G. E. TURNER.

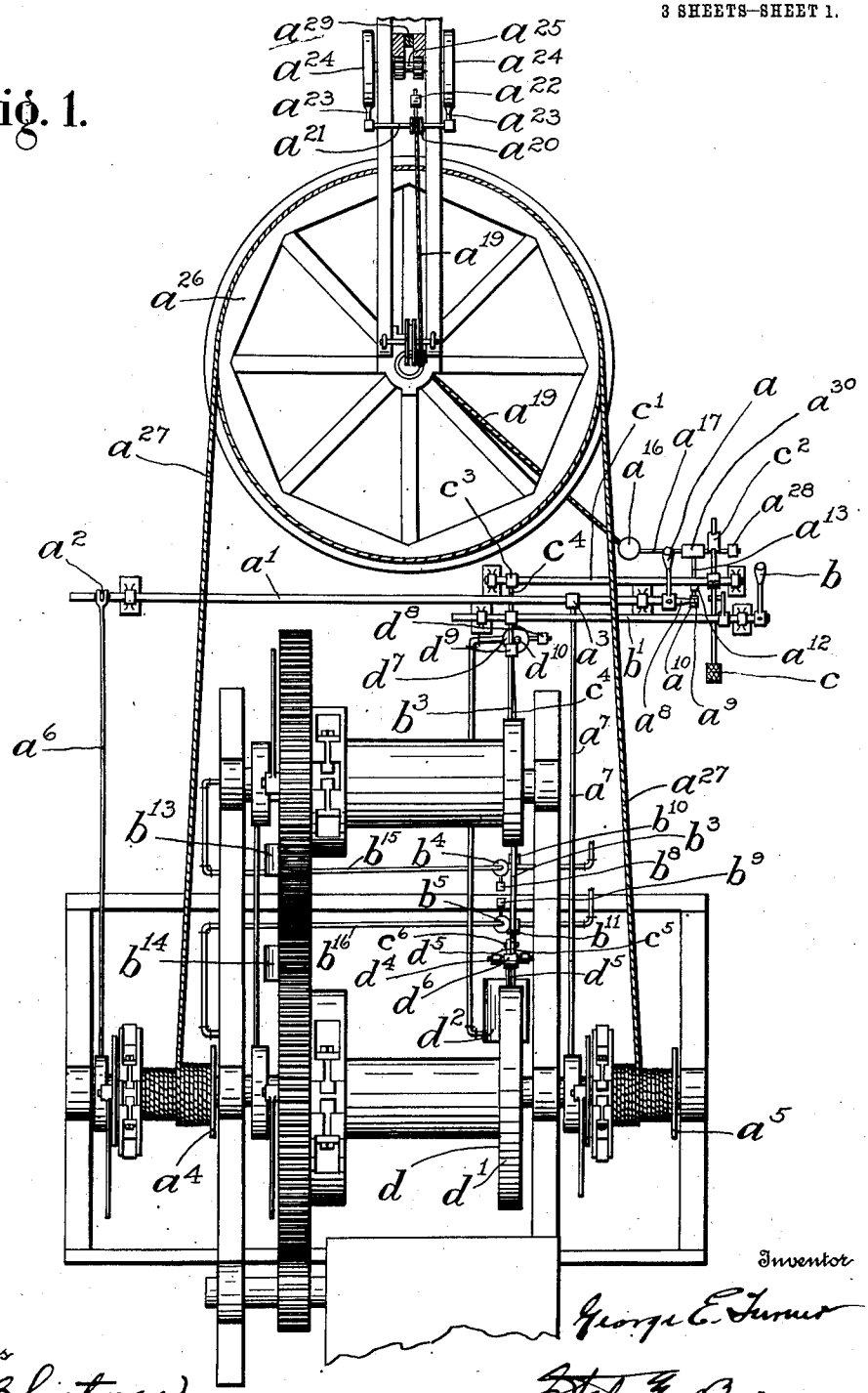
CONTROLLING MECHANISM.

APPLICATION FILED AUG. 13, 1908.

972,296. **Patented Oct. 11, 1910.**

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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3 SHEETS—SHEET 2.

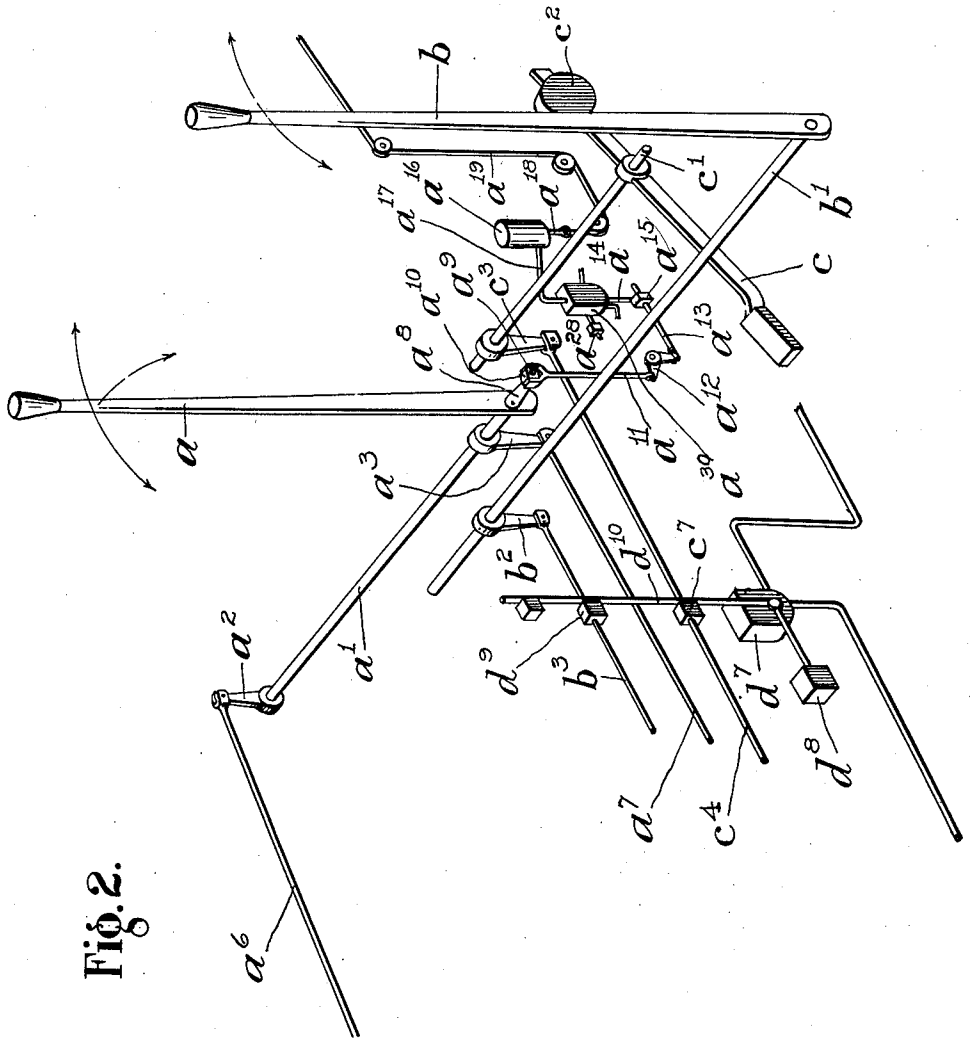

Fig. 2.

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3 SHEETS—SHEET 3.

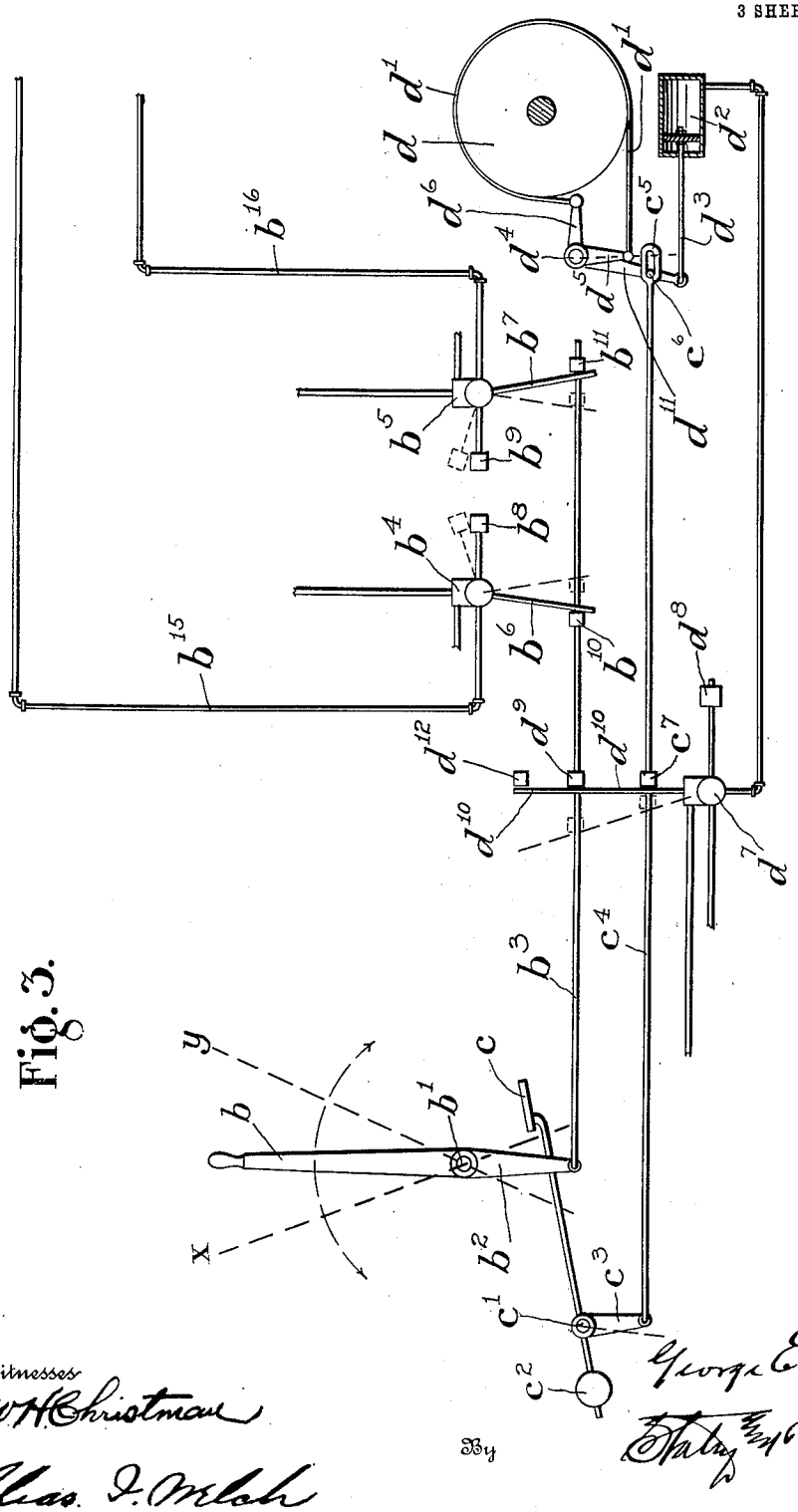

Fig. 3.

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UNITED STATES PATENT OFFICE.

GEORGE E. TURNER, OF BELLEFONTAINE, OHIO.

CONTROLLING MECHANISM.

972,296. Specification of Letters Patent. Patented Oct. 11, 1910.

Application filed August 13, 1908. Serial No. 448,444.

To all whom it may concern:

Be it known that I, GEORGE E. TURNER, a citizen of the United States, residing at Bellefontaine, in the county of Logan and State of Ohio, have invented certain new and useful Improvements in Controlling Mechanism, of which the following is a specification.

My invention relates to improvements in controlling devices for the operating mechanism of steam shovels or dredges.

The object of my invention is to simplify and increase the capacity of devices of this kind so that all the movements of the dipper and its operating mechanism may be controlled by a single operator at a central point.

A further object of my invention is to improve upon the constructions shown and described in my prior Patents No. 790,765 dated May 23, 1905 and No. 794,203 dated July 11, 1905.

My invention consists in constructions and combinations of parts hereinafter described and set forth in the claims.

In the accompanying drawings Figure 1 is a plan view of the dipper operating mechanism of a machine of the kind referred to embodying my invention. Fig. 2 is a perspective view of the controlling levers employed with some of their connecting parts. Fig. 3 is a side elevation, somewhat diagrammatic of the controlling lever for the hoisting and backing drums.

Like parts are represented by similar characters of reference in the several views.

In the said drawings a, b, and c represent the three controlling levers which are employed, a and b being hand-levers and c a foot-lever. The lever a controls the swinging of the boom and also the movement of the dipper handle through the boom, as in my former Patent No. 794,203, but in the present devices, I have changed the operation so that the brake devices will be normally set, and a movement of the lever from its normal position will be required to release them. The lever is connected to a rock-shaft a^1 having an upwardly extending arm a^2 and a downwardly extending arm a^3 which are connected to the clutches of the respective swinging drums, a^4 and a^5, through the medium of the links, a^6 and a^7, so that one movement of the lever will release one of said clutches and engage the other, and vice versa upon the opposite movement of the lever. The lever a is pivoted to the shaft, a^1, the axis of its pivotal connection being at right angles to the axis of the shaft, and said lever has a laterally extending arm, a^8, whose axis is normally coincident with that of the shaft. Said arm has a trunnion a^9 at its end on which is a loose block a^{10} which has pivoted thereto a rod, a^{11}, pivotally connected to one arm of a bell crank lever a^{12}. The other arm of this bell crank lever is pivoted to the end of a rod a^{13} which lies adjacent to a valve stem or lever a^{14} and is provided with a knocker a^{15} to engage said valve stem or lever when the rod is moved in one direction. The valve stem or lever a^{14} is connected with a suitable valve and there is provided a weight a^{28} adapted to normally hold the valve a^{30} open so that the steam or other motive power will be applied to the ram a^{16} through the connection a^{17}. The piston rod a^{18} of this ram is connected to the cable a^{19} which passes over suitable sheaves and is connected to an arm a^{20} of rock-shaft a^{21}, said rock-shaft having a counter-balance a^{22} and being connected to the friction bands a^{23} of the brake wheels a^{24} of the shipper shaft a^{25}. The movement of the lever either forward or backward from its vertical position will cause the respective swinging drums to be clutched or unclutched and thus swing the turn-table a^{26} through the medium of the cable a^{27}. The lateral movement of the lever will operate the valve of the ram to cause the same to release the brake wheels of the shipper shaft to permit the movement of the dipper handle a^{29}, which may be easily controlled by the operator applying the brakes with more or less pressure, as will be understood. It will thus be seen that the operator can with one hand control the swinging drums for the boom and also control the movement of the dipper handle through the boom.

The backing and hoisting lever b is connected to the shaft b^1, which shaft is provided with a downwardly extending arm b^2 having pivoted thereto a rod b^3, which rod is adapted upon the movement of the lever in either direction from the vertical, to op-

erate the valves of the operating rams for the clutches of the backing and hoisting drums respectively.

b^4 represents the valve which controls the backing drum ram b^{13} and b^5 the valve for the hoisting drum ram, b^{14}, pipes b^{15} and b^{16} connecting the respective valves with these rams. These valves are provided with extending valve stems or levers, b^6 b^7, respectively which are provided with weights, b^8 b^9, to hold the valves normally in a closed position. Located on the rod b^3 are knockers, b^{10} b^{11}. The valve stems or levers, b^6 b^7, are adapted to lie in the path of movement of the knockers which knockers normally stand adjacent to these stems or levers when the valves are closed as shown in full lines in Fig. 3. When the operating lever b is in its normal vertical position therefore, both of the valves will be closed and the clutches of the respective drums therefor disengaged. When the lever is thrown to a backing position, which would be to the dotted line position represented by x in Fig. 3, it will be seen that the knocker contacting the valve stem or lever b^6 will open the valve for the backing drum ram and permit and cause that drum to become engaged with its clutch. When the lever is thrown to the other dotted line position represented by y in Fig. 3, the knocker b^{11} contacting the valve stem or lever b^7 will open the valve b^5 and at the same time the knocker b^{10}, moving away from the valve stem or lever b^6 will permit the weight b^8 to close the valve b^4 of the backing drum ram. Upon the opening of the valve b^5, the clutch for the hoisting drum will become engaged therewith through the operation of the ram connected therewith.

d is the usual brake wheel connected to the hoisting drum for controlling the descent of the dipper when the hoisting drum is released, d^1 representing the usual friction band used in connection with this type of brake. The band d^1 of this brake is normally kept tightened on the brake wheel by a steam or water ram d^2, the piston rod d^3 of which is connected to said band through the medium of the crank d^{11}, rock-shaft d^4 and arms, d^5 d^6, connected therewith as shown. The valve d^7 which controls this ram is normally kept open by the weight d^8 so that as before stated the brake for the hoisting drum will normally be on.

I have provided means for releasing this brake when the operating lever b is moved to a hoisting position or to the position which will cause the clutch for the hoisting drum to be engaged therewith and the clutch for the backing drum to become disengaged. Located on the rod b^3 is a knocker d^9 and connected to the valve d^7 is an extended stem or lever d^{10} which lies in the path of movement of the knocker d^9; this knocker d^9 being adapted to lie adjacent to said stem d^{10} when the lever b is in its normal vertical position d^{12} being the stop for the stem d^{10}. When however, the lever b is moved to a hoisting position the knocker d^9, contacting the stem or lever d^{10} will close the valve d^7 and permit the brake of the hoisting drum to be released, so that the operation of hoisting may be performed. When it is desired to back, upon the throwing of the lever b in a backing position to release the hoisting drum clutch and engage the backing drum clutch, as before described, it will be seen that the valve d^7 will be permitted to again open under the influence of the weight d^8 and the hoisting drum brake again set. To now release and control this brake so that the dipper may be dropped, I have provided a foot-lever c, which lever is designed upon being depressed by the foot of the operator to release the power which is applied to the brake and at the same time connect the foot-lever to this brake. The foot-lever c is connected to the shaft c^1 and has a weight c^2 adapted to normally hold it in inoperative position. The shaft c^1 has a downwardly projecting arm c^3 to which is connected a rod c^4 having at the end thereof a slotted portion c^5 into which extends a pin c^6 which projects laterally from the crank d^{11} of the brake mechanism. The rod c^4 also has a knocker c^7, into the path of movement of which the valve stem or lever extends; this knocker being adapted to normally lie adjacent to said valve stem or lever d^{10} when the valve d^7 is in its normally open position. As the foot-lever is depressed the knocker c^7 contacting the valve stem or lever d^{10}, it will be seen will close the valve d^7 and thus release the power applied to the brake, and at the same time the end of the slotted portion c^5 contacting the pin c^6 will keep the brake band d^1 tightened to the wheel d and then the operator by different degrees of pressure upon the foot-lever c can readily control the descent of the dipper.

The complete operation of the controlling device thus described would be as follows: Starting with the dipper in the bottom of the ditch, with both hand levers in their vertical normal positions and with the foot-lever also in its raised normal position, the dipper handle being thus held in the boom by the power brake, by moving the lever b to a hoisting position the power brake on the hoisting drum would be released, causing the dipper to be hoisted for the purpose of filling it. As soon as the dipper leaves the bottom of the ditch it may be quickly run out or forward through the boom in order to give to it the greatest maximum reach of the dipper handle by tilting the lever a laterally to release the power brake

of the dipper handle at the boom. After the dipper handle has run forward through the boom a sufficient distance, by throwing the lever *a* back to its vertical position again the power brake will be again applied. As soon as the dipper has been hoisted sufficiently the lever *b* will be thrown to its normal vertical position thus unclutching the hoisting drum and permitting the power brake to be applied to said hoisting drum to hold the dipper in its hoisted position. By operating the swinging lever *a* in either direction the dipper may be swung around to its proper dumping position so that the dipper can be dumped in the usual way. By operating the various levers described the dipper may be swung back over the ditch again and the lever *b* thrown to a backing position so as to throw the backing drum into engagement with its clutch. Then by pressing the foot-lever the power brake on the hoist drum will be disengaged and the foot brake applied thereto so that the operator may control the descent of the dipper in the manner before described.

Having thus described my invention, I claim:

1. In a mechanism of the character described, operating devices, a controlling lever therefor, a power operated brake for said operating devices, said controlling lever being adapted to release said power brake when in one position of its movement, and a second lever for releasing said power brake in the other position of said controlling lever, and for applying a manually operated brake to said operating devices, substantially as specified.

2. In a mechanism of the character described, operating devices, a controlling lever therefor, a brake for said operating devices, the movement of said controlling lever in one direction being adapted to release said power brake and the movement of said lever in opposite direction being adapted to set said power brake, and a second lever for controlling said power brake when set by said controlling lever, said second lever being also adapted to set in operation, a manually operated brake for said operating device, substantially as specified.

3. In a mechanism of the character described, operating devices, a controlling lever for said operating devices, a normally set power brake, means connected with said controlling lever for releasing said power brake in one position of said controlling lever, a second lever and means connected with said second lever for releasing said power brake in the other position of said controlling lever and for applying a manually operated brake, controlled by said second lever, to said operating device, substantially as specified.

4. In a mechanism of the character described, hoisting devices, a power brake therefor, a controlling lever for said hoisting device adapted to release said power brake when thrown to hoisting position, and a second lever for releasing said power brake and applying a manually operated brake to said hoisting device when said controlling lever is thrown to backing position, substantially as specified.

5. In a mechanism of the character described, a hoisting device, a normally set power brake therefor, a controlling lever for said hoisting device adapted to release said power brake when thrown to hoisting position, and a second lever for releasing said power brake and applying a manually operated brake to said hoisting device in the backing position of said controlling lever, substantially as specified.

6. In a mechanism of the character described, a hoisting device, a normally set power brake therefor, a controlling lever for said hoisting device, means connected with said controlling lever for releasing said power brake when thrown to hoisting position and for permitting said power brake to be applied to said hoisting device when thrown to backing position, and a second lever for releasing said power brake and applying a manually operated brake to said hoisting device in the backing position of said controlling lever, substantially as specified.

7. In a mechanism of the character described, two winding drums, a controlling lever adapted to alternately engage and disengage said drums, a power brake for one of said drums, means connected with said controlling lever for setting said power brake in one position and for releasing said power brake in its other position, a second lever, and means connected with said second lever for releasing and for applying a manually operated brake to said drum when the other drum is engaged by movement of said controlling lever, substantially as specified.

8. In a mechanism of the character described, two winding drums, a controlling lever adapted to alternately throw into engagement and disengagement each of said drums with their driving mechanism, a normally set power brake for one of said drums adapted to be released by said controlling lever when said drum is thrown into engagement thereby, and a second lever adapted to release said power brake and set a manually operated brake on said drum when the other drum is thrown into engagement by said controlling lever, substantially as specified.

9. In a mechanism of the character described, a hoisting drum and a backing drum and their driving mechanism, a power brake

for said hoisting drum, a controlling lever for alternately engaging and disengaging each of said drums with said driving mechanism, connections between said controlling lever and said power brake for releasing the same when said hoisting drum is thrown into engagement and for setting the same when said backing drum is thrown into engagement, and a second lever for releasing said power brake when said backing drum has been thrown into engagement by said controlling lever and for applying a manually operated brake to said hoisting drum, substantially as specified.

10. In a machine of the character described, a hoisting drum and a backing drum, a normally set power brake for said hoisting drum, a controlling lever for alternately engaging and disengaging each of said drums with their driving mechanism, connections between said controlling lever and said power brake for releasing the same when said hoisting drum is thrown into engagement thereby, and a second lever for releasing said power brake when said backing drum has been thrown into engagement by said controlling lever and for applying a manually operated brake to said hoisting drum, substantially as specified.

11. In a machine of the character described, a boom, a dipper having a handle movable through said boom, boom-swinging devices and a controlling device for said dipper handle, a lever for controlling said boom-swinging devices and said dipper handle controlling device, hoisting devices for said dipper, a power brake and also a manually operated brake for said hoisting device, a second lever for controlling said hoisting devices and said power brake and a third lever for controlling said power brake and also said manually operated brake, substantially as and for the purpose specified.

12. In a machine of the character described, boom-swinging devices, dipper hoisting and backing devices, a dipper-handle controlling device, said dipper backing and hoisting devices comprising a power brake and a manually operated brake a lever for controlling said boom-swinging device and said dipper handle controlling device, a second lever for controlling said hoisting and backing devices and their power brake, a third lever for controlling both of said brakes, substantially as specified.

13. In a machine of the character described, boom-swinging devices, dipper hoisting devices, a dipper handle controlling device, a normally set power brake and a manually operated brake for said hoisting devices, a lever for controlling said boom-swinging devices and said dipper-handle controlling devices, a second lever for controlling said hoisting devices and their power-brake, and a third lever for controlling the power brake and the manually operated brake of said hoisting device, substantially as specified.

14. In a machine of the character described, boom-swinging devices, a dipper hoisting drum and a dipper backing drum, a normally set power brake and a manually operated brake for said hoisting drum, a lever for controlling said boom swinging devices, and also said dipper handle controlling devices, a second lever for alternately engaging and disengaging said hoisting and backing drums with their driving mechanism, connections with said second lever for releasing the power brake from said hoisting drum when said lever is thrown to hoisting position, and a third lever for releasing said power brake from said hoisting drum when said second lever is thrown to backing position, and at the same time applying the manually operated brake to said hoisting drum, substantially as specified.

15. In a machine of the character described, two winding drums, power operated means for alternately engaging and disengaging said drums with their controlling mechanism, a controlling lever for said power operated means, a power brake and a manually operated brake for one of said drums, connections from said lever to said power brake for releasing the same when said drum is thrown into engagement, and a second lever having a connection to said brakes for releasing said power brake from said drum when the other drum is thrown into engagement and for applying the manually operated brake thereto, substantially as specified.

16. In a machine of the character described, two winding drums, a brake for one of said drums, said brake having power operating devices connected therewith, a lever for alternately engaging and disengaging said drums with their driving mechanism a connection from said lever to the power operating devices of the brake to release said brake when its drum is thrown into engagement, and a second lever having a connection to said power operating means of the brake and also to the brake itself to release the power operating means from said brake when the free drum has been thrown into engagement and for operating said drum by manual power, substantially as specified.

In testimony whereof, I have hereunto set my hand this 26th day of October, 1907.

GEORGE E. TURNER.

Witnesses:

MARY WALL,

CHAS. I. WELCH.