PATENT SPECIFICATION

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PROVISIONAL SPECIFICATION

Improvements in and relating to Bucket Dredgers

I, HENRY WARBURTON, of 56, Cannon Hall Road, Sheffield, 5, in the County of York, a British Subject, do hereby declare the nature of this invention to be as follows:—

This invention relates to bucket dredgers.

As is well known the buckets thereof are so constructed that the carrying portion somewhat resembles a cup-shaped body which is disposed at an angle approximating 45° to the base of the bucket, the said base having bifurcated formation at the front to form companion side members and a projecting portion at the rear to form a knuckle whereby the said companion side members on one bucket are adapted to embrace the knuckle on an adjacent bucket, the said side members and knuckle each being provided with an eye for the passage of a coupling pin.

This coupling pin is provided with a head which is adapted to engage and be secured in a recessed portion in one of the side members but no separate member is provided on the pin at its end remote from the head for securing the pin at that end to the companion side member and consequently when a line of buckets is in operation there is, owing to the fastening of the pin being only at one side of the buckets, considerable strain upon the pins especially at the junction of the head with the shaft of the pin. Furthermore, owing to the turning movement exerted by the buckets when passing over the usual tumblers, the heads of the pins soon become loose in the eyes of the buckets while one sided wear also takes place on the shafts of the pins.

In some cases the pin is of such construction and adapted for fitment in position so that it can be angularly reversed when it becomes worn on one side of the shaft.

Auxiliary securing means such as a wedge has also been provided between the head of the pin and the side of the recess in which it is fitted.

In spite of these precautions however considerable wear and breakage of pins still takes place and the object of my invention is to provide improvements which will both strengthen the coupling pin and obviate excessive wear upon it in use.

The present invention is an improved development upon previous patent No. 260,468 of which I was one of the inventors and patentees, which patent had, for its main feature, the construction of the coupling pin in which the shaft portion was of suitable hard wearing alloy or steel and the head, of the same or other suitable alloy or steel, was a separate member shrunk on to the shaft.

One feature according to the present invention consists in providing that a line of coupled buckets is provided with coupling pins having heads one at each of their ends whereby torque is more or less equally distributed throughout the coupling pins from both sides of the buckets.

Another feature consists in an improved arrangement of fastening the head of a pin upon its shaft.

The coupling pins may each have an integral head at one end and an attached head at the other end or they may each have an attached head at each end.

The shaft of the pin may be of any suitable hard wearing alloy or steel and the heads of the same of other suitable hard wearing alloy or steel except that in the case of the integral head it naturally follows that this is of the same alloy or steel as the shaft.

In the case of the attached head, the shaft of the pin is formed with a cylindrical end of reduced cross section in which the portion of said reduced end forming the extremity thereof is of less cross sectional area than, and disposed eccentrically with respect to, the immediately adjacent portion lying between it and the portion of the shaft of normal cross sectional area; the head is correspondingly formed with a shaft receiving opening which is of a complementary shape for the shaft end to fit, that is to say, the said opening is of larger diameter at one side of the head than at the other side, thus forming two openings which merge into one another, one being eccentric to the other and the smaller opening being

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located at the outer side of the head.

Preferably, although not necessarily, the eccentricity of the reduced portions of the shaft end is such that their peripheries coincide with one another at a point common to the circumferences of both.

The periphery of the smaller opening at the outer side of the head of the pin may be bevelled and metal at the extremity of the shaft displaced into said bevel by a caulking operation and to facilitate this, the said extremity of the shaft may be formed with an annular protrusion adapted to be displaced into the bevel of the opening.

Where desirable and convenient the head may be shrunk on to the shaft of the pin.

Where a line of buckets is provided with coupling pins having a head at each end it is to be understood that the head at one end of the shaft must be fitted after insertion of the pin from one side and at that side from which the pin is inserted the head may be integral or it may be a separate head which has been shrunk on.

Dated this 4th day of October, 1938.

MEWBURN, ELLIS & CO.,
70—72, Chancery Lane, London, W.C.2,
Chartered Patent Agents,
and 15, York Street, Sheffield, 1.

COMPLETE SPECIFICATION

Improvements in and relating to Bucket Dredgers

I, HENRY WARBURTON, of 56, Cannon Hall Road, Sheffield, 5, in the County of York, a British Subject, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to bucket dredgers.

As is well known the buckets thereof are so constructed that the carrying portion somewhat resembles a cup-shaped body which is disposed at an angle approximating 45° to the base of the bucket, the said base having bifurcated formation at the front to form companion side members and a projecting portion at the rear to form a knuckle whereby the said companion side members on one bucket are adapted to embrace the knuckle on an adjacent bucket, the said side members and knuckle each being provided with an eye for the passage of a coupling pin adapted to couple adjacent buckets together.

This coupling pin is provided with a head which is adapted to engage and be secured in a recessed portion in one of the side members but no separate member is provided on the pin at its end remote from the head for securing the pin at that end to the companion side member and consequently when a line of coupled buckets is in operation there is, owing to the fastening of the pin being only at one side of the line of buckets, considerable strain upon the pins especially at the junction of the head with the shaft of the pin. Furthermore, owing to the turning movement exerted by the buckets when passing over the usual tumblers, the heads of the pins soon become loose in the eyes of the buckets while one sided wear also takes place on the shafts of the pins.

In some cases the pin is of such construction and adapted for fitment in position so that it can be angularly reversed when it becomes worn on one side of the shaft.

Auxiliary securing means such as a wedge has also been provided between the head of the pin and the side of the recess in which it is fitted.

In spite of these precautions however considerable wear and breakage of pins still take place and the object of my invention is to provide improvements which will both strengthen the coupling pin and obviate excessive wear upon it in use.

The present invention is an improved development upon previous patent No. 260,468 of which I was one of the inventors and patentees, which patent had, for its main feature, the construction of the coupling pin in which the shaft portion was of suitable hard wearing alloy or steel and the head, of the same or other suitable alloy or steel, was a separate member shrunk on to the shaft.

One feature according to the present invention consists in providing that a line of coupled buckets is provided with coupling pins having heads one at each of their ends whereby torque is more or less equally distributed throughout the coupling pins from both sides of the buckets.

Another feature consists in an improved arrangement of fastening the head of a pin upon its shaft.

The coupling pins may each have an integral head at one end and an attached head at the other end or they may each

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The shaft of the pin may be of any suitable hard wearing alloy or steel and the heads of the same or other suitable hard wearing alloy or steel except that in the case of the integral head it naturally follows that this is of the same alloy or steel as the shaft.

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Preferably, although not necessarily, the eccentricity of the reduced portions of the shaft end is such that their peripheries coincide with one another at a point common to the circumferences of both.

The periphery of the smaller opening at the outer side of the head of the pin may be bevelled and metal at the extremity of the shaft displaced into said bevel by a caulking operation and to facilitate this, the said extremity of the shaft may be formed with an annular protrusion adapted to be displaced into the bevel of the opening.

Where desirable and convenient the head may be shrunk on to the shaft of the pin.

Where a line of buckets is provided with coupling pins having a head at each end it is to be understood that the head at one end of the shaft must be fitted after insertion of the pin from one side and at that side from which the pin is inserted the head may be integral or it may be a separate head which has been shrunk on.

Referring to the drawings filed herewith:—

Fig. 1 is an elevation of one form of coupling pin made in accordance with this invention.

Fig. 2 is an end view.

Fig. 3 is an elevation of one form of head for attachment to the coupling pin.

Fig. 4 is a sectional side elevation of same.

Fig. 5 is an elevation partly in section showing a head fitted at each end of a coupling pin.

Fig. 6 is an elevation of an alternative form of head, whilst

Fig. 7 is a sectional elevation showing a modified form of head and pin assembly.

Figs. 8 and 9 are elevation and sectional side elevation respectively of a still further modified form of head.

The improved pin shown in Figs. 1 and 2 is adapted to be fitted at each end with the head shown in Figs. 3 and 4. As will be seen the pin comprises a shaft *a* reduced in cross section at each end to form a cylindrical stub having an eccentrically disposed extremity *b* and a cylindrical concentric portion *c* intermediate of the extremity *b* and the shaft *a*, the arrangement being such that the peripheries of the extremity *b* and the intermediate portion *c* coincide at the point *d* which is common to their circumferences.

The head *e* is provided with a complementary stepped opening, one portion *f* of which is at one side of the head *e*, eccentrically disposed with respect to the adjacent portion *g* at the other side of the head, the two peripheries coinciding at the point *h* common to their circumferences, whereby the head *e* can be fitted to the pin as is shown in Fig. 5, the said head being shrunk on to the pin.

Wear upon the pin usually takes place along the peripheral surface of the shaft *a* approximately as indicated by the arrow in Fig. 2 and when too much worn for further use, the pin can be removed and replaced in a position with the worn surface angularly reversed 180° so as to present the reverse unworn surface for subsequent use. In this case the alternative form of head *j* depicted in Fig. 6 would have to be fitted, which head is provided with the eccentric side *k* of the opening therein in the reverse position of location to that shown in Figs. 3 and 4 owing to the reversed position of the extremity *b* on the pin. Fig. 7 which illustrates a modified method of securing the head *j*, clearly shows this reversed fitment of head and pin but instead of the head being shrunk on, the eccentric extremity *b* of the pin is provided with an annular protrusion *m* and the eccentric side *k* of the opening in the head is bevelled whereby the annular protrusion can be rivetted over in countersunk fashion and thereby secure the head to the pin.

Figs. 8 and 9 show a still further modified form of head *n* in that the eccentric side of the opening *o* therein has no part of its circumference coincident with that of the other portion *p* and obviously the

eccentric extremity *b* of the shaft *a* would be correspondingly formed to suit.

The heads *e*, *j* and *n* are secured to a bucket by rivets passing through the rivet holes *s*.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A coupling for bucket dredgers wherein in a line of buckets each bucket is swung from its adjacent neighbouring bucket on a transverse cylindrical coupling pin which is carried by said adjacent bucket through the medium of a head attached thereto and provided with an opening fixedly accommodating a reduced end of the pin, characterised in that an eccentrically disposed extension of the reduced end of the pin engages an eccentrically offset portion of the opening in the head.

2. A coupling for bucket dredgers according to claim 1 wherein the eccentricity of the extension is such that the peripheries of said extension and reduced end coincide with one another at a point common to the circumferences of both.

3. A coupling for bucket dredgers according to claim 1 or claim 2 wherein the eccentrically disposed extension of the pin is provided with an annular protrusion adapted to be rivetted over into a bevelled periphery of the eccentrically offset portion of the opening in the head for the purpose set forth.

4. A coupling for bucket dredgers according to the preceding claims wherein the pin is provided with a head at each of its ends.

5. A coupling pin for bucket dredgers constructed substantially as described with reference to and as illustrated in Figs. 1, 2, 5 and 7 of the accompanying drawings.

6. A coupling head for bucket dredgers constructed substantially as described with reference to and as illustrated in Figs. 3 to 9, inclusive, of the accompanying drawings.

7. A coupling pin and head for bucket dredgers constructed, arranged and adapted for use substantially as described with reference to the accompanying drawings.

Dated this 4th day of July, 1939.

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2. A coupling for bucket dredgers according to claim 1 wherein the eccentricity of the extension is such that the peripheries of said extension and reduced end coincide with one another at a point common to the circumferences of both.

3. A coupling for bucket dredgers according to claim 1 or claim 2 wherein the eccentrically disposed extension of the pin is provided with an annular protrusion adapted to be rivetted over into a bevelled periphery of the eccentrically offset portion of the opening in the head for the purpose set forth.

4. A coupling for bucket dredgers according to the preceding claims wherein the pin is provided with a head at each of its ends.

5. A coupling pin for bucket dredgers constructed substantially as described with reference to and as illustrated in Figs. 1, 2, 5 and 7 of the accompanying drawings.

6. A coupling head for bucket dredgers constructed substantially as described with reference to and as illustrated in Figs. 3 to 9, inclusive, of the accompanying drawings.

7. A coupling pin and head for bucket dredgers constructed, arranged and adapted for use substantially as described with reference to the accompanying drawings.

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J.M.

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