May 16, 1939. D. H. YOUNG 2,158,348

EXCAVATOR

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FIG. 2.

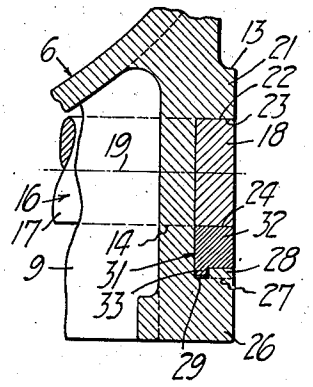
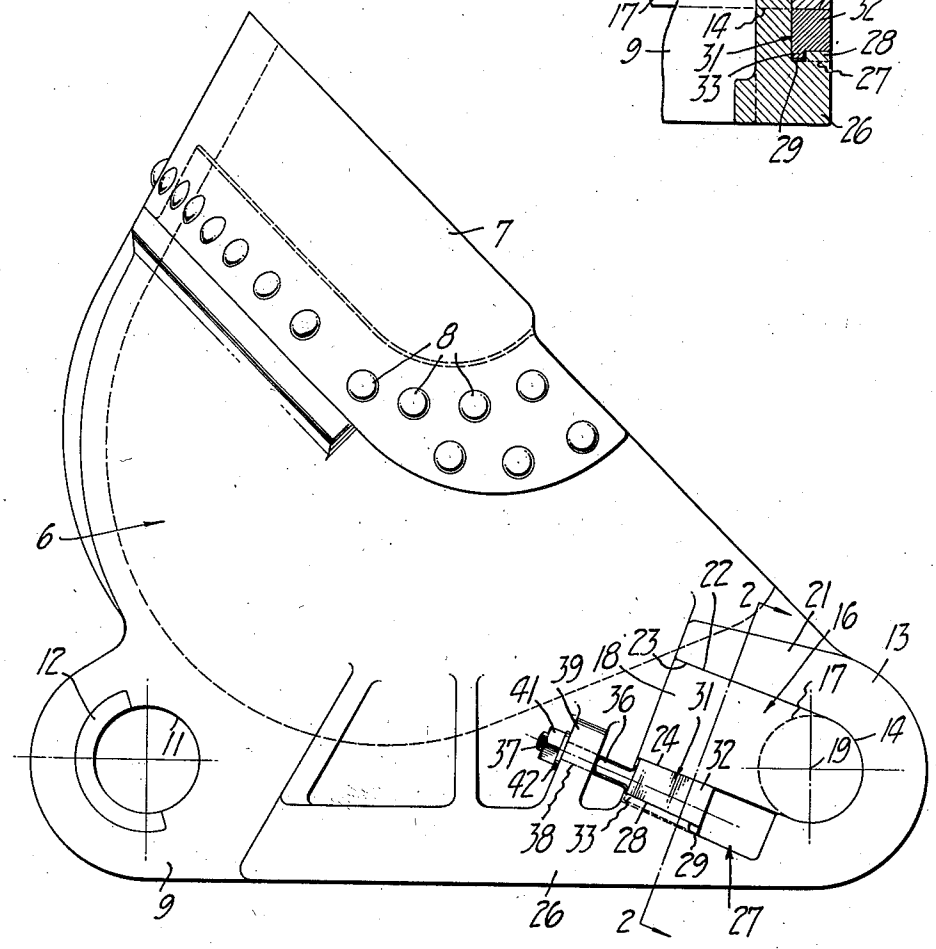


FIG. 1.



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FIG_3_

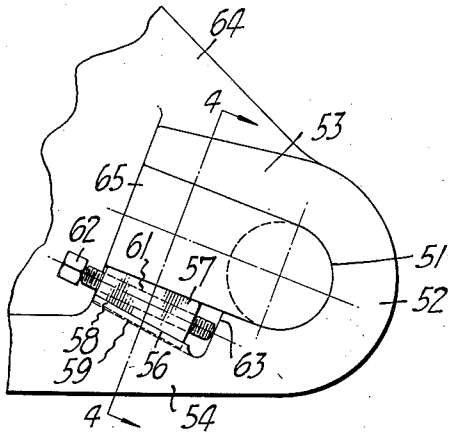


FIG_4_

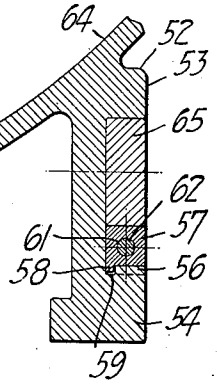


FIG_5_

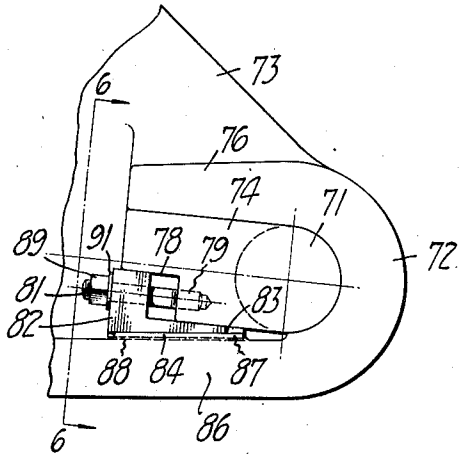
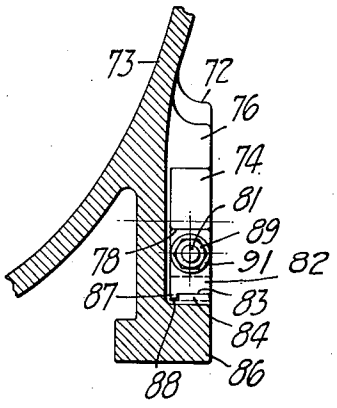


FIG_6_



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Patented May 16, 1939 2,158,348

UNITED STATES PATENT OFFICE

2,158,348

EXCAVATOR

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Application October 31, 1936, Serial No. 108,561

2 Claims. (Cl. 37—191)

My invention relates particularly to buckets utilized for receiving earth and comparable material in excavating machines such as power shovels, and particularly dredges. My invention is usually placed in use 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. The successive buckets are connected by bucket pins which are held non-rotatably in one hinge element and rotate with respect to the other hinge element. 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, the pin having 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.

It is an object of my invention to provide a means for securely holding a bucket pin in location without necessitating material changes in the customary manner of manufacture of the bucket.

Another object of my invention is to provide a satisfactory pin-holding means for use with cast manganese steel buckets.

A further object of my invention is to provide an improved means for holding an excavator pin.

The foregoing and other objects are attained in the embodiments of the invention illustrated in the drawings, in which—

Fig. 1 is a side elevation of an excavator constructed in accordance with my invention.

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

Fig. 3 is a side elevation of a fragmentary excavator, showing a modified form of my invention.

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

Fig. 5 is a side elevation of a fragmentary excavator, showing a further modified form of my invention.

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

In its preferred form, the excavator of my invention comprises a dredge bucket having a pin aperture therethrough and a rib formed thereon adjacent said aperture and against which abuts a wedge also abutting the pin for holding the pin in position.

In the structure shown in Figs. 1 and 2, there is provided a dredge 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 lug 13 having a pin aperture 14 therethrough 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 circular 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 an offset lug 18 which is generally rectangular in cross-section and extends radially from the axis 19 of the pin body.

The bucket 6 is contoured to provide 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 face 22 approximately tangent to the aperture 14. The lug 18 has a comparable meeting face 23 adapted to abut the face 22, and also has a face 24 which is substantially parallel to the face 23.

In accordance with my invention, I provide means for gripping the lug 18 and the pin 17 in position. The bucket body 6 is cast to provide a rib 26 which is preferably integral with the body and merges with the lug 13. The rib 26 terminates in a face 27 which in general is not parallel with the face 22 but is inclined with respect thereto, converging in a direction away from the axis 19, for example, as shown in Fig. 1. The face 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 face 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. In order that the wedge may be appropriately manipulated, I afford a means for bringing it into tightly abutting relationship with the lug 18 and with the face 28.

For this purpose the wedge 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 is drawn into engagement with the lug 18, so that the face 23 is forced into abutment with the face 22 and so that the wedge body 32 is forced into engagement with the face 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 face 22 and the face 28.

Comparable considerations apply to the arrangement shown in Figs. 3 and 4. In this instance, the aperture 51 in the lug 52 is bounded by a tangential rib 53 and a converging rib 54. This rib is formed with a key 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 integrally formed with the bucket 64. With this arrangement the wedge 57 is forced into abutment with the key 56, and the extension 65 on the pin is forced into abutment with the rib 53 by appropriate manipulation of the set screw 62.

In the arrangement of Figs. 5 and 6, a pin 71 is seated in an apertured lug 72 forming part of the bucket body 73, and an extension 74 of the pin seats against a rib 76 formed integrally with the body. The extension 74 is cut away to provide an abutting face 78 and is formed with a threaded socket 79 into which a stud 81 is screwed. The stud passes through a pierced wedge 82 which has a face 83 seating against a key 84 formed integrally with the bucket body and comprising part of a rib 86 extending from the lug 72. The wedge 82 likewise is provided with a fin 87 which projects into a groove 88 between the key 84 and the bucket body 73. A nut 89 and an interposed washer 91 encompass the threaded stud 81, and when the nut is suitably manipulated the wedge 82 is forced between the projection 74 of the pin and the key 84, and the projection 74 is forced against the rib 76, thereby holding the pin tightly in position.

I claim:

1. An excavator comprising a bucket body having a pin aperture therethrough, a pin seat on said body adjacent one end of said aperture, a pin in said aperture, a head on said pin having parallel sides, one of which abuts said pin seat, a wedge seat on said body merging with a wall normal to said parallel sides, a wedge interposed between the other side of said head and said wedge seat, and a set screw threaded through said wedge and having its leading end bearing upon said wall.

2. An excavator comprising a bucket body, a pin boss on said body having a pin aperture therethrough, a first rib and a second rib on said body diverging toward said aperture, a wall on said body normal to said first rib, a pin in said aperture, a head on said pin having substantially parallel sides one of which abuts said first rib, a wedge abutting said second rib and the other side of said head, and a set screw engaging said wedge and bearing upon said wall normal thereto.

DONALD H. YOUNG.