

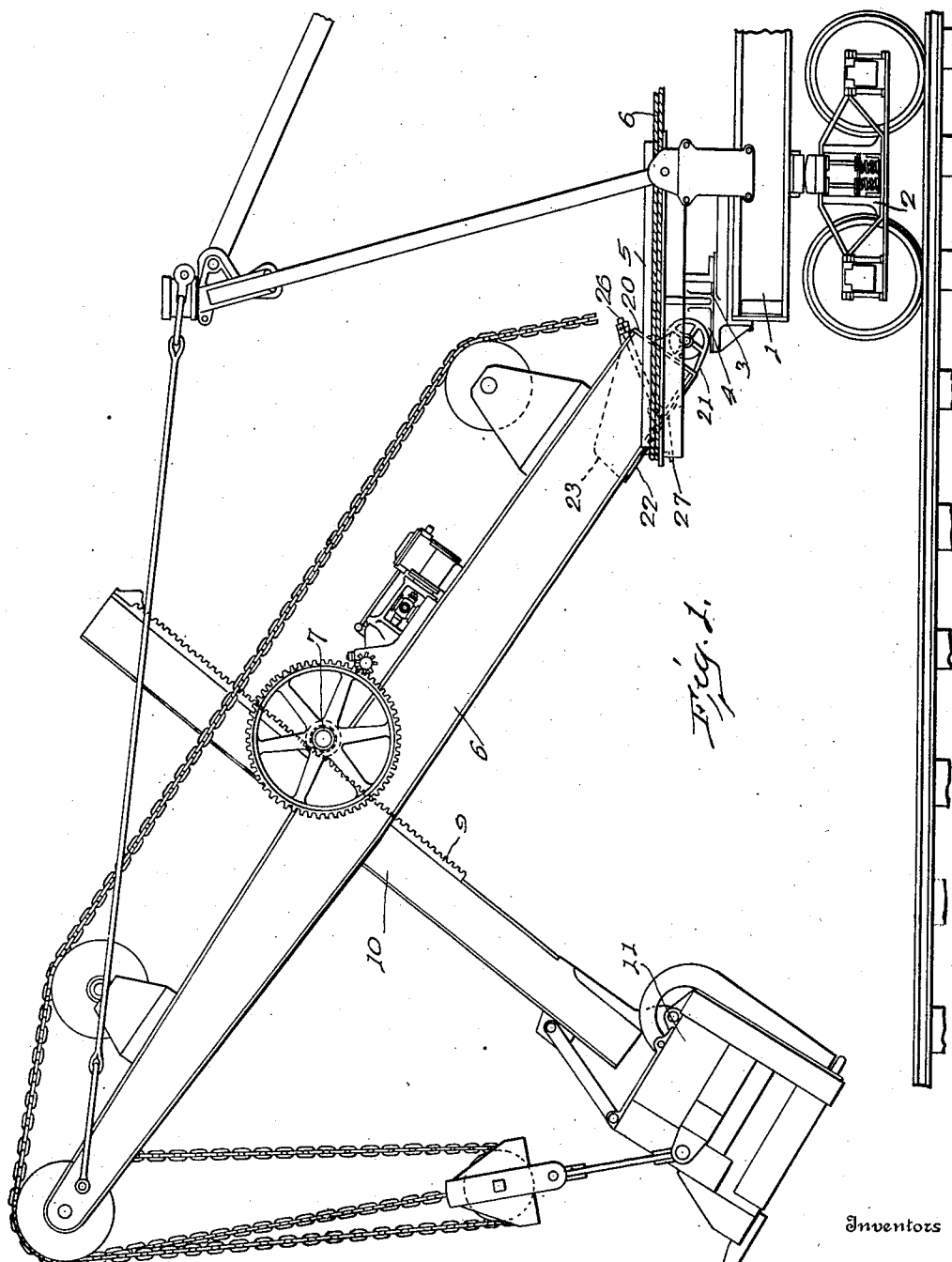
G. W. KING, H. J. BARNHART & C. B. KING.
BOOM FOR EXCAVATING MACHINES.

APPLICATION FILED OCT. 18, 1909.

1,012,087.

Patented Dec. 19, 1911.

3 SHEETS—SHEET 1.



Witnesses

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334

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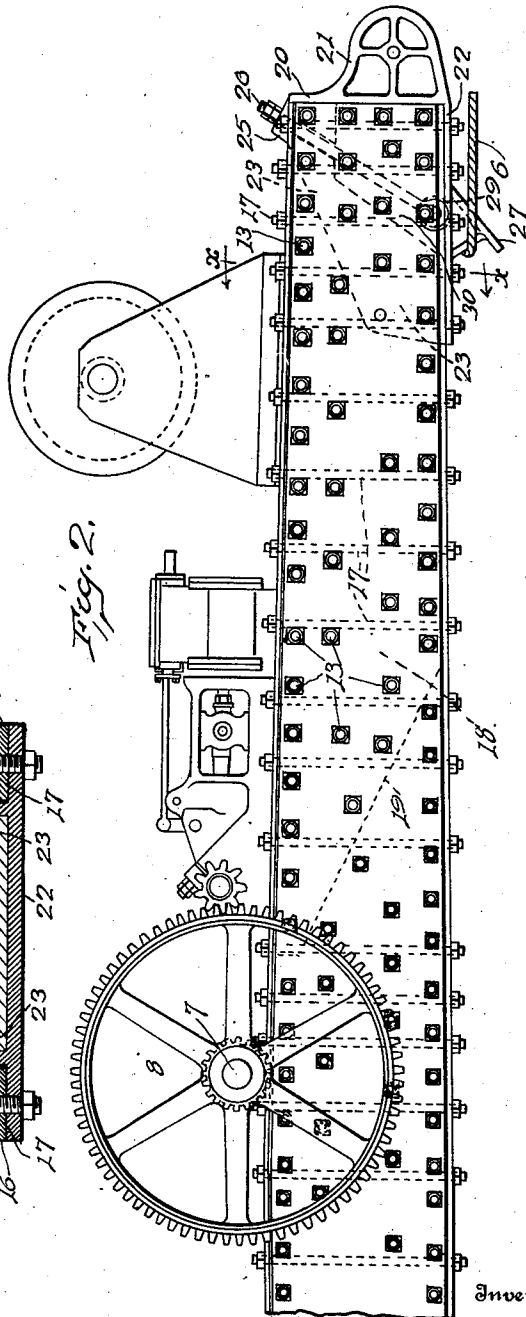
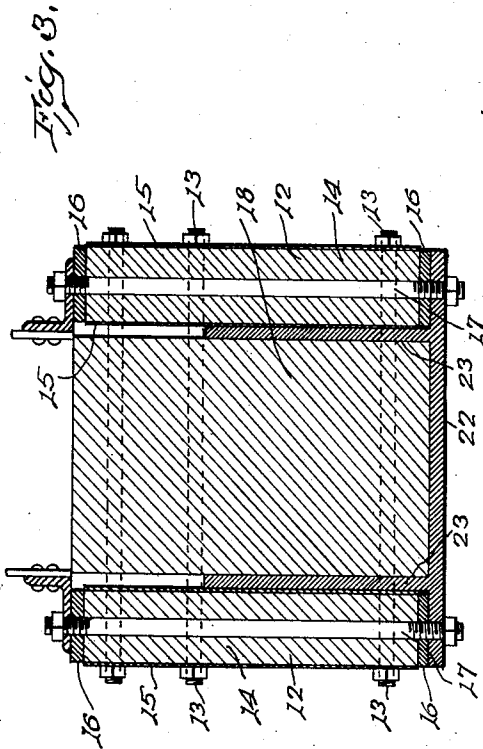
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3 SHEETS-SHEET 3.

Fig. 5.

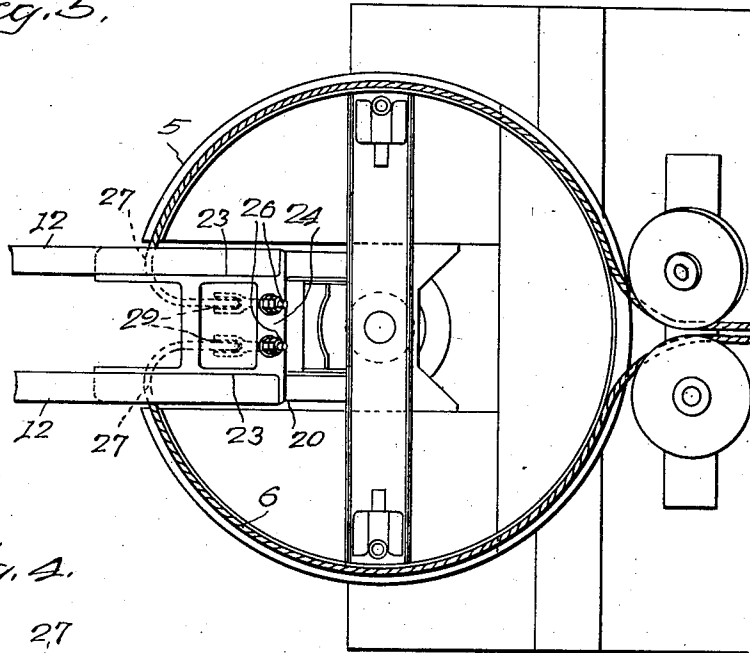
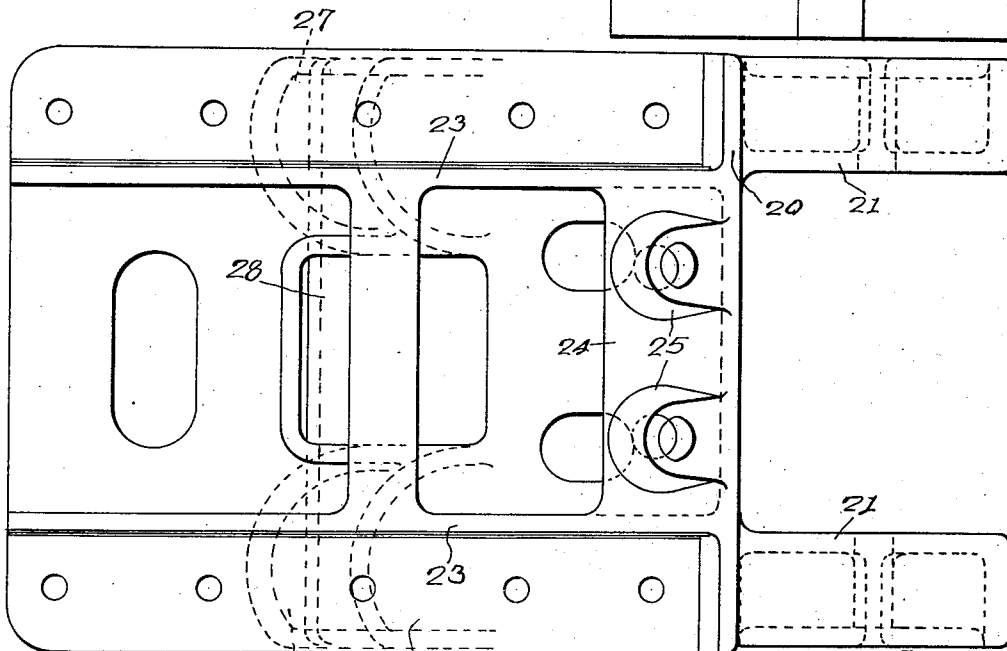


Fig. 4.



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UNITED STATES PATENT OFFICE.

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BOOM FOR EXCAVATING-MACHINES.

1,012,087.

Specification of Letters Patent.

Patented Dec. 19, 1911.

Application filed October 18, 1909. Serial No. 523,118.

To all whom it may concern:

Be it known that we, GEORGE W. KING, HARRY J. BARNHART, and CHARLES B. KING, citizens of the United States, residing at Marion, in the county of Marion and State of Ohio, have invented certain new and useful Improvements in Booms for Excavating-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to booms for excavating machines, such as steam shovels, dipper dredges and the like.

The object of the invention is, primarily, to reinforce or strengthen the boom at the point where it is subjected to the greatest strain. In a boom as ordinarily constructed the boom members taper from a central point, near where the dipper handle is connected to the boom, toward each end, the foot or rear end of the boom being reduced to such a size that it will enter the bearing on the body portion of the excavating machine. The greatest strain is imposed upon the boom at a point substantially midway between the point of support of the dipper and the foot of the boom. Consequently, by so tapering the boom the strength of the same is materially reduced at this point. To overcome this difficulty and, at the same time, provide a satisfactory bearing for the boom, we have constructed the boom with the upper and lower edges of the members substantially parallel from the point of connection with the dipper handle to the foot or base of the boom and have provided the foot with a bearing block which is rigidly secured thereto and adapted to engage the bearing on the body of the excavating machine.

A further object of the invention is to so connect the boom members one to the other as to form a perfectly rigid construction in which the several parts of the boom will have no movement relatively one to the other, thereby further increasing the strength of the boom.

With these objects in view our invention consists in certain novel features and in certain combinations and arrangements of parts hereinafter to be described, and then more particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation of the forward portion of a steam shovel equipped with a boom em-

bodying our invention; Fig. 2 is a side elevation of a portion of the boom; Fig. 3 is a transverse, sectional view, taken on the line *x x* of Fig. 2 and looking in the direction of the arrows; Fig. 4 is a top plan view of the foot casting; and Fig. 5 is a top plan view of the foot of the boom and the turn-table.

In these drawings we have illustrated one embodiment of our invention and have shown the same as applied to a steam shovel of ordinary construction and comprising a body 1 mounted upon the usual truck 2 and having at its forward end a turn-table 3 provided with a bearing 4 adapted to receive the boom. This turn-table also has a cable drum 5, about which extend cables 6 which are connected to the boom and pass about the usual swinging-drums, which are not here shown. The boom is supported and operated in the usual manner and has, at a point substantially midway between its opposite ends, the usual transverse shaft 7 having the pinions 8 which mesh with the rack 9 on the handle 10 of the dipper 11. The boom itself preferably consists of two members, 12, which, as shown in Fig. 3, are spaced some distance apart and are connected one to the other by the transverse bolts 13. Each of these members comprises a center or body portion 14, of wood or other material, and an armor consisting of side plates 15, the body portion and side plates being secured together by the transverse bolts 13 which secure the two members one to the other. Each member 12 also has strengthening bars 16 extending along its upper and lower edges, respectively. The two strengthening bars of each member are connected one to the other and to the body portion of that member by vertical bolts 17 which extend through the boom member as a whole. The strengthening bars 16 are of a width substantially equal to the distance between the two armor plates 15 and can be drawn toward each other by tightening down the nuts on the bolts 17 to take up any looseness resulting from the shrinkage of the wood of the body portion or from other causes. The construction so far described is substantially the same as that embodied in the ordinary boom. The boom members 12 have their upper and lower edges substantially parallel from the shaft 7, or point of connection of the dipper handle, to the base of the boom, and thus, not only eliminate

the work necessary to cut down the wooden body portion and shear the armor plates, as was required to give the old form of boom its taper, but, which is far more important, retains in the boom the strength of the material, which, in the old form, was cut away, and materially reinforces the boom at a point substantially midway between the foot of the boom and the shaft 7, which is the point usually subjected to the greatest strain. This part of the boom is further reinforced by providing the same with a solid filler 18, of wood, which extends from a point a short distance in the rear of the shaft 7 to the foot of the boom, it being cut away at its forward end, as shown at 19, to permit the free swinging movement of the dipper handle. In order to support a boom of this construction in a bearing of suitable size it is necessary to provide the foot of the boom with a bearing member or bearing block, and, to this end, we have rigidly secured to the foot or lower end of the boom a plate 20, which is of a size and shape corresponding substantially to the area of the end of the boom, and have secured to this plate, in substantial alinement with the boom members, bearing blocks 21 adapted to fit within the standard bearings carried by excavating machines, thus rendering the present boom interchangeable with the old form. The plate 20 is here shown as forming part of a casting, which, in addition to the end plate 20, comprises a bottom plate or face plate 22 extending along the lower surface of the boom for a considerable distance. The casting also comprises two webs or vertically arranged plates 23 extending forwardly and upwardly from the plates 20 and 22 at points removed from the opposite edges of these plates a distance substantially equal to the thickness of the boom members, thus forming on each side of the casting sockets corresponding in size and shape to the ends of the boom members, and within which these boom members are inserted. This casting is secured to the boom by a part of the bolts 13 and 17, which bolts extend through the webs or plates 23 and the bottom plate 22, respectively. A short plate or flange 24 extends forwardly from the upper edge of the end plate 20 and has apertured bosses 25 through which extend bolts or rods 26 which are arranged between the two webs 23 of the casting and have secured thereto the swinging-cable 6, which cable extends about guides 27, secured to the bottom plate 22, and through an opening 28 in that bottom plate. In the present instance, the cables 6 are shown as double cables which extend about equalizing pulleys 29 secured to the lower ends of the bolts 26. The solid wood filler 18 extends between the webs or plates 23 of the casting for a portion of their length, but is cut away near the rear end

of the boom, as shown at 30, to permit of the passage of the bolts 26 and the cable 6. By means of this casting the two end members of the boom are firmly tied together and are held against movement relatively one to the other, thus adding materially to the strength of the boom. Further, it will be noted that the lower end or foot of each boom member is supported upon the plate 20 and that the end thrust of the boom is thus distributed over the entire cross sectional area of the boom member, as distinguished from the old form of boom, in which the thrust was received entirely by the rounded end portion of the member which engaged the bearing. In this old form the thrust was so great as to frequently break the reinforcing bar which extended about the end of the member and crush or stave in the end of the boom member in such a manner as to render it useless. By the present construction this difficulty is entirely overcome.

While we have shown the casting or foot socket as formed in a single piece it would be possible, if found desirable, to make the same in two or more parts and then connect these parts together. Further, it will be understood that it is not essential that the upper and lower edges of the boom should be exactly parallel, it being sufficient that these edges are substantially parallel one with the other. By "substantially parallel" we mean that there may be a slight convergence of the upper and lower edges of the boom members toward the foot of the boom, but this convergence of the edges would not be sufficient to materially reduce the strength of the boom at its point of greatest strain and would not so reduce the foot of the boom as to enable the same to enter the bearing on the excavating machine, but would require the use of the auxiliary bearing block or foot casting. These modifications, as well as many others, would be obvious to a person skilled in the art and we, therefore, wish it to be understood that we do not desire to be limited to the details of construction shown and described.

Having thus fully described our invention, what we claim as new and desire to secure by Letters Patent, is:—

1. The combination, with a supporting frame and bearing sockets carried thereby, of a boom comprising two parallel members, an excavating member mounted on said boom between the ends thereof, the two members of said boom having their upper and lower edges converging from said excavating member toward the outer end of the boom and said edges being substantially parallel from said excavating member to the foot of the boom, a single filling block mounted between said boom members and extending from a point near said excavat-

ing member to a point near the foot of the boom, and an integral foot casting having sockets to receive the ends of said boom members and comprising a plate extending
5 across the ends of both of said boom members and having bearing blocks to enter the respective bearing sockets on said frame.

2. The combination, with a boom comprising two parallel members, of a foot casting comprising an end plate supported
10 in engagement with the ends of both members of said boom, bottom plates formed integral with said end plate and extending along the lower edges of the respective boom
15 members, other plates formed integral with said end plate and said bottom plates and extending upward along the inner faces of the respective boom members, means for rigidly connecting said boom members to said
20 plates, and bearing blocks formed integral with said end plate and arranged in substantial alinement with said boom members.

3. The combination, with a boom comprising two parallel members, of a foot casting comprising an end plate supported in
25 engagement with the ends of both members of said boom, bottom plates formed integral with said end plate and extending along the lower edges of the respective boom members, other plates formed integral with said
30 end plate and said bottom plates and extending upward along the inner faces of the respective boom members, a transverse flange formed integral with said end plate and
35 said upwardly extending plates and having apertured bosses.

In testimony whereof, we affix our signatures in presence of two witnesses.

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HARRY J. BARNHART.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."