Sept. 7, 1926. 1,598,723

G. HOLMES

ADJUSTABLE BOOM STRUCTURE

Filed Nov. 26, 1923 2 Sheets-Sheet 1

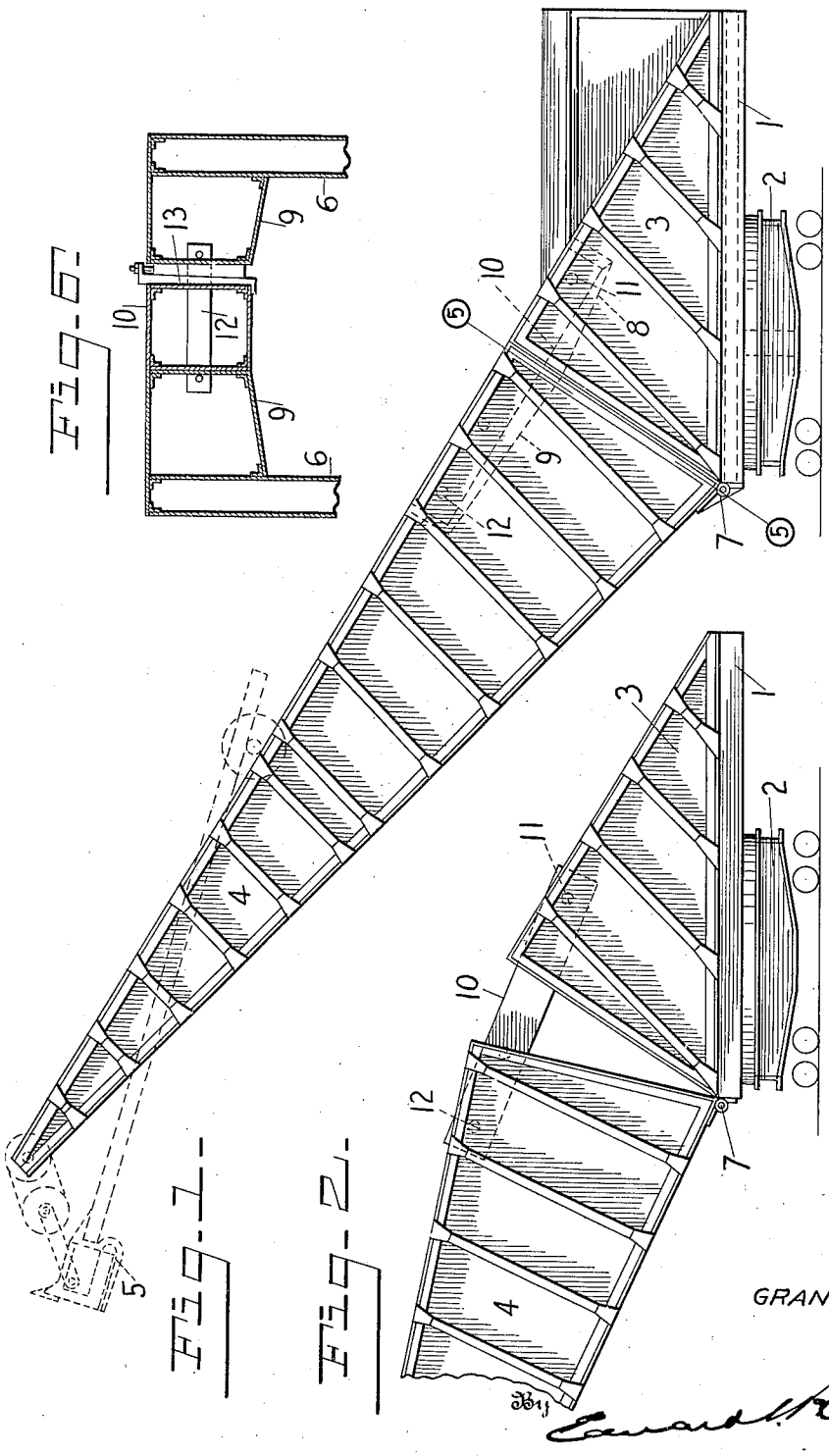


FIG. 1.

FIG. 2.

FIG. 3.

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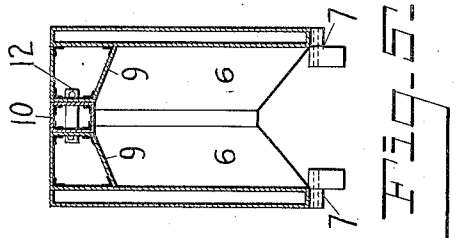


FIG. 5.

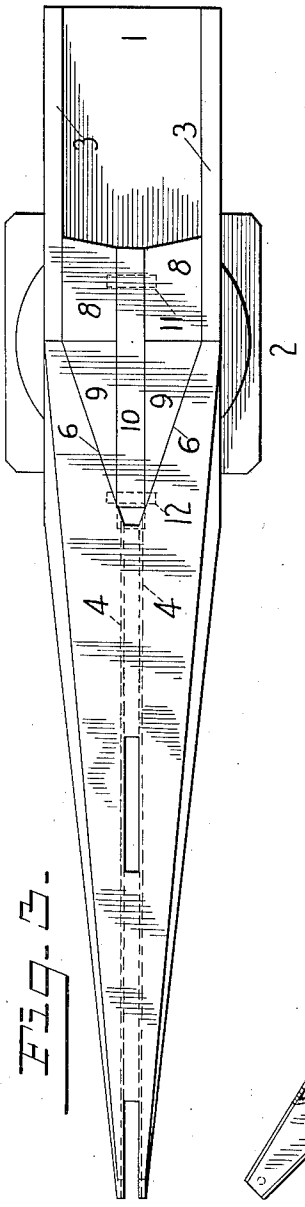


FIG. 3.

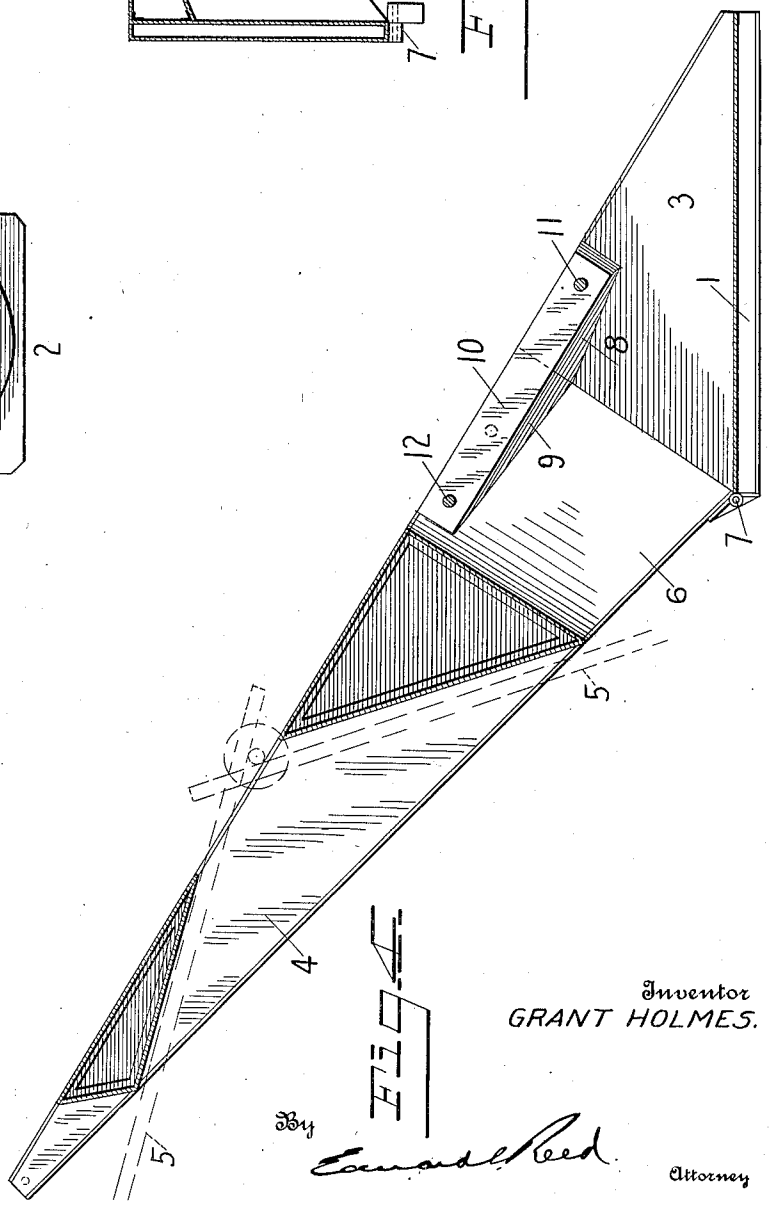


FIG. 4.

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Patented Sept. 7, 1926. 1,598,723

UNITED STATES PATENT OFFICE.

GRANT HOLMES, OF DANVILLE, ILLINOIS, ASSIGNOR TO THE MARION STEAM SHOVEL COMPANY, OF MARION, OHIO, A CORPORATION OF OHIO.

ADJUSTABLE BOOM STRUCTURE.

Application filed November 26, 1923. Serial No. 676,929.

This invention relates to booms for excavating machines and the like and is in the nature of an improvement upon the boom shown and described in the application for patent filed by me July 30, 1923, Serial No. 654,568. In that application I have shown and described a unitary boom structure which is rigid throughout its length and has its base portion mounted on a rotary support and adapted in turn to support the outer portion or arm of the boom. With that construction the point of the boom is always supported in the same position with relation to the base.

One object of the present invention is to provide a boom of this type the point of which can be supported in different positions with relation to the base and therefore different distances from the ground.

A further object of the invention is to provide such a boom comprising two parts rigidly but adjustably connected one to the other so that the vertical position of the point of the boom may be varied.

Other objects of the invention will appear as the device is described in detail.

In the accompanying drawings Fig. 1 is a side elevation of an excavating machine provided with a boom embodying my invention, showing the point of the boom in its highest position; Fig. 2 is a similar view, partly broken away, showing the arm of the boom in a different position; Fig. 3 is a top plan view of the structure; Fig. 4 is a longitudinal sectional view taken centrally through the boom structure; Fig. 5 is a transverse sectional view taken on the line 5—5 of Fig. 1; and Fig. 6 is a transverse sectional view taken through the girder and showing a minor modification.

In these drawings I have illustrated one embodiment of my invention and have shown the same as embodied in an excavating machine of the rotary steam shovel type, which comprises a rotatable support or platform 1 mounted on a base or truck frame 2 for movement about a vertical axis. The lower or base portion of the boom structure is rigidly mounted on the support 1 and, as here shown, comprises upright side members 3 which may be of any suitable construction, such as metal plates properly reinforced and braced, as described in the above mentioned application. These side members are rigidly secured to the support 1 near the lateral edges thereof and are thus spaced apart to receive between them the mechanism which is usually mounted on the rotatable support. Further, by spacing the side members of the base a considerable distance apart it is possible to utilize the same to brace the boom arm against lateral strains, as will hereinafter appear. The side members of the base extend across the axis of the support and, in the present instance, they are triangular in form and their lower horizontal edges extend for substantially the full length of the support while the apex of the triangle lies adjacent to the vertical plane of the axis about which the support rotates.

The arm or boom proper is supported by the base 3 and extends upwardly and forwardly therefrom. This arm may be of any suitable construction and is here shown as comprising parallel plates 4 having their upper and lower edges converging toward the point of the boom and spaced a short distance apart to receive between them a dipper arm 5. The rear ends of these parallel portions of the arm terminate some distance in front of the forward edges of the base plates 3. They are connected with these base plates by rearwardly diverging plates 6 the forward edges of which are rigidly secured to the rear edges of the respective parallel plates 4 and form in effect continuations of these plates. These rearwardly diverging or inclined plates are connected at their rear edges with the base 3 and because of their inclined positions serve to reinforce or brace the boom arm against lateral strains due to the swinging of the boom structure.

When the arm and base of the boom are permanently connected one to the other, as in the above mentioned application, the arm of the boom cannot be adjusted with relation to the base and in order to secure an adjustment of this arm with relation to the base I have provided an adjustable connection between the arm and the base which is of such a character that when in any adjusted position the two parts are rigidly connected one to the other and have the strength and characteristics of the unitary structure. This adjustable connection may take various forms, but in the present instance, I have pivotally connected the lower edge of the arm with the adjacent portion of the base, by means of a hinge pin 7, so that the arm of the boom may be moved into different

angular positions with relation to the base, thereby supporting the point of the boom at different distances from the ground. The adjacent upper portions of the boom arm and of the base are rigidly connected one to the other, the connection being of such a character as to prevent lateral movement of the parts relatively one to the other and to hold the arm normally against all movement about the hinge pin 7. This connection preferably comprises a connecting member the end portions of which overlap the adjacent parts of the arm and the boom, respectively, and are secured thereto in such a manner that the point of connection between the connecting member and one part of the boom structure may be changed to permit the arm of the boom to be moved to different positions about its axis 7. In the present construction the base of the boom and the arm are provided in their upper portions with alined recesses 8 and 9 and a rigid connecting member, such as a girder 10, is mounted in said recesses and means are provided for rigidly securing the same therein. That end of the girder which is in the recess 8 of the base is secured therein by means of a pin 11 extending through the walls of the recess and through the girder, thus securing the girder in the recess at a fixed longitudinal point but permitting the same to be adjusted about the axis of the pin, the recess 8 being so shaped as to permit of limited pivotal movement of the girder therein. The other end of the girder is secured in the recess 9 in the arm by pins 12 extending through the side walls of the recess and through the girder. When the arm is in its uppermost position, as shown in Fig. 1, two pins may be utilized in establishing this connection but when the arm is moved downwardly to the position shown in Fig. 2 the foremost opening in the girder is brought into line with the rearmost openings in the walls of the recess of the arm and one of the pins is inserted through these alined openings thus connecting the girder with the arm at a single point. However, the walls of the recess and the pin are of sufficient strength to carry the weight of the arm. I have illustrated means for securing the boom in two positions, which requires the forming of no additional holes either in the walls of the recesses or in the girder, but it will be obvious that the boom may be secured in any desired position or in any one of a plurality of positions by providing the proper number and arrangement of holes to receive the connecting pin or pins. The girder is so mounted in the respective recesses that the girder and the two parts of the boom structure are held rigidly against all relative lateral movement. This may be accomplished by fitting the girder snugly within the recesses or, if it is found more convenient in manufacture, wedges may be inserted between one side of the girder and the adjacent walls of the respective recesses, as shown at 13 in Fig. 6, and in this manner all relative lateral movement of the part is prevented.

While I have shown and described one embodiment of my invention I wish it to be understood that I do not desire to be limited to the details thereof as various modifications may appear to a person skilled in the art.

Having now fully described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. A boom structure comprising two parts arranged end to end and having their ends pivotally connected one to the other at the lower edge of said structure, a rigid connecting member extending between the two parts of said structure near the upper edge thereof, and means for securing said connecting member to both parts of said structure when said parts are in different relative positions and for holding said parts and said connecting members against all relative movement.

2. A boom structure comprising two parts arranged end to end and having their adjacent ends pivotally connected one to the other at one edge of said structure, a rigid connecting member arranged near the opposite edge of said structure and overlapping the adjacent end portions of said parts, said connecting member and said parts being held against relative movement, and adjustable means for securing said member to one part of said structure.

3. A boom structure comprising two parts arranged end to end and having their adjacent ends pivotally connected one to the other at one edge of said structure, a rigid connecting member arranged near the opposite edge of said structure and overlapping the adjacent end portions of said parts, said connecting member and said parts being held against relative lateral movement, and adjustable means for securing said member to both parts of said structure.

4. A boom structure comprising two parts arranged end to end and having their adjacent ends pivotally connected one to the other at one edge of said structure, said parts of said structure having alined recesses, and a rigid connecting member having its end portions mounted in the respective recesses, and means for securing said member in one of said recesses in any one of a plurality of positions relative thereto.

5. A boom structure comprising two parts arranged end to end and having their adjacent ends pivotally connected one to the other at one edge of said structure, said parts of said structure having alined recesses, a rigid connecting member having

its end portions mounted in the respective recesses, means for pivotally securing said member at a fixed point in one of said recesses, and means for securing said member in any one of a plurality of positions in the other recess.

6. A boom structure comprising two parts arranged end to end and having their adjacent ends pivotally connected one to the other at one edge of said structure, said parts of said structure having alined recesses, a rigid connecting member having its end portions mounted in the respective recesses, means for securing said member in one of said recesses in a plurality of positions relative thereto, and means for holding said connecting member and the two parts of said structure against relative lateral movement.

7. In a machine of the character described, the combination with a revolving platform, of a boom structure having a lower portion comprising side frames mounted on said platform in spaced relation one to the other, extending for substantially the full length of said platform and having their upper edges inclined upwardly and forwardly, said boom structure also having an upwardly and forwardly extending portion, the upper and lower edges of which converge forwardly, the rear end of the last mentioned portion of said boom structure being of a height substantially equal to the height of the forward ends of said side frames, said portions of said structure having hinged connection one to the other at the lower edge of said structure, and means for connecting said portions of said structure one to the other near the upper edge thereof in different relative positions and for holding said portions of said structure against relative movement.

In testimony whereof, I affix my signature hereto.

GRANT HOLMES.