Oct. 27, 1925. 1,559,004

J. J. RATTIGAN

DREDGE BUCKET

Filed May 18, 1921

FIG. 1.

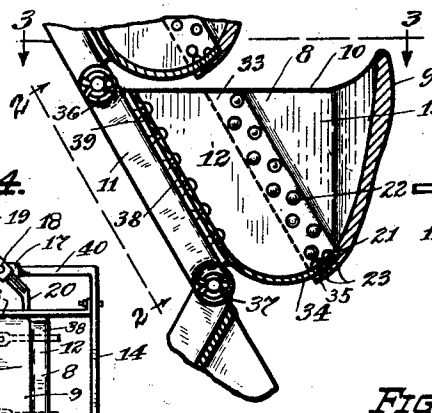



FIG. 2.

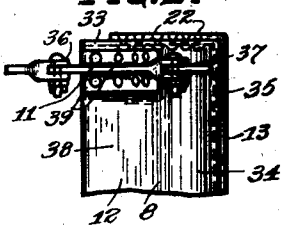



FIG. 4.

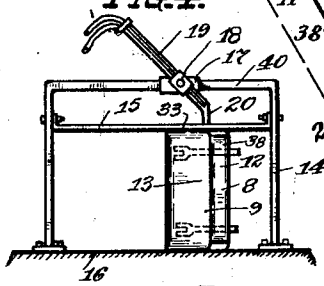



FIG. 5.

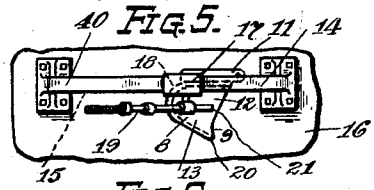



FIG. 3.

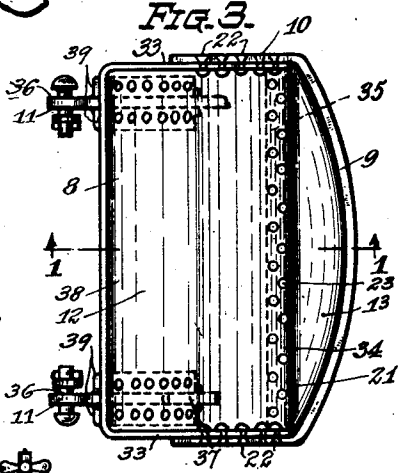



FIG. 6.

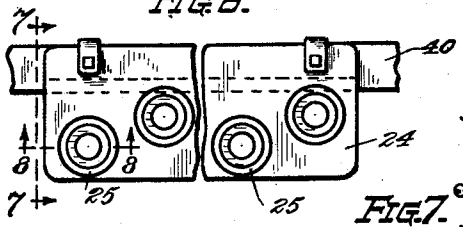



FIG. 7.

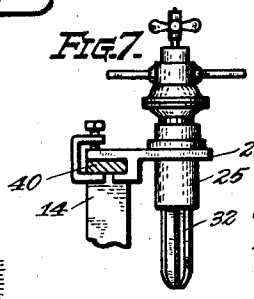



FIG. 8.

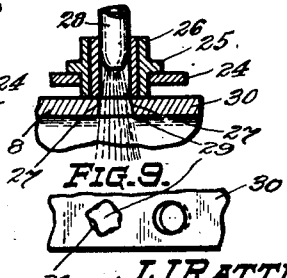
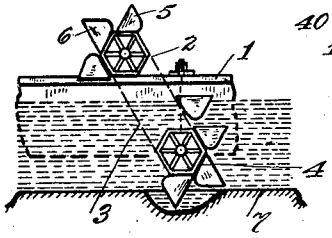



FIG. 9.




FIG. 10.




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# UNITED STATES PATENT OFFICE.

JOHN J. RATTIGAN, OF HOMESTEAD, PENNSYLVANIA.

## DREDGE BUCKET.

Application filed May 18, 1921. Serial No. 470,734.

*To all whom it may concern:*

Be it known that I, JOHN J. RATTIGAN, a citizen of the United States of America, residing at Homestead, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Dredge Buckets, of which the following is a specification.

The present invention relates to a method of repairing the wearing-lips of manganese steel buckets, and particularly such buckets as are used on sand dredges, and furnishes a means of extending the life of such buckets almost indefinitely. Another object of the present invention is to provide a dredge bucket having the parts which receive the "wear" by contact with a hard gritty material such as sand, and also the parts which resist the shock when the buckets encounter bowlders or rocks concealed in the sand, made of manganese steel, while the body section of the bucket which does not receive such severe treatment in service is constructed of ordinary cast or alloyed steel. The cost of manufacture of the buckets can be in this way greatly reduced, as the body section of the bucket is thereby made of a much less expensive material, and this without lessening the efficiency of the buckets. The present application bears a certain relation to an earlier application which has matured into United States Patent No. 1,377,925, dated May 10, 1921, entitled "Method of attaching lips to dredge buckets" by the present inventor.

In the accompanying drawings forming part of this specification, I have shown one complete example of my invention, and some modifications thereof, constructed according to the best mode I have so far devised for the practical application of the principles of my invention.

Figure 1 is a central vertical section through a dredge bucket.

Figure 2 is a face view of the rear portion of a bucket taken in the direction of the arrows 2—2 of Figure 1.

Figure 3 is a plan view on line 3—3 of Figure 1.

Figure 4 is a side elevation of an apparatus devised for use in carrying out my invention.

Figure 5 is a plan view of Figure 4.

Figure 6 is a plan view of a templet, and holding means used.

Figure 7 is a transverse vertical section on line 7—7 of Figure 6.

Figure 8 is a vertical section on line 8—8 of Figure 6.

Figure 9 is a plan view of a portion of a bucket showing some rivet holes formed therein.

Figure 10 is a diagrammatic elevational view of a dredge-bucket conveyor, in operative position on a sand dredge.

The numeral 1 indicates a portion of a sand-dredge boat, on which is ordinarily mounted a spider or hexagonal drum 2, an endless conveyor chain 3, and a second spider 4, as shown in Figure 10. On the conveyor chain 3 are attached the buckets 5, 6 etc. The spider 2 is operated by power within the ship or sand-dredge 1, to manipulate the buckets 5, 6 etc. and thereby remove sand from the river bed 7 as is readily understood. This type of sand-dredge or boat is much used on some of the large rivers of this country, in recovering sand from the river bed, for building and other purposes. As sand is of a very gritty and hard nature, the buckets 5, 6 can only be made of extremely hard material to withstand the grinding "wear", and in the present state of the art, manganese steel has been found to be practically the only useful material for this purpose, when considered from a commercial as well as a mechanical point of view. The manganese buckets 8 Figure 1 are formed usually with an upwardly projecting lip 9 cast integral with the body of the bucket, so that this lip 9 takes most of the "wear" caused by contact with the sand bed 7 in digging. But even with manganese steel these lips 9 soon wear down even with, or below the edges 10, of the bucket, and the whole bucket 8 has to be "scrapped" or thrown away, as it is not desirable at the present time either from a commercial or practical view point, to reuse these buckets, first because of the difficulty in cutting the extremely hard manganese steel and secondly, as rivet holes cannot be punched through said steel, in order to attach new lip portions, as might ordinarily be done were the buckets of any ordinary cast or alloyed steel. Moreover, these worn manganese buckets

cannot be remelted and cast over into new buckets, because the present refractories used for furnace linings will not withstand the treatment from a chemical point of view. So that, as before stated, these worn manganese buckets are entirely discarded as soon as their lip portions 9 are worn down below approximately the edge level 10. When it is stated, by way of illustration, that these manganese buckets average in price approximately twenty-five cents a pound, as against a cost of say four to six cents a pound for ordinary cast or plate steel; and that these buckets average from four hundred and fifty to six hundred pounds each; the importance of being able to re-use these manganese discarded buckets is at once seen to approach a matter of great moment in this particular art.

Again with the above facts in mind, it is seen that if any parts of these expensive buckets, can be made of less expensive material without lessening their efficiency as a whole, that improvements in the matter of construction, is also very desirable. Both of these objects are attained by my invention as described herein. My method of repairing these manganese buckets will be first described.

The ordinary manganese bucket is usually a single casting provided with integral lugs similar to 11, Figure 3, the latter being mounted on an endless chain 3. In this case the lugs 11, the body portion 12, and the lip portion 13, are all cast in one piece. By my method of repairing these buckets, I stand the bucket on its end as in Figures 4 and 5, and secure it by means of the metal housing or stand 14, and cross-bar 15, the stand 14 being rigidly secured to the foundation 16. The stand 14 has a top bar 40, which preferably is "machined" on its outer surfaces, and carries a slidable metal collar or casing 17 on which is rotatably mounted at 18 an oxy-acetylene torch 19, having the usual supply of gas and oxygen furnished thereto, and also the cutting or burning tip 20. As shown in Figure 5, as the bucket is securely held by 15, and its attachments, and the slidable casing 17 can be reciprocated along bar 40, and also the torch 19 rotated about point 18, so that the lip portion 13 of the bucket can be cut along the line 21 in practically a straight line, a performance not readily attainable otherwise, on account of the uncertainty of the oxy-acetylene flame when hand operated. This is practically necessary in order to have a straight edge at 21, Figure 1, so that a butt and lap joint can be made by the new lip 13 about to be attached to the body portion 12.

The lip 13, is cast of manganese steel with a number of rivet holes at 22, 23, etc. and in order to form complementary rivet holes in the body portion 12, of the old bucket, a templet 24, having the proper rivet spacing is mounted on the bar 40, the slidable casing 17 being moved to permit the templet to be placed in proper position over the bucket. The templet 24 has a number of tubular collars 25, preferably lined at 26 with refractory material, so as to protect the material of the bucket at 27 as much as possible when an oxy-acetylene torch tip 28 is introduced into collars 25 for burning the holes 29 through the bucket material 30. The collar 25, it will be understood may be of considerable length, the purpose being to form a guide for the torch tip 28, and burn the hole 29 in as correct spacing location as possible. After the torch tip 28 has been withdrawn the hole will appear as at 31, Figure 9, with a somewhat uneven periphery, and while the material 30 is still in a highly heated condition, a preferably, air-reaming tool 32 is inserted in the collar 25, and the hole 29 reamed to as nearly a perfect circle as possible. It is essential in this connection, that the reaming be performed while the metal 30 is still in a heated condition, because otherwise the hard manganese steel cannot be cut by an ordinary reamer. As soon as all the holes necessary have been made in the body portion 12, both on the sides 33, and bottom 34, the newly cast manganese lip 13, having a shoulder at 21, and an extension at 35, to preferably form the necessary "lap," is applied to the body portion 12, and riveted fast in the ordinary way. It is noted that the lip-portion 13 is usually cast with the holes 22, 23 countersunk on the exterior, so that the rivet heads do not project into the sand when the buckets are in operation. The lip 13 is made of thicker material in cross-section than the bucket body 12, and the ends 41, 41 of said lip, (see Figure 1) on account of receiving practically all the " wear " contact with the sand in digging or excavating.

It is seen from the Figures 1 and 3 of the drawings, that the whole front of the cutting-lip 13, is made spoon-shaped, i. e. vertically and transversely bulged outward from the interior of the bucket. The purpose of the particular spoon-shaped form of the cutting-lip is readily appreciated, to wit; to ensure the bucket "scooping-up" a full load of material from the river bed, so that each bucket is sure to carry a full load, and thus greatly increase the efficiency of the dredging machine shown in Figure 10, as a whole.

It is seen that a great deal of the "wear" on the dredge bucket is also carried to the joints 36, 37 of the links 11, and for this reason these links are in my invention made of manganese steel, as well as the lip 13, and in practice, even these manganese links soon wear and have elongated holes at 36, 37. It is noted that this is also important in that when the links elongate materially

they cannot pass over the spiders 2 and 3, Figure 10, properly.

But it is also seen that the body portion 12, comprising the two end walls 33, the rear wall 38 and part of the bottom 34, receives practically very little "wear" and consequently I make this portion of ordinary cast or plate steel, which can be made much cheaper than the manganese steel portions, as before explained, so that the cost of these ordinarily expensive buckets is reduced to less than half of the usual all-manganese bucket. It is seen that the links 11 have flanges 39 and are preferably riveted to the body portion 12 as shown. The bi-metal bucket just described, it is seen can be readily provided with a new wearing-lip 13, by simply removing and replacing the rivets in the holes 22, 23 etc. as is commonly done with other buckets at the present time.

From the above it is seen that I have devised a new method of attaching manganese lips to worn dredge buckets whereby the latter can be re-used almost indefinitely, and the effect of which is practically revolutionary in this particular art; and secondly I have provided in an article of manufacture, a new type of bi-metal bucket having the "wearing" portions of extremely hard material adapted to withstand severe service, and having the remaining portion of said bucket constructed of comparatively softer, less durable, and less expensive material, without detracting from the efficiency and utility of the dredge bucket as a whole.

I claim:

1. A dredge bucket having a body made of comparatively soft material, a pair of connecting links composed of very hard wearing material, and a spoon-shaped cutting-lip of very hard material covering the whole front and wearing portion of the ends of the bucket and having its front face of much greater thickness than the side walls thereof for resisting the greater service wear on the front portion of the cutting-lip.

2. In a dredge bucket, a body portion of comparatively soft material, a spoon-shaped cutting-lip of very hard material covering the whole front face and wearing portion of the ends of the bucket, and having its front face of much greater thickness than the side-walls thereof, for resisting the greater amount of wear on the front portion of the cutting-lip.

3. In a dredge bucket, a cutting-lip covering the whole front face and wearing portion of the ends of said bucket, the front face of said cutting-lip being of greater thickness than the ends thereof, and a verticle and transverse spoon-shaped bulge formed in the front wall of the cutting-lip.

In testimony whereof I affix my signature.

JOHN J. RATTIGAN.