be held down by the short stirrup, and its rear end tipped upward by the longer stirrup, thereby giving to the bucket a true and positive scooping movement which is highly effectual in digging. As the buckets pass around the upper sprocket wheel their rear ends will, in a like manner, be thrown upward owing to the position of the links and the relative length of the two stirrups which action will greatly assist in the discharge of the contents of the bucket.

The ladder or frame as before stated is preferably formed of channel iron, and is composed of two bars which extend obliquely, downwardly, and outwardly, and are joined at their lower ends, the frame at this point being thus much wider than at the top.

The sprocket wheel, at the lower end of the frame extends in a longitudinal slot J, formed in the frame, and is provided with a shaft mounted at its ends in boxes K, K', secured to the frame at the sides of the slot. By forming the frame wider at its lower end than at its upper end a rigid and substantially continuous support is afforded for the chain throughout its length, and the objectionable

sagging of the upper or lower section prevented. Further, the extended radius through which the chain moves in passing over the large sprocket wheel presents the buckets in the most favorable position for acting effectively, and reduces the wear on the chain to a minimum. It is to be noted that under this construction the strain due to the longitudinal thrust of the frame will be received endwise by the bars composing the frame, so that they are thus adapted to withstand severe strains without sagging or bending sidewise.

I prefer to make the bucket of such size that its opposite sides will be in line with the sides of the bars composing the frame, and this for the reason that the bucket will dig a channel of the size to admit of the frame readily following the buckets.

In order that the soil may be loosened to be the more readily received by the buckets, I secure to the shaft carrying the lower sprocket wheel, on opposite sides, cutting plates L. Each of these cutting plates consists of a disk provided with openings therethrough, and adjacent to the openings with outwardly extending blades or cutters, the construction being such that while the water will be free to flow through the openings, the disks will act as a shield to prevent the soil, in case of a cave in from clogging the buckets or injuring the same.

In order that the dredged material may be quickly removed from the scow, I arrange the upper end of the excavator chains so that the buckets will discharge their contents into a chute M, leading to the rear end of the longitudinal well before referred to. In this well the dredged material is intimately mixed with the water therein, and is drawn into the receiving pipe of a suction pump and forced therefrom through a pipe N, to the desired point. By extending the receiving pipe of the pump into the well, a continuous current is created at the bottom of the chute, and the material entering this current will follow the same, and be thus discharged.

While I have shown and described my invention as being embodied in the preferred form, it is to be understood that various changes, which suggest themselves to the skilled mechanic, may be made, provided the operation of the apparatus is substantially as above set forth.

Having thus described my invention, what I claim is—

1. The sustaining frame or guide for an endless chain of excavators, said frame comprising continuous upper and lower track rails diverging from the upper end; and provided at both ends with carrying wheels whereby a substantially continuous and rigid support is afforded for the chain and sagging prevented.

2. The sustaining frame or guide for an endless chain of excavators, said frame comprising upper and lower guide rails or tracks connected at both ends and slotted longitudi-

nally at its lower end to receive the sprocket wheel, and provided on opposite sides of the slot with bearings for the same.

3. The chain and bucket sustaining and
5 guiding frame for bucket dredges, comprising upper and lower guide rails diverging toward the lower end, chain carrying wheels at both ends of such diameter as to bring their peripheries substantially into line with the
10 guide rails, whereby the buckets in passing around the lower wheel are given a long, sweeping action, and in passing around the upper wheel a quick dumping movement.

4. In a dredging apparatus, a chain and
15 bucket-sustaining frame comprising upper and lower single rails diverging toward their lower ends and united by a semi-circular curve, and chain-carrying wheels at the ends of said frame corresponding in diameter with
20 the distance between the rails to bring their peripheries into line with the outer surfaces of the same.

5. A chain and bucket sustaining frame for bucket dredges, consisting of upper and lower
25 rails united at their lower ends by a semi-circular curved section from which they converge toward their upper ends, the curved section being slotted for the reception of a carrying wheel for the chain, and the said
30 rails being channeled on their outer faces to form parallel guide tracks.

6. In a dredging machine, the combination with the chain, of the excavators or buckets, and the stirrups having their horizontal portions mounted in bearings on the buckets and
35 their ends jointed to the chains.

7. In a dredging machine the combination with the chain, of the buckets or cutters pro-

vided on their under side with transverse bearings, the front and rear stirrups having
40 their horizontal portions mounted in said bearings on the bucket, and their ends in the form of eyes encircling the transverse pins of the chain.

8. In a dredging machine, the combination
45 with the endless chain, of the bucket or cutter, the front and rear links jointed respectively to the chain and the buckets, and capable of vibrating to permit longitudinal movement of the bucket the said front link being
50 shorter than the rear whereby, when the bucket moves forward its rear end is thrown outward, or away from the chain.

9. In a dredging machine, the combination with the excavators or buckets the carrying
55 chain, the supporting shaft, and the sustaining frame, of the cutter or agitator plate fixed on the shaft at the side of the frame, and formed with openings and outwardly projecting cutting blades.
60

10. The combination with the excavators or buckets the carrying chain, the supporting shaft, and the sustaining frame, of the cutting or agitating plates mounted on the shaft at
65 opposite sides of the frame at its lower end and constructed with openings and outwardly projecting cutting blades to admit of the circulation of the water and to prevent the soil from clogging the excavators.

In testimony whereof I hereunto set my
70 hand, this 17th day of October, 1892, in the presence of two attesting witnesses.

WILLIAM T. URIE.

Witnesses:

W. R. KENNEDY,
RAYMOND F. BARNES.