

W. P. BETTENDORF, DEC'D.
J. W. BETTENDORF, ADMINISTRATOR.
FEEDING MECHANISM FOR HYDRAULIC PRESSES.
APPLICATION FILED OCT. 25, 1909.

1,021,501.

Patented Mar. 26, 1912.

5 SHEETS—SHEET 1.

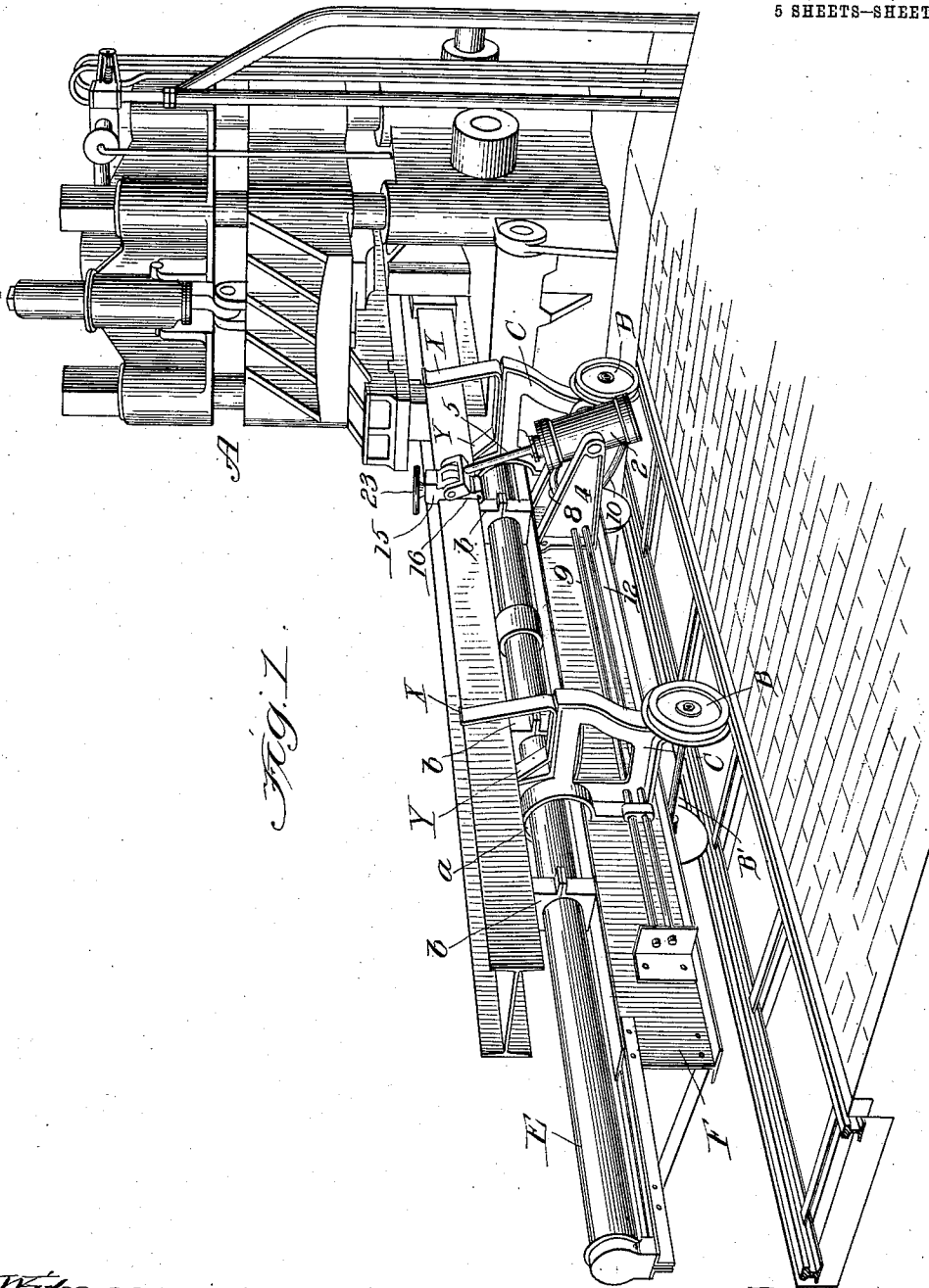


Fig. 1.

Witnesses:
Harry S. Gaither
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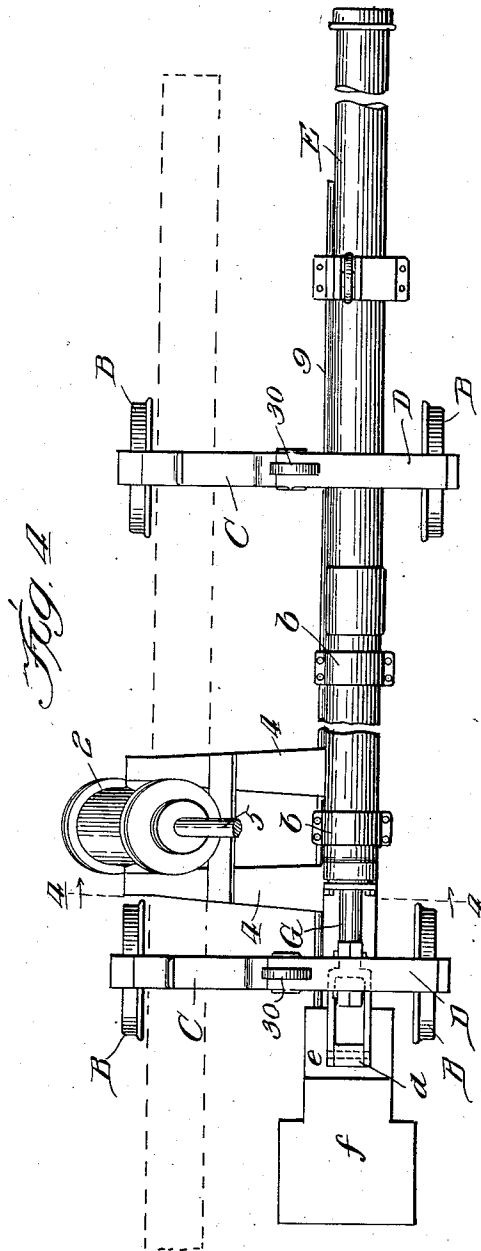
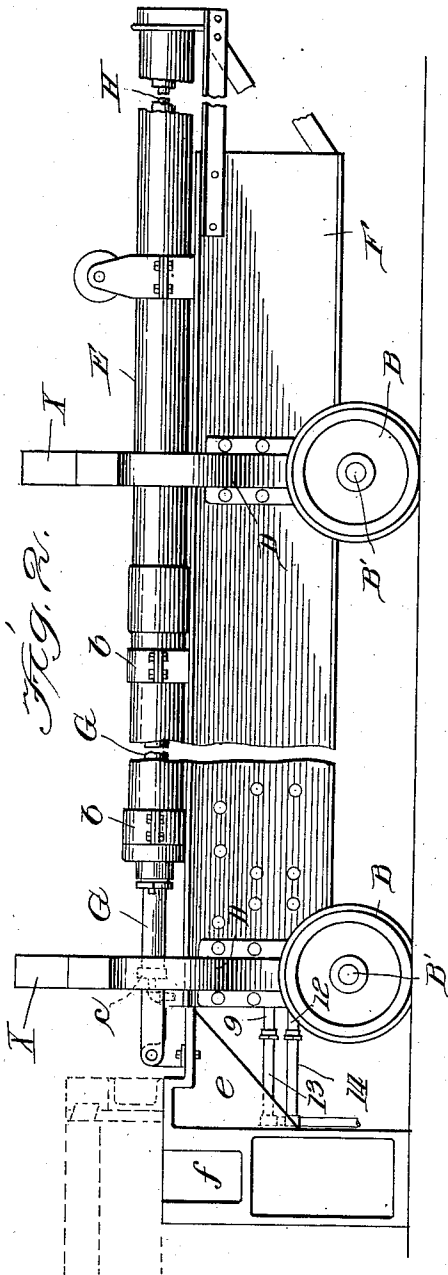
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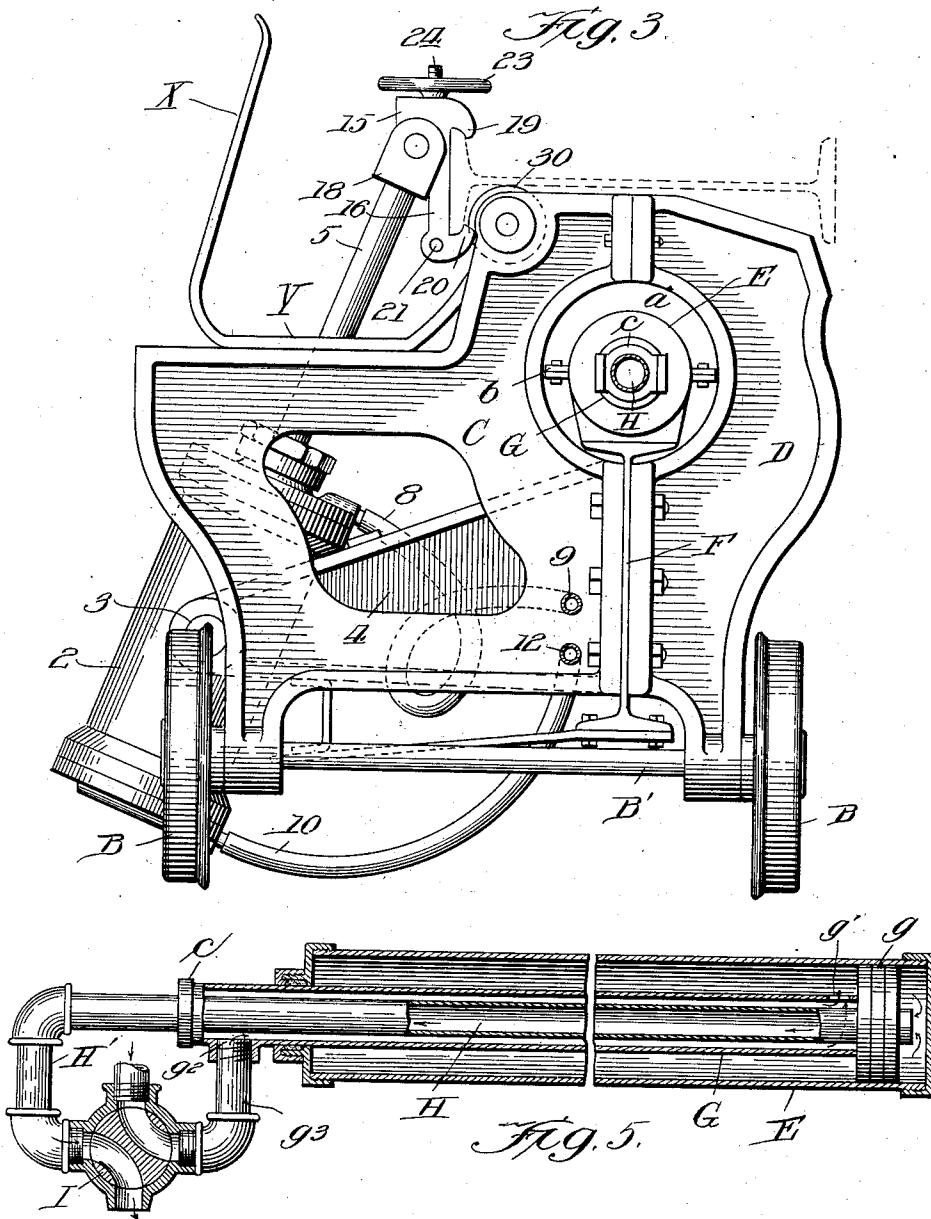
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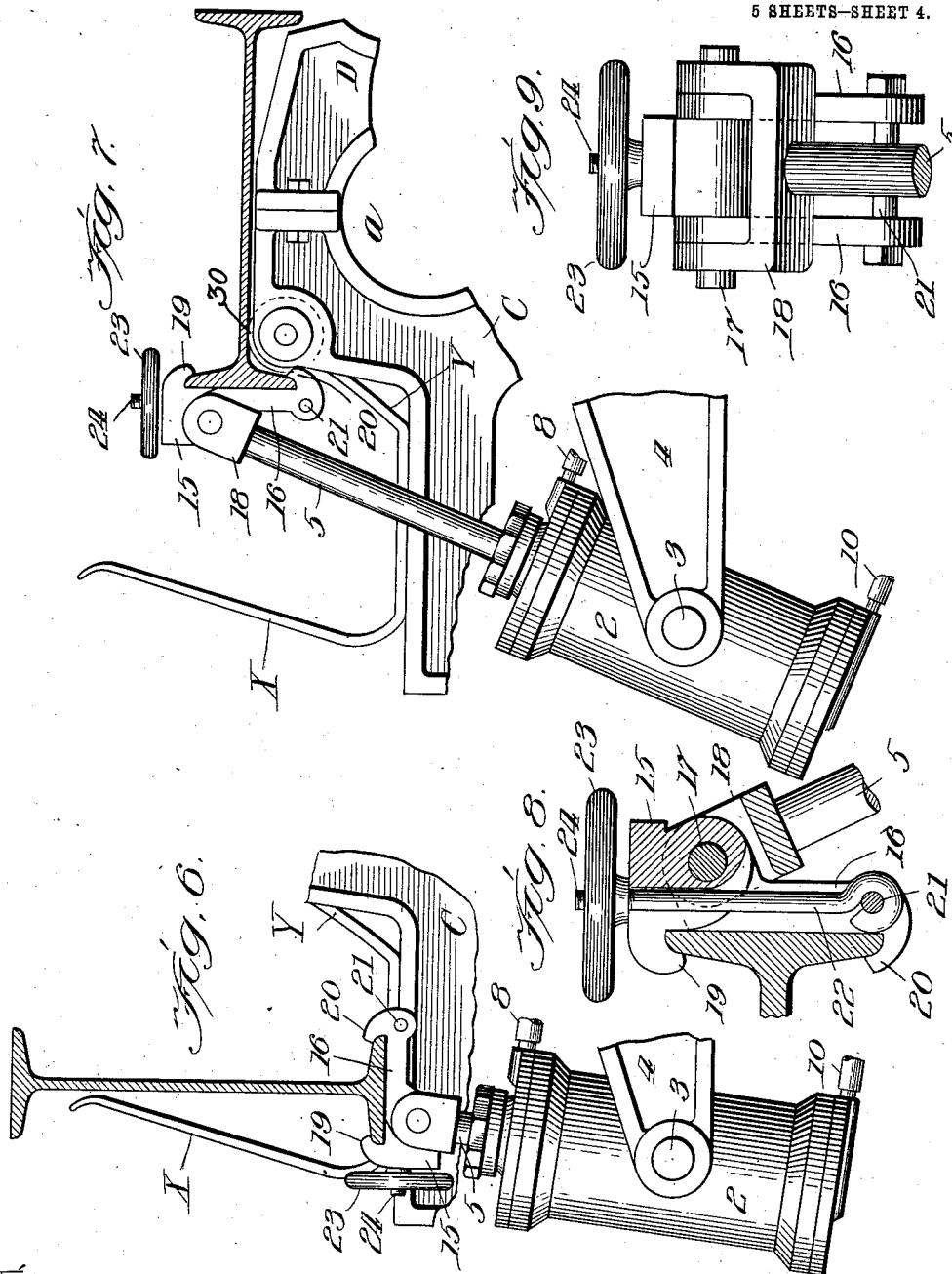
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5 SHEETS—SHEET 4.



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5 SHEETS—SHEET 5.

Fig. 10.

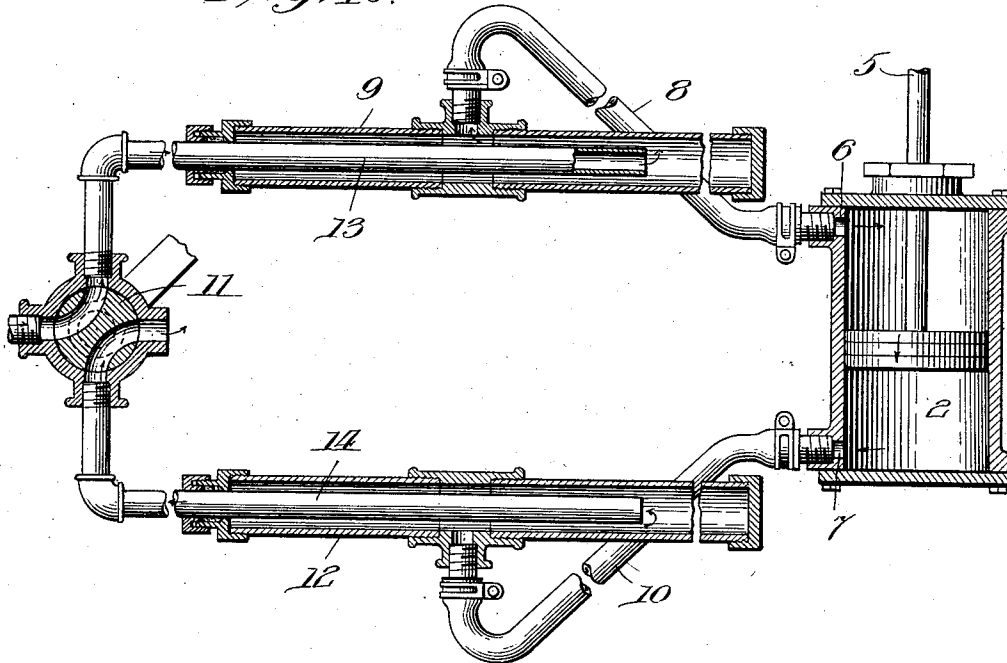


Fig. 11.

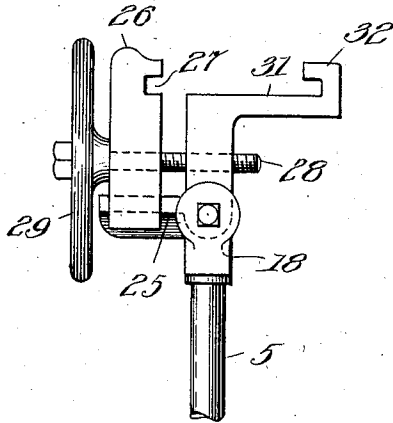
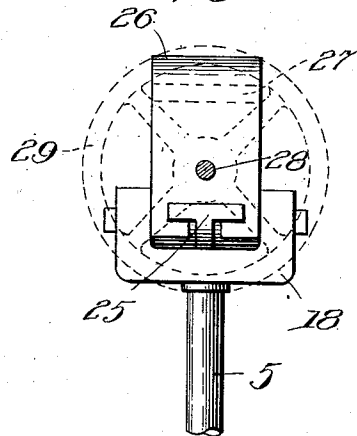


Fig. 12.



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UNITED STATES PATENT OFFICE.

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FEEDING MECHANISM FOR HYDRAULIC PRESSES.

1,021,501.

Specification of Letters Patent.

Patented Mar. 26, 1912.

Application filed October 25, 1909. Serial No. 524,467.

To all whom it may concern:

Be it known that I, WILLIAM P. BETTENDORF, a citizen of the United States, residing at Davenport, in the county of Scott and State of Iowa, have invented new and useful Improvements in Feeding Mechanism for Hydraulic Presses, of which the following is a full, clear, and exact description.

My invention relates to carriages or trucks for feeding heavy work to metal working machines and more particularly for feeding rolled metal beams to hydraulic presses.

The objects of my invention are to entirely avoid the expense incident to the manual handling of this kind of work; to enable the operator to manipulate the work and control the feed thereof to the press, entirely from his station alongside the machine, and to avoid the dragging back and forth of the hose connections of the pneumatic devices used, and the rapid wearing out of the same. These and other important objects I accomplish by the means hereinafter fully described and as particularly pointed out in the claims.

In the drawings:—Figure 1 is a side elevation of a hydraulic press showing my improvements used in connection therewith. Fig. 2 is an enlarged side elevation of my invention showing the central portion thereof broken away. Fig. 3 is an end view of the same. Fig. 4 is a plan view thereof. Fig. 5 is a detail view showing, in section, the pneumatic means for reciprocating the carriage. Figs. 6 and 7 are transverse vertical sections taken on line 4—4, Fig. 4, illustrating the positions assumed by the "flipper" or pneumatic device employed to turn the work. Figs. 8 and 9 are detail views of the grapple used in connection with said "flipper." Fig. 10 is a diagrammatical view showing, in section, the pneumatic means for actuating the piston in the cylinder of the "flipper." Figs. 11 and 12 are detail views showing a side elevation, and an edge elevation of a modified construction of the grapple of the "flipper."

In the drawings A represents a hydraulic press, the construction of which it is unnecessary to explain in detail. It is sufficient to call attention to the fact that it comprises an upper and a lower die, and that the upper die is carried on the lower end of a hydraulic ram which is adapted to move downward, and, in conjunction with the

lower die, punch, cut and shape a metal I-beam according as desired. Beams of the kind shown in dotted lines in Fig. 4 of the drawings will weigh 4800 pounds. The cost of carrying this work to the press by manual labor would make the cost of the finished product prohibitive, so my invention is adapted to take the place of manual labor and to place the manipulation of the same practically within the entire control of the operator of the press and his helper. With this end in view a track is laid that extends longitudinally from one end of the press, in the direction of the length of the die, and upon this track is placed a truck or carriage the travel of which away from the press is limited by the length of the air-cylinder used in moving the same longitudinally, or otherwise. This truck consists of four wheels, B, B, that are mounted on the ends of suitable axles, B', journaled in bearings depending down from, and preferably made integral with the lower ends of the sections C and D of the transverse bolsters, located at each end of the truck. Sections C, C, of said bolsters are much wider than sections D, D, and both sections have their adjacent vertical edges flanged, and, near the upper edge thereof are provided with semi-circular recesses which, when the sections are connected together form a circular opening *a* for the passage of the pneumatic cylinder E, used in connection with the pneumatic means for reciprocating the truck, as will hereinafter be more fully described. Above this opening *a* the flanged edges of these sections are bolted directly to each other, but below the same the web of the ends of the I-beam reach, F, connecting the forward with the rear bolster of the truck is placed between the flanged edges of said section and secured thereto by the same bolts used to clamp the flanges of the lower portion of the meeting edges of said sections together. As thus secured, the upper flanged edge of said I-beam reach enters the lower portion of opening *a*, and the lower flanged edges thereof are below the lower edges of said sections. Cylinder E is secured to the upper flanges of the reach F by means of straps *b, b*, or by any other suitable means. The forward end of this cylinder terminates near the forward bolster but the rear end extends beyond the rear bolster some distance and said cylinder is provided

with a hollow piston G, the outer forward end of which has a head *c* having longitudinally extending arms secured thereto, the extremities of which pass on each side of and are pivotally connected to lug *d* fastened upon and arising from the horizontal platform of a bracket *e*, which latter is secured to and projects from a column *f* located at one end of the hydraulic press and designed, among other things, to support the adjacent overhanging end of the lower die, particularly when the lengths of said die are such that its ends extend beyond the end of the bed of the press.

A piston-head *g* is secured to the inner end of the piston G, which latter is provided with a port *g'* near said head, and is also provided with a port *g''* near its outer end, that is connected by a pipe *g'''* to a suitable source of pneumatic pressure. Extending longitudinally through piston G is a tube H, one end of which extends through the piston-head, and the opposite end of which extends out through head *c* of the outer end of the piston. The outer end of this tube H is connected by a pipe H' to a suitable source of air-pressure, and pipe H' and pipe *g'''* are connected to a four-way valve, I, on the end of a compressed air-supply-pipe, which is controlled by the operator alongside of the press. When it is desired to cause the truck to move toward the press, the valve is manipulated so that compressed air is admitted through port *g''* into the piston, from whence it issues into the cylinder between said piston-head and its forward end, and as said piston is stationary, causes said cylinder and the truck to which it is attached to move toward the press, during which movement the air will exhaust from in front of the opposite side of the piston-head through tube H, pipe H' and its connections. When it is desired to move the truck away from the press, the compressed air is admitted into the outer end of tube H, from whence it enters the rear end of the cylinder back of the piston-head and causes said cylinder and truck to move away from the press, the air on the forward side of the piston-head exhausting from the cylinder through port *g'* and out of port *g''*.

The upper flanged edge of sections C and C, of the bolsters are in a horizontal plane above the cylinder opening *a*, and extend from the vertical meeting edges of the sections a distance less than one-half of the height of the web of the I-beams it is desired to manipulate, and then the edges of said sections C, C, are stepped downward to a horizontal plane intersecting cylinder E about the horizontal plane of the upper segment of the tube H.

When it is desired to place the I-beam upright, it is turned so that its web will be in a vertical plane, and its lower flanges rest

upon the upper edges of sections C, and when it is desired to place said beam in a horizontal position, it is turned so that its web rests upon the top edges of said sections above said shoulder. In order to hold said beam in an upright position, or, in a horizontal position, according as desired, and to turn the same from the former to the latter, I have provided devices commonly known as a "flipper". This consists of a cylinder 2, having trunnions 3, 3, about its center of length, that are journaled in bearings in the outer ends of suitably shaped brackets 4, 4, which latter are secured to and project laterally from the web of the reach F, just back of the forward bolsters. The position of the cylinder is such that its upper end is below the plane of the lower horizontal portion of the top edges of sections C, and it is provided with a piston, 5, whose upper end has a suitable grappling device securely mounted thereon, as will hereinafter be more fully described. The piston is provided with a piston-head on its inner end, and in order to actuate it, both the upper end and the lower end of the cylinder have a port, 6, 7, therein, respectively. A flexible pipe, 8, connects the upper port, 6, with a longitudinally disposed compressed air-tube 9, and a flexible pipe 10, connects the lower port 7, with a similarly disposed compressed-air tube 12. Tubes 9 and 12, are, preferably, secured by means of suitable brackets to the web of the reach, and extend from end to end of the truck, through sections C. The forward ends of tubes 9 and 12, are provided with heads having packed guide-openings for the passage therethrough of telescoping stationary pipes 13 and 14, respectively, which latter extend longitudinally toward the press and at a convenient point are connected to a four-way valve, 11, by means of which compressed-air may be supplied to one pipe, 13, and from thence to tube 9, in transit to the top of the cylinder, and the air exhausted from the opposite end of the cylinder through flexible pipe 10, tube 12, and pipe 14, or vice versa, regardless of the direction in which the truck is moving.

The grapple on the upper end of piston, 5, consists of two members, 15 and 16, each of which is pivoted at one end to a transverse bolt 17 suitably secured in the ends of corresponding ears of a boss 18 which is secured to the end of said piston 5. Member 15 is provided with an overhanging or hooked edge 19, farthest from its pivot, and the channel made by said hook is adapted to fit over and embrace the edge of the adjacent lower flange of the I-beam it is particularly designed to hold. Member 16 is considerably longer than the member 15, and, preferably comprises two link-shaped parts, the end of which farthest from its pivot is pro-

vided with L-shaped or hook-shaped fingers 20 which, when the grapple is in operation, are adapted to fit over and embrace the longitudinal edges of the flange opposite that embraced by the edge of member 15. The 5 knuckles of the hook-shaped fingers, 20, of member 16, are connected by a transverse bolt 21, and this bolt, between the link-shaped parts of said member 16, has the eye 10 on the end of a bolt 22 surrounding the same. The barrel of this bolt extends out through a suitable opening in the center of member 15, in a plane which will be parallel to the base of the beam, and has a wheel-shaped 15 nut 23, on its screw-threaded end, 24, by tightening which the hooked ends of the said member grasps and firmly holds the adjacent flanged edge of the beam between them. When this grappling device has been attached to the basal flanges of the beam, and piston 5 is at the limit of its downward stroke, the said beam will be securely held in an upright position on the truck as it advances to the press, while being operated 25 upon in said press, and while being withdrawn from the same. Of course, it will be understood that the construction of the lower die will greatly contribute toward holding the beam against any independent 30 movement while being operated upon, but this result is greatly aided by the grapple.

When it is desired to turn the beam, as, for instance, when it is desired to punch or cut or shape the web thereof, the compressed 35 air is permitted to enter the lower end of the cylinder and the piston 5 moves upward and pushes and raises the beam upward at such an angle that it tilts over onto the transverse friction roller, 30, journaled in the recess in the upper angle of the shoulder of the 40 bolster, and assumes a horizontal position and rests upon the upper horizontal edge of section C above the shoulder, in which position, if desired, the grapple may be removed, 45 and an overhead crane utilized to remove the beam from the truck. If desired, the beam, when disposed upon the truck may be placed horizontally upon the upper edges C of the bolsters, in the position hereinbefore explained, and then the grapple be attached 50 thereto and the I-beam drawn down into the vertical position.

In Figs. 11 and 12 I show a modified construction of the means carried by the upper 55 end of the piston for grasping the lower flanges of the I-beam. This consists of a clamping member 31 which, looking at it from the front end of the truck, is Z-shaped, and is pivoted at about its lower angle between the arms of the head 18 secured to 60 the upper end of the piston. The end of the upper horizontal part of this member, 31, is flanged upward and backward to provide an inverted L-shaped flange 32, and the upper 65 surface of its lower horizontal part is

provided with a longitudinal central T-shaped tenon, 25. The other member, 26, consists simply of a straight jaw the lower edge of which is provided with a T-shaped groove that engages the T-shaped tenon, 25. In the 70 plane of the upper surface of the upper part of member 31, member 26, is provided with a transverse groove 27, which is complementary to the channel produced by the overhanging flange 32, and is designed to embrace the longitudinal edge of the flange of the I-beam 75 opposite that embraced by the flange 32. Member 26 is adjusted to and from member 31 by means of a screw 28, whose outer end is, preferably, provided with a hand-wheel 29 and whose barrel passes through member 26 into a tapped opening at right angles to the opposing surface of the central vertical 80 portion of member 31.

What I claim as new is:—

1. Means for feeding heavy work to machines, consisting of a suitable truck, a longitudinally disposed cylinder, means constituting a part of said truck to which said cylinder is secured, a stationary piston and piston-head therefor within the piston and means for alternately supplying the actuating gas or fluid on one side of said head and simultaneously exhausting it from the other and vice versa. 85 90 95

2. Means for feeding heavy work to machines, comprising a suitable truck, a longitudinally disposed cylinder, means constituting a part of said truck to which said cylinder is secured, a stationary hollow piston, having a port near its outer end and a port near its inner end, a piston-head secured on and closing the inner end of said hollow piston, and a hollow tube extending 100 through said piston to which it is closed and through the piston-head, and means for supplying the actuating gas or fluid through said piston to one side of said piston-head, and exhausting it from the other side through said tube and vice versa. 105 110

3. A truck for feeding heavy work to machines comprising wheels, bolsters, and a reach for connecting said bolsters, in combination with a longitudinally disposed cylinder, means constituting a part of said truck to which said cylinder is secured, a stationary piston and piston-head within said cylinder, means for supplying the actuating fluid on one side of said piston-head and exhausting it from the other and devices for 115 retaining the work on said truck in a horizontal or vertical position. 120

4. A truck for feeding heavy work to machines comprising wheels, bolsters, and a reach for connecting said bolsters, in combination with a longitudinally disposed cylinder, means constituting a part of said truck to which said cylinder is secured, a stationary piston and piston-head within said cylinder, means for supplying the actuating 125 130

fluid on one side of said piston-head and exhausting it from the other and pneumatically actuated devices for retaining the work on said truck in a horizontal or vertical position.

5. A truck for feeding heavy work to machines comprising wheels, bolsters, and a reach for connecting said bolsters, in combination with a longitudinally disposed cylinder, means constituting a part of said truck to which said cylinder is secured, a stationary piston and piston-head within said cylinder, means for supplying the actuating fluid on one side of said piston-head and exhausting it from the other, a rocking-cylinder carried by said truck, a piston reciprocable therein, devices secured to the outer end of said piston for moving the work transversely and retaining the work in the positions to which it has been moved, longitudinally disposed pipes secured to said truck and stationary pipes telescoping into the same for supplying the motive fluid to one end of said cylinder and exhausting the said fluid from the opposite end thereof.

6. A truck for feeding heavy work to machines comprising wheels, bolsters, and a reach for connecting said bolsters, in combination with a longitudinally disposed cylinder, means constituting a part of said truck to which said cylinder is secured, a stationary piston and piston-head within said cylinder, means for supplying the actuating fluid on one side of said piston-head and exhausting it from the other, a rocking-cylinder carried by said truck, a piston reciprocable therein, devices secured to the outer end of said piston for moving the work transversely and retaining the work in the positions to which it has been moved, longitudinally disposed pipes secured to said truck and stationary pipes telescoping into the same, and flexible means connecting the former to the cylinder for supplying the motive fluid to one end of said cylinder and exhausting the said fluid from the opposite end thereof.

7. A truck for feeding heavy work to machines comprising wheels, bolsters, and a reach to which said bolsters are secured, in combination with a longitudinally disposed cylinder permanently secured to said truck against movement relative thereto in the direction of length of travel thereof, means constituting a part of said truck by which said cylinder is secured, a piston attached at its outer end to stationary means independent of the truck, a piston-head within said cylinder, means independent of said truck for supplying the actuating element on one side of said piston-head and exhausting it from the other, and transversely arranged pneumatically actuated devices carried by

said truck for moving and for retaining the work on the same in the horizontal or vertical position to which it has been moved.

8. A truck for feeding heavy work to machines comprising wheels, bolsters, and a reach to which said bolsters are secured, in combination with a longitudinally disposed cylinder permanently secured to said truck against movement relative thereto in the direction of length of travel thereof, means constituting a part of said truck by which said cylinder is secured, a piston attached at its outer end to stationary means independent of said truck, a piston-head within said cylinder, means independent of said truck for supplying the actuating element on one side of said piston-head and exhausting it from the other, and transversely arranged pneumatically actuated devices carried by said truck located below the support of the work for moving and for retaining the work on the same in the horizontal or vertical position to which it has been moved.

9. A truck for feeding heavy work to machines comprising bolsters having a stepped upper edge that has an upper and lower horizontally disposed portion, a reach connecting said bolsters, pneumatic means including a cylinder secured to and forming a part of the truck, and a stationary tube that coöperates with said cylinder, devices for moving said work laterally into a vertical or horizontal position upon the upper edge of said bolsters, longitudinal pipes carried by and movable with said trucks and stationary pipes attached at their outer ends to stationary means independent of the truck for pneumatically actuating said devices.

10. A truck for feeding heavy work to machines comprising bolsters consisting of two sections having a stepped upper edge that has an upper and lower horizontally disposed portion, an I-beam reach connecting said bolsters, pneumatic means including a cylinder secured to and forming a part of the truck, and a stationary tube that coöperates with said cylinder, devices for moving said work laterally into a vertical or horizontal position upon the upper edge of said bolsters, longitudinal pipes carried by and movable with said trucks and stationary pipes attached at their outer ends to stationary means independent of the truck for pneumatically actuating said devices.

In witness whereof I have hereunto set my hand this 16th day of October 1909.

WILLIAM P. BETTENDORF.

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