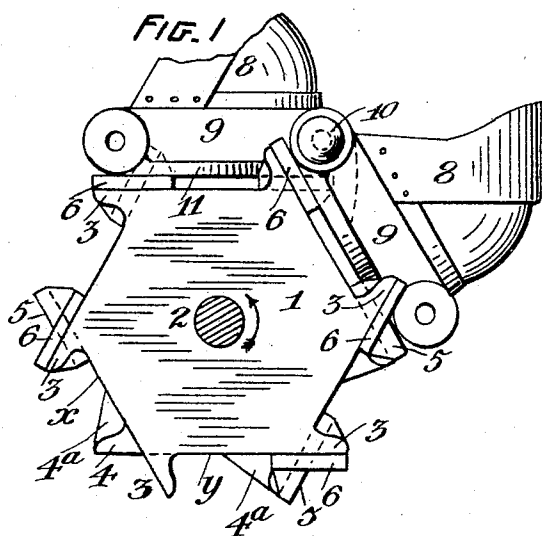
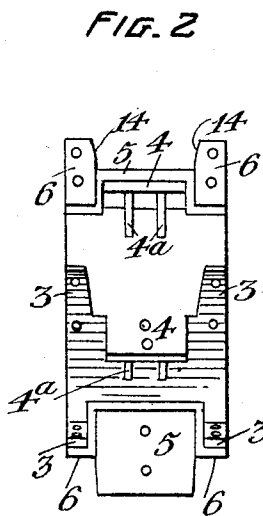
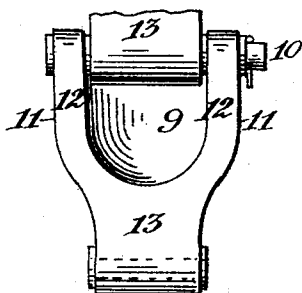
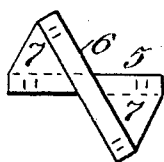
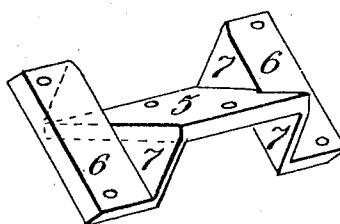


No. 779,361.

PATENTED JAN. 3, 1905.

R. G. HANFORD.
TUMBLER FOR DREDGES.
APPLICATION FILED FEB. 23, 1904.



WITNESSES:

M. K. Seely
H. D. Churchill.

INVENTOR.

INVENTOR.
Robert L. Sanford
by Spear & Lecky Attys

UNITED STATES PATENT OFFICE.

ROBERT G. HANFORD, OF SAN FRANCISCO, CALIFORNIA.

TUMBLER FOR DREDGES.

SPECIFICATION forming part of Letters Patent No. 779,361, dated January 3, 1905.

Application filed February 23, 1904. Serial No. 194,867.

To all whom it may concern:

Be it known that I, ROBERT G. HANFORD, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Tumblers for Dredgers, of which the following is a specification.

At the upper end of the ladder of a dredger of the chain-bucket type is journaled a drum, over which the chain of buckets travels and which in the dredging art is called the "upper" tumbler. It is generally polygonal in side view, and the chain, whose links are hinged to each other by transverse pins, flexes or bends around such upper tumblers, so as to fit them and be driven by motion communicated through them. It has been found in practice that under the dredging strain there is a tendency of the chain to ride sidewise off the tumbler and also a tendency to slide back and forth on the tumbler in the line of travel. The latter movement causes undue wear of the bucket-backs, links, pins, and related parts, which shortens the life of the chain and interferes with effective work. I have found that the wear can be prevented to a very great extent by positively locking the chain to the tumbler while it is passing around the latter. Hence my invention contains locking means which prevent any sliding movement of individual links while on the tumbler. At the same time the devices which form the locking means are also effective to restrain the tendency of the chain to ride sidewise off the tumbler.

The objects of my invention are sufficiently indicated by the foregoing, and an embodiment of the invention by which said objects are accomplished is hereinafter described and is shown in the accompanying drawings, in which—

Figure 1 is a side elevation of the tumbler with two buckets of the chain in position. Fig. 2 is an end view of the tumbler with the chain removed. Fig. 3 is a bottom plan of one of the buckets. Fig. 4 is a side view of one of the angle-plates forming part of the

cradle. Fig. 5 is a perspective view of the same.

The tumbler 1 is shown as having a closed end, although in practice it is generally an open-ended drum having a central hub connected by spokes to a rim. A shaft 2 forms journals for mounting the tumbler rotatably in the end of the dredge-ladder. The tumbler is hexagonal in end view. Formed with the tumbler, at each of its angles and at both ends of said tumbler, are two lugs 3 3, which project beyond the perimeter of the hexagon in the plane of one of the faces. In Fig. 1 this is illustrated at the lower left-hand angle, where the lug 3 projects beyond the perimeter in the plane of the face marked *x*. There is a similar lug at the other end of the tumbler at that angle, and the construction is the same in this respect at all the angles. Formed also with the tumbler and at each angle thereof is an inner lug 4, braced by the ribs 4^a and which projects beyond the perimeter in the plane of the adjacent face of the polygon, as shown at the lower left-hand angle of Fig. 1, where the lug 4 projects beyond the perimeter in the plane of the face marked *y*. In Fig. 2 the relative locations of lugs 3 and 4 are clearly shown, lug 4 being between lugs 3 3. This construction forms at each angle two flat outer bearing-plates and one inner bearing-plate at an angle to the two, all being a part of the tumbler itself.

At each angle of the tumbler and securely riveted to the lugs 3 and 4 is a peculiar angle-piece, the shape of which is clearly shown in Fig. 5. It comprises an inclined plate 5, which forms the middle portion, two oppositely-inclined side plates or flanges 6 6, and webs 7, connecting the said plates, all forming one structure. The relative angles of the plate 5 and the plates or flanges 6 6 are the same as those of lugs 4 and 3 3, and the angle-pieces are secured in place by riveting or bolting plate 5 to lug 4 and plates 6 to lugs 3. The angle-piece is omitted from the lower left-hand angle of Fig. 1 and from the middle angle of Fig. 2 in order that the position of the lugs

3 and 4 may be clearly understood. Any two of these angle-pieces at successive angles of the hexagon form what I term a "cradle" to receive and lock a link of the bucket-chain to the tumbler. With a hexagonal tumbler there will be at any one time three chain-links passing around it; but I have considered it sufficient for illustration and easier of comprehension to show only two of such links in Fig. 1 and to remove them entirely from Fig. 2. A dredge-bucket 8 is secured to each link 9, the two forming one structure. In Fig. 3 the bottoms of two adjacent links are shown, such links being hinged together by the pin 10. Each link has side ribs 11, which are for the purpose of widening its lower side bearing-surfaces 12 12, as well as to form a fork in which the narrow end of the adjoining link is hinged, and the narrow end forms another bearing-surface 13. The bucket is riveted to the sides of the link at the top. When the chain is passing around the tumbler, as illustrated by the two links in Fig. 1, the side bearing-surfaces 12 rest upon the side flanges of one of the angle-pieces and the middle bearing-surface 13 of the same link upon the plate 5 of the following angle-piece, the motion being with the arrow in Fig. 1. All this is true of all the links engaged with the tumbler. The plates 6 of the angle-pieces can be slightly beveled, as shown in Fig. 2 at 14, so as to insure an easy passage for the links. The webs of the angle-pieces absolutely prevent any side motion of either end of the link. From the construction as described it is clear that any endwise movement independently of the motion of the tumbler is also prevented and that the engaged links are locked to the tumbler. Taking the inclined link in Fig. 1, the eye at the hinge-joint is an outer eye, which rests upon a plate 6 of an angle-piece, and so exerts a forward pressure upon the tumbler; but the associated eye, which is in the narrow end of the preceding link, bears solidly backward against the plate 5 of that angle-piece. Thus, taking any two angle-pieces forming what I have termed a "cradle," the relation of the links thereto is such that the forked ends of the links positively drive the tumbler, (an upper tumbler being assumed,) while the solid ends of the links are locked backwardly in the cradle. Hence there is practically no lost motion and the wear is greatly reduced.

I do not limit myself to the precise construction herein described, and shown in the drawings, as I desire to avail myself of such modifications and equivalents as fall properly within the spirit of my invention.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A tumbler provided with bearing-plates for the links of a dredge-chain, such plates

having means for preventing movement of the chain, independently of the movement of the tumbler, whether backwardly, forwardly or transversely.

2. A polygonal tumbler, having separate angle-pieces at its own angles, such pieces forming bearing-surfaces and locking devices for the links of a dredge-chain.

3. A tumbler having angle-pieces at its own angles, each piece having bearing-surfaces for two adjacent hinged links of a dredge-chain.

4. A tumbler having angle-pieces at its own angles, each piece having side bearing-surfaces for the separated ends of a chain-link, and an intermediate bearing-surface for the end of an adjacent link hinged between said separated ends.

5. An angle-piece for polygonal tumblers, having two side plates and an intermediate plate at an angle thereto and integral therewith, the said structure being adapted to be fitted to a tumbler at an angle thereof.

6. An angle-piece for polygonal tumblers, comprising two side plates or flanges adapted to fit one face of said tumbler, an intermediate plate at an angle to said side plate and adapted to fit an adjacent face of said tumbler, and webs connecting said plates together.

7. In combination with a polygonal tumbler, a series of cradles, each cradle comprising two of a series of angle-pieces secured at the angles of the tumbler; and chain-links passing around said tumbler and bearing in said cradles; whereby said links are locked against both transverse and endwise movement independently of the tumbler.

8. In combination with a polygonal tumbler, side lugs at each angle projecting beyond the perimeter and in the plane of any face of the polygon, an inner lug at each angle projecting beyond the perimeter and in the plane of the adjacent face of the polygon, and an angle-piece secured to said lugs at each angle of the polygon.

9. In combination with a polygonal tumbler, an angle-piece at each angle of the polygon projecting in both directions beyond the perimeter and fitting its adjacent faces, and a chain of links; the forward end of a link bearing forwardly and against one face of said angle-piece, and the other face of said angle-piece forming a stop for the rear end of the preceding link, whereby the chain is locked to the tumbler.

10. In combination with a polygonal tumbler, an angle-piece at each angle of the polygon comprising a middle bearing-plate fitting one face of the polygon, and two side bearing-plates fitting the adjacent face of the polygon; and a chain of hinged links; the wide end of a link bearing forwardly and against the said side bearing-plates, and the middle bearing-plate forming a stop for the narrow end of the

preceding link, whereby the chain is locked to the tumbler.

11. An angle-piece for polygonal tumblers, the said piece being a single structure comprising side bearing-plates and a middle bearing-plate at an angle thereto, the inner edges of said side bearing-plates being inclined or beveled toward their extremities.

.In testimony whereof I have affixed my signature, in presence of two witnesses, this 1st day of February, 1904.

ROBERT G. HANFORD.

Witnesses:

L. W. SEELY,
M. R. SEELY.