

March 5, 1929.

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1,704,425

EJECTOR FOR EXCAVATOR DIPPERS

Filed Oct. 22, 1927

2 Sheets-Sheet 1

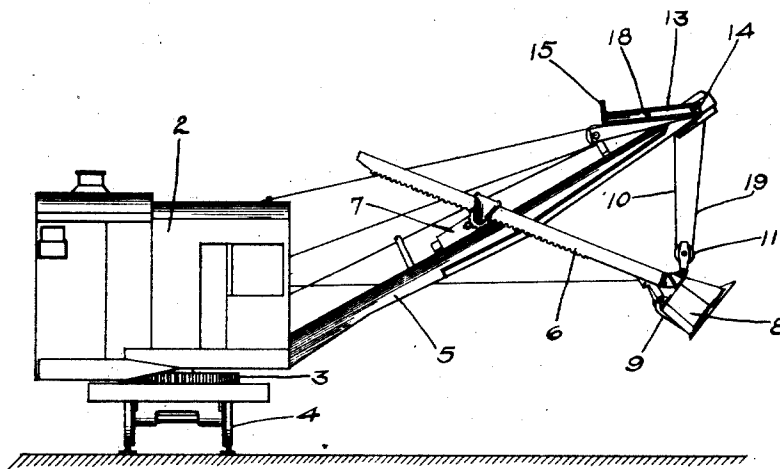


FIG. 1

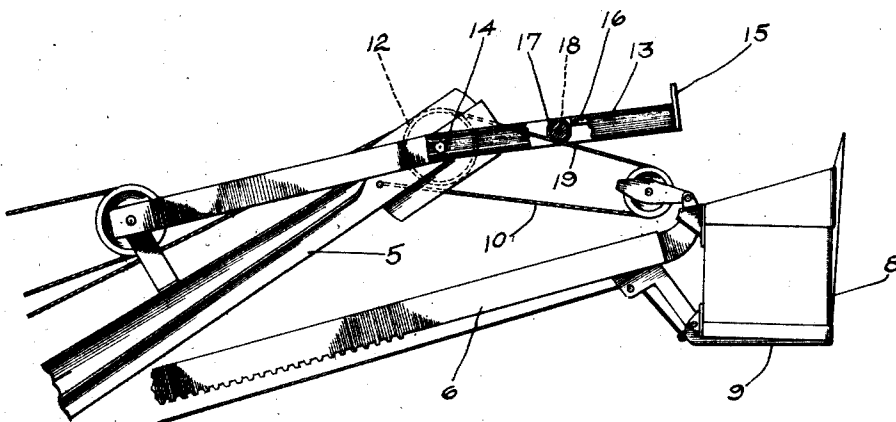


FIG. 2

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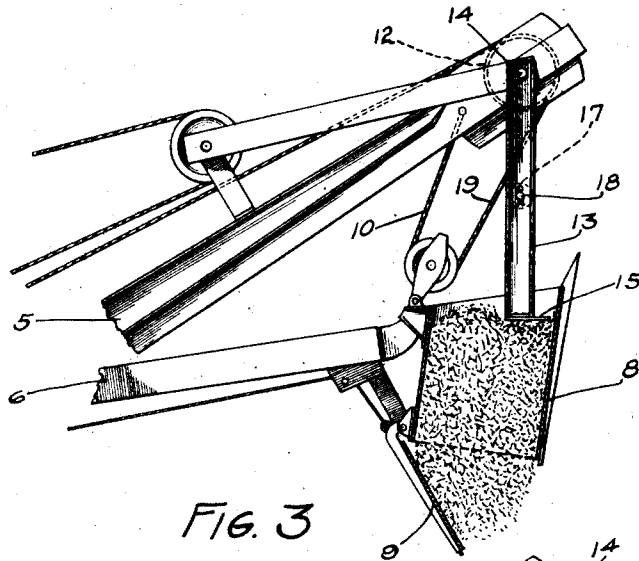
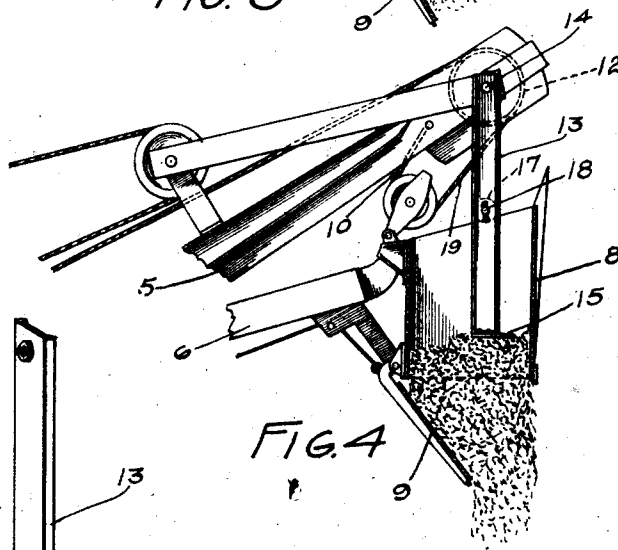
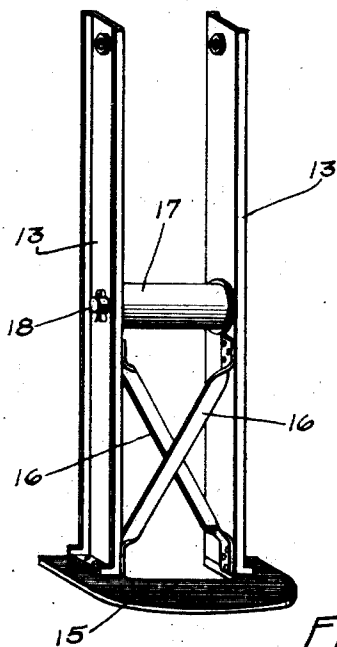
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE.

HERMANN BRUNING, OF ST. PAUL, MINNESOTA, ASSIGNOR TO AMERICAN HOIST & DERRICK COMPANY, OF ST. PAUL, MINNESOTA, A PARTNERSHIP COMPOSED OF F. J. JOHNSON AND W. O. WASHBURN.

EJECTOR FOR EXCAVATOR DIPPERS.

Application filed October 22, 1927. Serial No. 228,039.

This invention relates to an improved device operable in connection with an excavator dipper to eject or forcibly remove the material therefrom when the latter is in load-dumping position.

An object of the invention is to provide at the end of an excavator boom, an ejector which is arranged in such a manner that when the dipper is raised to a load-dumping position, and the usual trap door or bottom provided on the dipper is opened, the material may be forcibly removed therefrom, as a result of the ejector bar engaging the material as the dipper is moved upwardly.

A further object of the invention is to provide a boom having an ejector bar pivotally mounted at the outer end thereof and normally depending therefrom in a position to engage the material contained in the dipper, when the latter has been loaded and is raised to a load-dumping position, the ejector being arranged in such a manner that when the dipper is moved upwardly towards the ejector bar, the latter will engage the material and force it through the open end of the dipper.

A further object is to provide a boom having an ejector pivotally mounted at the outer end thereof, which is provided with a roller adapted to engage the usual cable which is connected with the dipper for operating the latter, and, whereby the ejector will automatically be moved to an inoperative position clear of the dipper, when the latter is moved forwardly to a load-dumping position beyond the end of the boom.

Other objects of the invention are; to provide an ejector bar particularly adapted for use on an excavator boom having a dipper arm mounted for both swinging and longitudinal movement; to provide an ejector having a pivotal connection with the boom and arranged in such a manner that when the dipper is operating in sand or gravel which may readily be discharged therefrom by gravity, the ejector bar may be swung to an inoperative position over the top of the boom; to provide means for automatically moving the ejector bar out of the way of the dipper when the latter is moved to a load-dumping position beyond the end of the boom; and, in the general construction

and arrangement of the ejector bar in connection with the boom.

Other objects of the invention will appear from the following description and accompanying drawings and will be pointed out in the annexed claims.

In the accompanying drawings there has been disclosed a structure designed to carry out the various objects of the invention, but it is to be understood that the invention is not confined to the exact features shown as various changes may be made within the scope of the claims which follow.

In the accompanying drawings forming part of this specification;

Figure 1 is a side elevation of a conventional form of excavator showing the invention applied thereto;

Figure 2 is an enlarged detailed view showing the outer end of the boom with the dipper raised to a load-dumping position at a point beyond the end of the boom, and also showing the ejector bar moved to an inoperative position;

Figure 3 is a detailed plan view of the outer end of the boom showing the dipper in load-dumping position with the ejector bar positioned to forcibly remove the material therefrom;

Figure 4 is a view similar to Figure 3, showing the material substantially removed from the dipper; and

Figure 5 is a perspective view showing the ejector bar removed from the boom.

In the selected embodiment of the invention here shown for purposes of disclosure, there is illustrated in Figure 1, an excavator of ordinary construction, comprising the usual power plant 2 mounted upon the usual turn table 3, here shown supported upon trucks 4 for the convenience of moving the excavator from place to place. The excavator is provided with the usual boom 5, having a dipper arm 6 mounted thereon and adapted for swinging and longitudinal movement. This type of arm is commonly known as the "crowding type." The dipper arm is moved longitudinally by a mechanism 7 mounted upon the boom as shown. The usual dipper 8 is shown terminally secured to the outer end of the arm 6, and is provided with the usual trap door or gate 9. The dipper is raised by means of a lift-

ing cable 10, having a running connection with the dipper by means of a sheave from which it passes upwardly over a sheave 12, terminally mounted upon the outer end of the boom 5. From this sheave, the cable leads to a suitable winding drum or mechanism, of ordinary construction, mounted in the power plant 2, which it is not thought necessary to show in the drawings.

The feature of this invention resides in the novel means provided at the end of the boom for forcibly removing the material from the dipper, when the latter is moved to a load-dumping position, and when the latter is operating in a sticky material such, for instance, as clay or gumbo. Such means consists of an ejector comprising side members 13 having their upper ends pivotally connected to the boom as, for instance, upon the pivot pin 14, supporting the sheave 12. A thrust plate 15 is secured to the lower ends of the members 13 to provide an enlarged surface adapted to engage the material contained in the dipper, as shown in Figures 3 and 4. The side members 13 are suitably braced at their lower ends by means of diagonal braces 16.

When the ejector bar is used in connection with a dipper arm of the type here shown and described, it is desirable that means be provided for moving the ejector out of the way of the dipper, when the latter is moved to a load-dumping position beyond the end of the boom. The means shown in this invention for thus moving the ejector bar out of the way of the dipper, when the latter is moved forwardly, consists of a roller 17, mounted between the side members 13 of the ejector bar, and which is supported upon a pin 18, mounted in the members 13 intermediately of the ends thereof. This roller 17 is adapted to engage the upper strand 19 of the lifting cable 10, when the dipper is moved to a load-dumping position beyond the end of the boom as shown in Figure 2. When the dipper is lowered to the position shown in Figure 1, the ejector will drop by gravity to the positions shown in Figures 3 and 4, wherein it will be noted that it is positioned in such a manner that when the dipper is raised to a load-dumping position, substantially beneath the outer end of the boom, the plate 15 at the lower end of the ejector will engage the material, and, as the dipper is moved upwardly, the material will be forcibly removed from the dipper by the ejector, as shown in Figure 4.

The pivotal connection of the ejector with the boom 5 also permits the ejector to be swung to an inoperative position over the top of the boom, as shown in Figure 1. When the ejector is in this position, the dipper may be operated in the usual manner without interference from the ejector

in any manner. Thus, it will be seen that when the dipper is operating in loose material, such as sand or gravel, which does not require means for forcibly removing the material from the dipper, the ejector may be moved to the position shown in Figure 1, thereby permitting the dipper to be operated in the usual manner without the ejector. On the other hand, when the dipper is operating in sticky material, such as clay or gumbo, the ejector may be quickly moved from the position shown in Figure 1 to that shown in Figure 3, wherein it will be noted that when the loaded dipper is moved to a load-dumping position beneath the outer end of the boom, the ejector will engage the material, and, as the dipper is further moved upwardly, after the trap door 9 has been opened, the material will be forced out of the open end of the dipper, as shown in Figure 4.

By the provision, therefore, of this novel ejector bar at the outer end of an excavator boom, the dipper may be successfully operated in practically all kinds of material of a plastic nature, and into which the dipper can be forced and loaded. As before stated, when the dipper is operating in loose free material, the ejector is not required and can be swung to its inoperative position shown in Figure 1, and, when the dipper is operating in sticky material, such as gumbo, which usually will not drop by gravity therefrom, when the trap door 9 is opened, the ejector bar may be swung to its operative position as shown in Figures 2, 3, and 4, so that it will engage the material and forcibly remove it from the dipper, when the latter is moved from the position shown in Figure 3 to that shown in Figure 4. The particular mounting of the ejector bar shown in this invention has an advantage over rigidly mounted ejector bars of this type now in use for the reason that it can be moved to an inoperative position, out of the way of the dipper, when its use is not required. Also, as a result of its pivotal connection with the boom and by the provision of the roller 17 provided thereon, it may be automatically moved out of the way of the dipper, when the latter is moved forwardly to a load-dumping position beyond the end of the boom, and, when the dipper is again lowered for loading, the ejector will return to its depending operative position, beneath the boom as shown in Figures 3 and 4.

This ejector, therefore, is particularly well adapted for use in connection with excavators employing a crowding dipper arm, or, one mounted for both swinging and longitudinal movement. In the drawings, I have shown the ejector as being pivotally supported upon the pin 14 upon which the sheave 12 is mounted. This, however, is

not essential as it may be pivotally mounted at any convenient location adjacent the end of the boom, and upon any suitable type of pivot pin, without departing from the scope of the invention, the main feature being that the ejector is pivotally mounted upon the boom and may be swung from an operative to an inoperative position, and vice versa, thus providing such a device which may be used in connection with standard excavators, employing dipper arms of the type here shown or of the type employing dipper arms which are only mounted for swinging movement.

15 In the drawings, I have also shown the outer end of the dipper arm as being operated by a single lifting cable 10. This particular operating mechanism may be varied in many ways without departing from the scope of the invention. For example, a three or five-part lifting cable may be employed or any other suitable mechanism applicable, the principal feature of the invention being, as before stated, to provide at the outer end of the boom, an ejector mounted for swinging movement and adapted to engage and remove the material from the dipper, when the latter is raised to a load-dumping position.

30 I claim as my invention:

1. The combination with a boom having an arm and a dipper movably mounted thereon, of an ejector movably mounted upon said boom and adapted to be positioned to engage and remove the material from said dipper, when the latter is raised to a load-dumping position, said movable mounting also permitting the ejector to be moved to an inoperative position.

40 2. The combination with a boom having an arm and a dipper movably mounted thereon, of an ejector pivotally mounted upon said boom and being adapted to be positioned to engage and remove the material from said dipper, when the latter is raised to a load-dumping position, said ejector also being adapted to be moved to an inoperative position out of the path of the dipper, when not in use.

50 3. The combination with a boom having an arm and a dipper movably mounted thereon, and a cable having a running connection with said boom and dipper for operating the latter, of an ejector pivotally mounted upon said boom and adapted to engage and remove the material from said dipper, when the latter is raised to a load-dumping position, and means on said ejector adapted to be engaged by said cable to move the ejector to an inoperative position, when the dipper is moved forwardly to a load-dumping position.

65 4. The combination with a boom having an arm and a dipper movably mounted thereon, and a cable having a running connection

with said boom and dipper for operating the latter, of an ejector adapted to engage and remove the material from said dipper, when the latter is raised to a load-dumping position beneath the outer end of said boom, said ejector comprising side members secured together and each having one end pivotally connected to said boom, a roller mounted between said members intermediate the ends thereof and adapted to engage said cable to move the ejector to an inoperative position, when the dipper is moved to a load-dumping position.

5. The combination with a boom having an arm and a dipper and a cable for operating said arm and dipper, of an ejector having a pivotal connection with the outer end of the boom and arranged to engage and remove the material from said dipper, when the latter is raised to a load-dumping position, said ejector comprising spaced side members, each having one end pivotally connected to said boom, a thrust plate secured to the lower ends of said side members for engaging the material in said dipper, and a roller mounted between said members and adapted to be engaged by said cable to move the ejector to an inoperative position, when the dipper is moved to a load-dumping position beyond the end of the boom.

6. The combination with a boom having an arm and a dipper movably mounted thereon and a cable having a running connection with said boom and dipper for operating the latter, of an ejector adapted to engage and remove the material from said dipper when the latter is raised to a load-dumping position beneath the outer end of said boom, said ejector comprising spaced side members suitably secured together, a roller mounted between said members intermediate the ends thereof and adapted to engage said cable to move the ejector to an inoperative position, when the dipper is moved to a load-dumping position beyond the end of said boom.

7. The combination with a boom having an arm and a dipper thereon, of a movable ejector adapted to dislodge the material in said dipper, a cable having a running connection with said boom and dipper, and means made operative through the travel of said cable for moving said ejector to a non-working position.

8. The combination with a boom having a dipper movably mounted thereon, of a cable for operating said dipper, an ejector movably supported upon the boom and adapted to dislodge the material in said dipper, and means on said ejector adapted to be engaged by said cable and to move said ejector to a non-working position.

In witness whereof, I have hereunto set my hand this 17th day of October, 1927.

HERMANN BRUNING.