PATENT SPECIFICATION

Application Date : April 14, 1939. No. 11347/39. **527,537**

Complete Specification Accepted : Oct. 10, 1940.

COMPLETE SPECIFICATION

Improvements in Excavator Buckets

(A communication from abroad from THE AMERICAN BRAKE SHOE AND FOUNDRY COMPANY, a corporation organized and existing under the laws of the State of Delaware, United States of America, engaged in business as Manufacturers, with a principal place of business at 230, Park Avenue, City of New York, County of New York, State of New York, United States of America).

I, ARTHUR FREDERICK BURGESS, a British Subject, of the firm of Lloyd Wise & Co., 10, New Court, Lincoln's Inn, London, W.C.2, England, Chartered Patent Agents, 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 particularly to excavator buckets which are utilized in excavating machines, such as power shovels and particularly dredges, for receiving earth and comparable material and which are usually used in connection with a dredge of the bucket line type in which the excavating is accomplished by a series of dredge buckets articulated to form an endless chain.

In such an arrangement the successive buckets are connected by pins which are held non-rotatably in one bucket and rotate with respect to the other bucket. Customarily, the dredge buckets are made of manganese steel or comparable material which has to be formed in approximately its finished shape by casting since machining is virtually impossible, being practically limited to minor surface grinding. In order to prevent undesired rotation of the bucket pin, a suitable socket is cast in the bucket and the pin is provided with an offset lug or head fitting the socket as accurately as possible. Due to the customary manner of manufacture, the cast socket and the pin lug or head are only with considerable difficulty made to fit tightly in engagement. Whenever there is even slight play therebetween, accelerated wear occurs and eventually the pin is excessively loose.

The object of this invention is to provide for securely holding a bucket pin in location without necessitating material changes in the customary manner of manufacture of the bucket.

The invention consists in an excavator bucket which comprises a body through which extends an aperture adapted to receive a pin having a head which is formed with parallel faces, one of which abuts a seat formed on the body adjacent said aperture while a wedge is interposed between the other parallel face of the pin head and a second seat formed on the bucket body in non-parallel relation to the first mentioned seat, said wedge being adjustable by screw means longitudinally of said seat and face.

Referring now to the accompanying drawings:—

Figure 1 is a side elevation of an excavator bucket constructed in accordance with this invention.

Figure 2 is a cross-section, the plane of which is indicated by the line 2—2 of Figure 1.

Figure 3 is a side fragmentary elevation, showing a modified form of bucket.

Figure 4 is a cross-section, the plane of which is indicated by the line 4—4 of Figure 3.

Figure 5 is a side fragmentary elevation of a further modified form of bucket.

Figure 6 is a cross-section, the plane of which is indicated by the line 6—6 of Figure 5.

In the structure shown in Figures 1 and 2, there is provided a dredge excavator bucket, generally designated 6, of the customary pattern ordinarily fabricated of cast manganese steel. To the body 6 is fastened a detachable lip 7 held in place by fastenings such as rivets 8. The bucket body 6 is provided with a lug 9 which is perforated to form an irregular passage 11 partially lined with a bushing 12 to afford a good frictional bearing for a bucket pin. The pin rotates against the bushing 12 so that when wear ultimately occurs the bushing 12 can be replaced and the bucket 6 itself will not be damaged.

Integrally formed with the bucket 6 is a boss 13 having a pin aperture 14 there-

through adapted to register with the pin aperture 11 on a successive bucket in the series of buckets constituting the dredge excavator line. The aperture 14 is designed to hold a bucket pin 16 relatively snugly, so that there will be no relative rotation between the cylindrical pin 16 and the aperture 14 but so that all of the rotation due to articulation of successive buckets will occur between the pin 16 and the bushing 12. In order to preclude rotation of the pin 16 with respect to the aperture 14, the pin is provided with a head 18 which is generally rectangular in cross-section and extends radially from the axis 19 of the pin body.

The bucket 6 is provided with an outstanding rib 21 adjacent the aperture 14 and preferably merging with the boss 13. The rib 21, if not cast with sufficient precision, is machined by grinding only as much as may be necessary to provide a suitable seat 22 approximately tangential to the aperture 14. The head 18 has a face 23 adapted to abut the seat 22, and also has a face 24 which is parallel to the face 23.

The bucket body 6 is also provided with a rib 26 which is preferably integral with the body 6 and merges with the lug 13. The rib 26 terminates in a seat 27 which is not parallel with the seat 22 but is inclined with respect thereto, diverging in a direction toward the axis 19, for example as shown in Figure 1. The seat 27 is preferably composite and includes an elevated portion 28 and a depressed portion 29, which are approximately parallel to each other. The portion 29 is roughly cast and is not ordinarily finished, whereas the raised portion 28 provides a key which, projecting from the level of the portion 29, is readily available for machining.

The seat 28 is ground as much as is necessary to provide a suitable abutment for a wedge 31 having a main body 32 from which projects a fin 33 designed to extend into the portion 29, although not necessarily coming into contact with such portion. The fin 33 precludes any material axial movement of the wedge 31.

Screw means is provided for causing a longitudinal adjustment of the wedge 31 to bring it into tight abutting relationship with the face 24 of the head 18 and with the seat 28 on the bucket body. To provide such screw means the wedge 31 is extended to form a stem 36 having a threaded terminus 37 which passes through an aperture 38 in a lug 39 preferably cast integrally with the body 6. A nut 41 engages the threaded stem 37 and abuts the lug 39 through the medium of a suitable washer 42. When the nut is operated, the wedge 31 is adjusted longitudinally so that the face 23 of the pin head 18 is forced into abutment with the seat 22 of the rib 21 and so that the wedge body 32 is forced into engagement with the seat 28. In this fashion, rotation of the pin 16 in the aperture 14 is absolutely precluded, and even if wear and looseness should occur, a suitable manipulation of the nut 41 will again restore tightness. At the same time, the fin 33 precludes axial displacement of the parts. The structure can be cast, as is customary, it being only occasionally necessary in manufacture to machine or grind the seats 22 and 28.

Comparable considerations apply to the arrangement shown in Figures 3 and 4. In this instance, the boss 52 adjacent the aperture 51 is integral on one side with a rib 53 and on the other side with a rib 54, these ribs providing seats which diverge towards the axis of the pin 51 as in the case of the ribs 21, 26 of Figure 1. The rib 54 is formed with a seat 56 against which a wedge 57 abuts. The wedge has a fin 58 extending into a groove 59 and is provided with a threaded passage 61 therethrough with which cooperates a set screw 62 abutting a wall 63 formed as an integral part of the bucket body 64. With this arrangement, by appropriate manipulation of the set screw 62, the wedge 57 is forced into abutment with the seat 56 and one of the parallel faces of the pin head 65, while the other parallel face of said head is forced into abutment with a seat on the rib 53.

In the arrangement of Figures 5 and 6, a pin 71 is seated in an apertured lug 72 forming part of the bucket body 73, and one of the parallel faces of the head 74 of the pin abuts against a seat on a rib 76 formed integrally with the lug 72. The head 74 is cut away to provide an abutting face 78 and a wall 78a substantially normal to the parallel faces of the head 74. The wall 78a is formed with a threaded socket 79 into which a stud 81 is screwed. The stud 81 passes through a pierced wedge 82 which has a face 83 abutting against a seat 84 formed on a rib 86 also integral with the lug 72. The wedge 82 likewise is provided with a fin 87 which projects into a groove 88 between the seat 84 and the bucket body 73. A nut 89 and an interposed washer 91 encompass the threaded stud 81. When the nut is suitably manipulated, the wedge 82 is longitudinally adjusted between the seat 84 and one of the parallel faces of the head 74 of the pin, the other parallel face of the head 74

being forced against a seat on the rib 76, thereby holding the pin 71 tightly in position. In this form of the invention the seats on the ribs 76, 86 converge towards the axis of the pin 71.

It will be seen that the modification shown in Figures 3 and 4 and that shown in Figures 5 and 6 like the form of the invention shown in Figures 1 and 2 each have a screw means for causing a longitudinal adjustment of the wedge 57 or 82.

Included amongst earlier proposals has been the employment of a pin having a head provided with parallel faces while the two seats formed on the bucket body are in non-parallel relation, the head being held by driving a locking key into the resulting wedge gap.

In other cases the head of the pin is provided with non-parallel faces where the locking key is a wedge adjustable by screw means longitudinally of the seat.

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. An excavator bucket which comprises a body through which extends an aperture adapted to receive a pin having a head which is formed with parallel faces, one of which abuts a seat formed on the body adjacent said aperture while a wedge is interposed between the other parallel face of the pin head and a second seat formed on the bucket body in non-parallel relation to the first mentioned seat, said wedge being adjustable by screw means longitudinally of said seat and face.

2. An excavator bucket according to claim 1 in which the two seats on the bucket body are constituted by the opposed faces of two ribs provided on said body and diverging toward the aperture which is adapted to receive the pin.

3. An excavator bucket according to claim 1 in which the screw means by which the longitudinal adjustment of the wedge is effected cooperates with a wall provided either on the bucket body or pin head substantially normal to the parallel faces of the pin head.

4. An excavator bucket substantially as hereinbefore described wih reference to the accompanying drawings.

Dated this 14th day of April, 1939.
For the Applicant.
LLOYD WISE & CO.,
10, New Court, Lincoln's Inn,
London, W.C.,
Chartered Patent Agents.

Leamington Spa: Printed for His Majesty's Stationery Office, by the Courier Press.—1940.

being forced against a seat on the rib 76, thereby holding the pin 71 tightly in position. In this form of the invention the seats on the ribs 76, 86 converge towards the axis of the pin 71.

It will be seen that the modification shown in Figures 3 and 4 and that shown in Figures 5 and 6 like the form of the invention shown in Figures 1 and 2 each have a screw means for causing a longitudinal adjustment of the wedge 57 or 82.

Included amongst earlier proposals has been the employment of a pin having a head provided with parallel faces while the two seats formed on the bucket body are in non-parallel relation, the head being held by driving a locking key into the resulting wedge gap.

In other cases the head of the pin is provided with non-parallel faces where the locking key is a wedge adjustable by screw means longitudinally of the seat.

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. An excavator bucket which comprises a body through which extends an aperture adapted to receive a pin having a head which is formed with parallel faces, one of which abuts a seat formed on the body adjacent said aperture while a wedge is interposed between the other parallel face of the pin head and a second seat formed on the bucket body in non-parallel relation to the first mentioned seat, said wedge being adjustable by screw means longitudinally of said seat and face.

2. An excavator bucket according to claim 1 in which the two seats on the bucket body are constituted by the opposed faces of two ribs provided on said body and diverging toward the aperture which is adapted to receive the pin.

3. An excavator bucket according to claim 1 in which the screw means by which the longitudinal adjustment of the wedge is effected cooperates with a wall provided either on the bucket body or pin head substantially normal to the parallel faces of the pin head.

4. An excavator bucket substantially as hereinbefore described wih reference to the accompanying drawings.

Dated this 14th day of April, 1939.

For the Applicant.
LLOYD WISE & CO.,
10, New Court, Lincoln's Inn,
London, W.C.,
Chartered Patent Agents.

Leamington Spa: Printed for His Majesty's Stationery Office, by the Courier Press.—1940.

