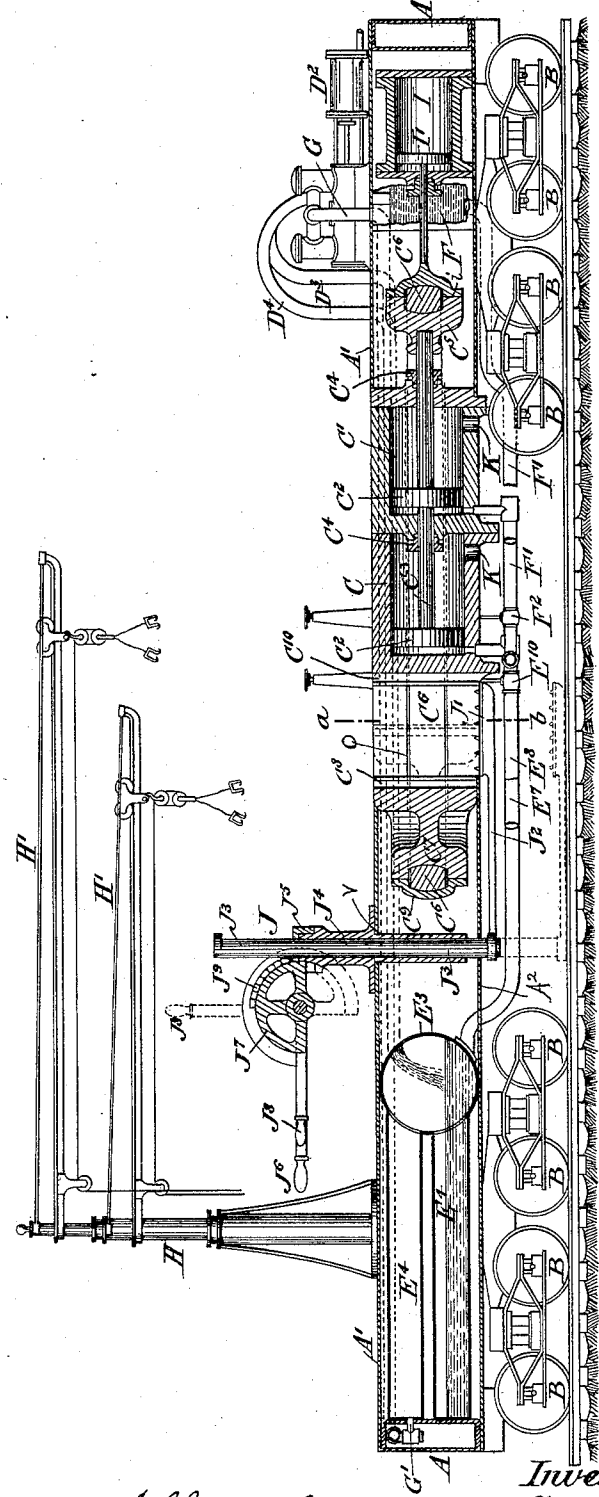
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A. L. BLACKMAN.

APPARATUS FOR COMPRESSING FIBROUS MATERIAL.

No. 430,986. Patented June 24, 1890.

Fig. 1.



Witnesses
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

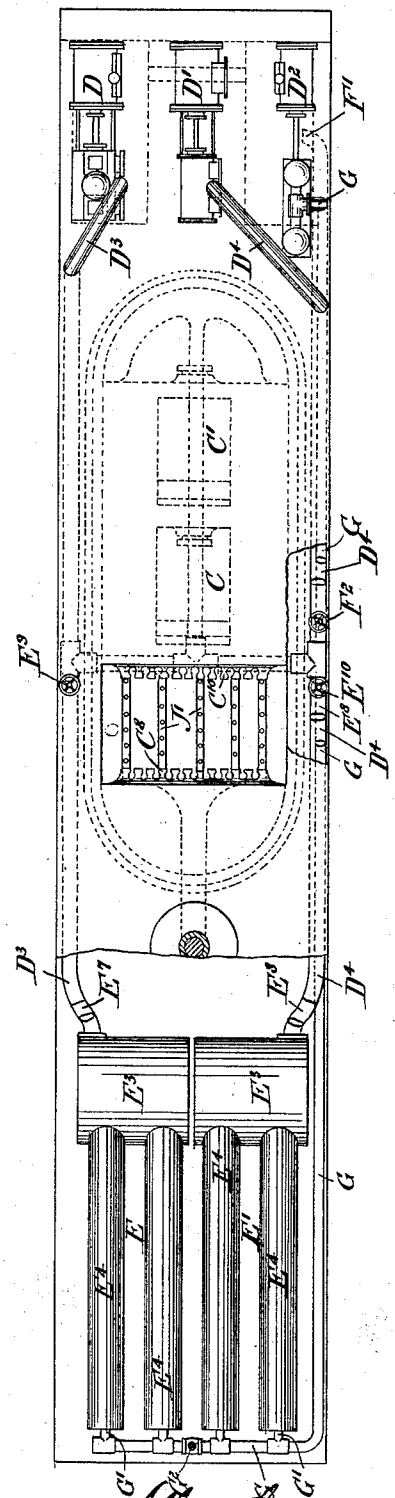
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APPARATUS FOR COMPRESSING FIBROUS MATERIAL.

No. 430,986. Patented June 24, 1890.

Fig. 2.



Witnesses

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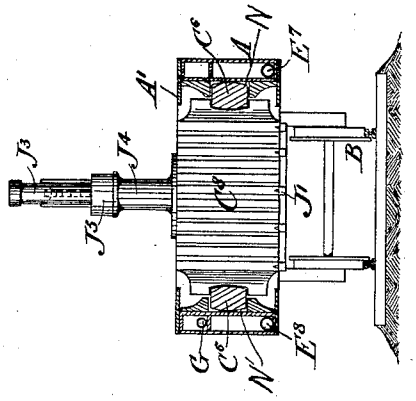
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Fig. 3.



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Fig. 5.

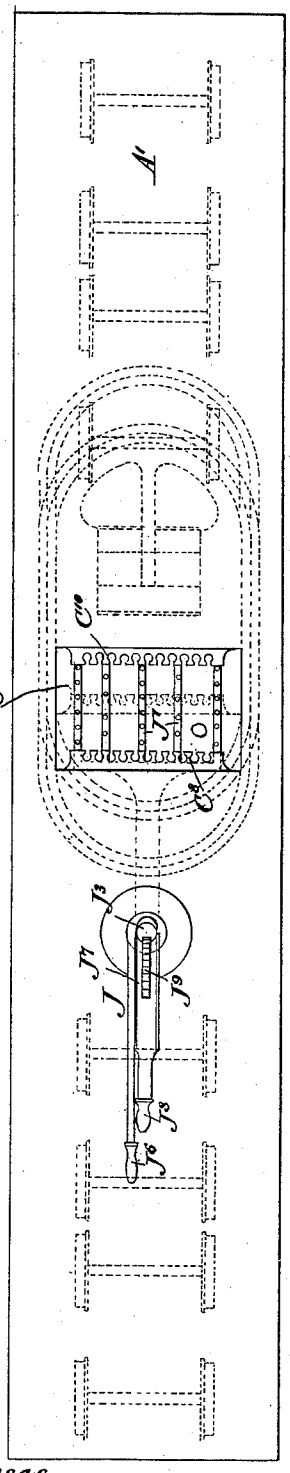
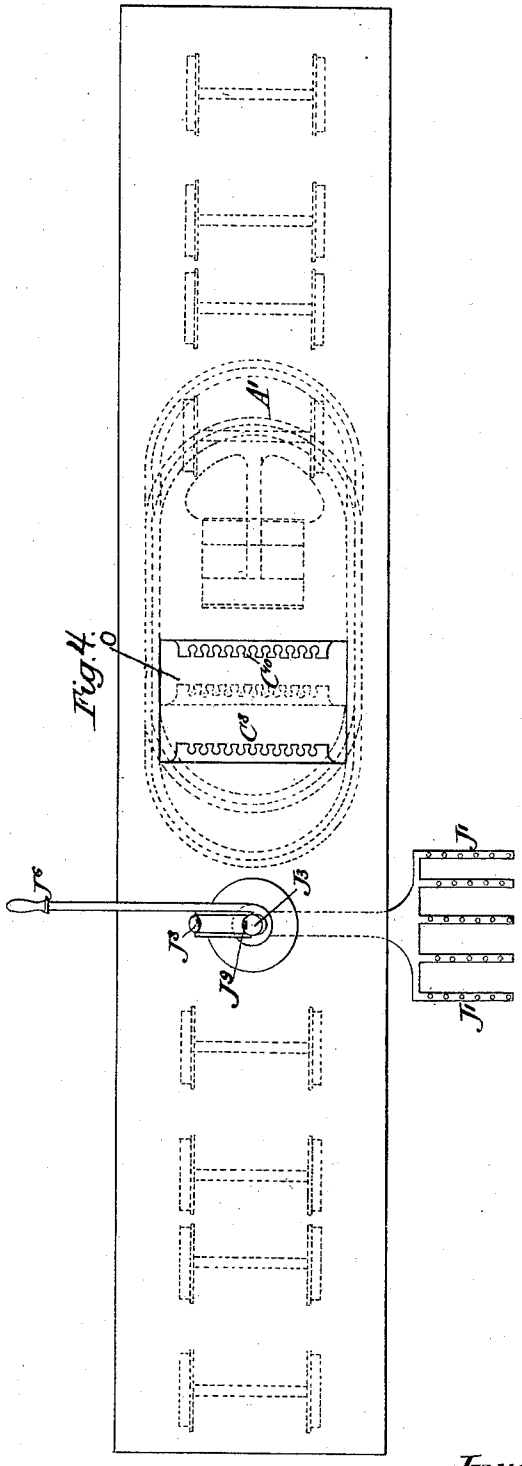


Fig. 4.



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UNITED STATES PATENT OFFICE.

ALBERT LIVINGSTON BLACKMAN, OF LONDON, ENGLAND.

APPARATUS FOR COMPRESSING FIBROUS MATERIAL.

SPECIFICATION forming part of Letters Patent No. 430,986, dated June 24, 1890.

Application filed April 15, 1889. Serial No. 307,331. (No model.)

To all whom it may concern:

Be it known that I, ALBERT LIVINGSTON BLACKMAN, a citizen of the United States, at present residing at London, in England, have invented certain new and useful Improvements in Apparatus for Compressing Cotton or other Fibrous Materials, of which the following is a specification.

My invention has relation to an improved bale-compress car, and is designed to serve as a portable compress for handling and compressing bales of cotton or other material; and it has for its object to provide a combined powerful bale-compress, actuating-motor, and car, which may be run on railway-tracks from station to station or other location where cotton may be stored, and may be economically operated by hydraulic power, steam, or other force, thus saving the great additional cost of transportation incident to shipping uncompressed bales to compressing stations or to trade centers or seaboard ports.

A further object is to adapt to my bale-compress car suitable appliances for economically handling bales of cotton or other material by mechanism.

A further object is to adapt to my bale-compress car suitable motor-power to operate the bale-compress.

In the accompanying drawings similar letters of reference indicate corresponding parts.

Figure 1 is a vertical longitudinal section of a bale-compress car, showing the bed, the trucks, the compress, the hydraulic cylinder, the stirrup, the actuating-piston, and a connecting steam-cylinder, the force-pumps, lifting-cranes, and an arm with fingers for removing the compressed bale. Fig. 2 is a plan of the same, showing the arm with fingers in position below the jaws of the bale-compress, a series of accumulators, and connecting-pipes. Fig. 3 is a vertical cross-section taken between the jaws of the bale-compress, the supporting sides of the car-bed, with ways for the stirrup, and the stirrup in cross-section adjusted therein. Fig. 4 is a plan of Fig. 1, showing the arm with fingers in position to discharge a compressed bale. Fig. 5 is the same, showing the arm with fingers in position to receive and hold the bale being compressed.

In a rectangular car-body A of suitable depth, constructed of metal securely riveted together, and having a substantial top or platform A′ and bottom A^2, and mounted on trucks B, adapted to travel on railways, is a central well-like vertical opening O to permit of the passage of a bale of material to be compressed. The curbing of this opening O, which latter passes vertically through the car-bed, is so substantially framed that the car-bed is as firm and strong at this point as at any other.

Within and along the sides of opening O, and parallel with the sides of the car-bed, grooved ways N N′ are constructed and adapted to receive and retain, while permitting of the free movement of, stirrup C^6, which operates the movable compress-platen C^8, which latter is arranged wholly within the car-bed near one side of the opening O, as shown in Fig. 1. Also within the car-bed, toward the end and on the side of opening O opposite to that of platen C^8, is arranged a stationary compress-platen C^{10}, a part of and attached to and forming an end of a stationary hydraulic cylinder C, the latter being the first of a series of two or more of such cylinders arranged coaxially, as in a tandem engine, within the car-bed and designed to provide the power for operating the compressor. In Fig. 1 I show two of these hydraulic cylinders C and C′, provided with pistons C^2 C^2, secured upon piston-rod C^3, which passes through suitable stuffing-boxes C^4 to prevent the escape of fluid and terminates in a combined grooved yoke C^5, adapted to receive and secure one end of the stirrup C^6, and a knuckle-joint *i*, by which it may be connected with the piston-rod of a piston I′ from a steam-cylinder I, employed for returning the parts and releasing the compressed bale. All of these parts are secured to and serve to strengthen the car-bed.

The sides of the stirrup C^6, as seen in Figs. 2 and 3, pass along the sides of the car-frame A and are supported in grooved guideways N N′. The other end of the said stirrup passing along in the grooved sides embraces the semicircular grooved projection C^7 of the movable compressor-platen C^8.

C^9 is a cap transversely spanning over the

end of the stirrup and secured to the projection C^7 for insuring the movements of platen C^8 at all times with said stirrup.

D^2 is an air-pump rigidly secured to and forming part of platform or car-bed A, and is connected through pipes G by branch pipes G′ to pipes or chambers E^4, forming part of the accumulators E E′.

D D′ are hydraulic pumps rigidly secured to and forming part of the car-bed or platform A′ and connected by pipes D^3 and D^4 with the accumulators E E′. The accumulators E, E′, E^3, and E^4 form accumulators to augment the force in operating hydraulic presses, and are rigidly secured within the car-bed, as shown in Figs. 1 and 2, and serve to add strength to it.

Passing vertically through the car-body is another opening *v*, in which is rigidly secured a cylindrical standard J^4, which extends above the plane of the car-bed A′, and through which a device J, for supporting and discharging compressed bales, is operated. Said supporting and discharging device J has a horizontal arm J^2 arranged beneath the car-bed and terminating in a "grid" or fingers J′. Said horizontal bar is secured to a vertical shaft J^3, which passes up through the standard J^4, and is capable of being practically rotated and moved up and down in the standard by means of a chain J^9, a toothed rack, or its equivalent. The upper end of standard J^4 supports a bracket J^5, which is pivoted thereto. The projecting arm of the bracket J^5 terminates in a handle J^6, by means of which the fingers or grid J′ and terminating horizontal arm J^2 may be swung to a position at right angles to its former position, as hereinafter described. To the bracket J^5 is pivoted a semicircular lever J^7, provided with a projecting handle J^8.

To a suitable point of the curved surface of the lever J^7 is attached one end of a lifting-chain J^9, or its equivalent, the other end of which is attached to the vertical shaft J^3. By this device it will be seen that by raising the handle J^8 the grid or fingers J′, which are provided with short spikes to prevent the bales from slipping therefrom, will be lowered from a position immediately in contact with the bottom of the car-bed, as shown in full lines in Fig. 1, to a position shown by dotted lines in the same figure, carrying with it the compressed bale, and that by moving the arm J^6 in a direction at right angles to its normal position the fingers or grid J′ will be swung laterally, carrying the compressed bale from under and clear of the car. (See Fig. 4.) There is also rigidly secured to the car-bed a crane H, with projecting arms H′ H′, for lifting into position between the platens or jaws C^{10} C^8 of the compress the bales of material to be compressed. The lifting-crane H is so constructed that the parts of the upright may telescope into each other, so that the crane may be raised when needed for use and lowered while moving. The lifting-crane H is connected by suitable induction-pipes (not shown) with the force-pumps D D′ and by eduction-pipes (not shown) with the fluid-reservoir F, and is operated by hydraulic power.

F is a fluid-tank from which the pumps are supplied, and is arranged within the car-bed, and F′ is a pipe fitted with a valve F^2, for allowing the water to escape from the cylinders C C′ back into tank F.

The pistons C^2 are adapted to be operated by hydraulic power, for generating which I prefer to use pumps D and D′ as hydraulic pumps and pump D^2 as an air-pump. The pump D is used for forcing water into the accumulator E, and pump D′ is used for forcing water at a higher pressure into the accumulator E′, while pump D^2 is designed to force compressed air into both of the said accumulators. The accumulators E E′ are connected by the cock G^2 and are constructed to sustain the necessary pressure. The accumulators have each a large connecting-chamber E^3, from which extend the closed cylindrical chambers E^4 or their equivalent. The pumps D D′ are respectively connected by conduit-pipes D^3 and D^4 with the accumulators E and E′, and water under pressure is conducted, respectively, from these accumulators to the cylinders C and C′ through the pipes E^7 and E^8, which are provided with valves E^9 E^{10}. These valves admit of the water being turned on to the cylinders C C′ either from the pipes E^7 or E^8, so as to move the piston C^2 by lower or higher pressure.

For providing the power to operate the compress I prefer to employ accumulators combining air and hydraulic pressure. The accumulators E E′ are used in order that the pumps may continuously work while the bale is being tied, thus accumulating pressure by compressing the air in the accumulators, which makes it possible to expedite the operation of compressing a bale.

When operating my compress, pumps D, D′, and D^2 may be driven by steam obtained from any source or by any other power-motor, the pumps D and D′ being preferably kept constantly at work, while pump D^2 is operated only sufficiently to keep up the necessary supply of air. The valves E^9, E^{10}, and F^2 having been closed, an uncompressed bale is introduced into the opening O between the compressing-platens C^8 C^{10} and resting on the grid or fingers J′ in place. The valve E^9 is then opened, introducing the lower pressure behind the pistons C^2, causing them to draw forward the stirrup C^6, and thereby close platen C^8 upon platen C^{10} longitudinally, thus reducing the bale, so that when the valve E^{10} is opened and the higher pressure is introduced behind the pistons C^2 the movable platen C^8 is by the stirrup C^6 drawn closer to the stationary platen C^{10} and the bale compressed to the desired maximum. The bale being while in this position securely bound, the valve E^{10} is closed, and the discharge-valve F^2 opened to permit of the discharge of the water

from the cylinders C C′, steam may be introduced into the cylinder I or any other power applied to piston C^3 to force the pistons C^2 and stirrup back to their normal position, the water from the cylinders C C′ flowing back into the tank F. The compressed bale being thus released is lowered by the grid or fingers J′ below the bottom of the car-bed, and by swinging the supporting-arm J^2 into a position at right angles to its former position the compressed bale may be discharged and the operation be repeated.

Having now fully described my invention, what I desire to protect by Letters Patent is—

1. A bale-compress car consisting of a substantially-built deep metal frame provided with an upper platform and a bottom, internally-arranged fluid-reservoirs, pressure-accumulators, and hydraulic cylinders and externally-arranged force-pumps, and connecting-pipes connected with and forming part of said car, the whole mounted on trucks adapted to travel on railways, and having a central substantially-framed opening provided with ways in its sides, a compressor-stirrup adjusted therein, compressor-platens arranged on opposite sides thereof, and connections, as described, for operating the compressor-stirrup, all substantially as described.

2. In a bale-compressor car, a deep substantial metal frame having top, bottom, and suitable braces, all securely riveted together and mounted on trucks adapted to travel on railways, and having a central opening provided with ways in its sides, in combination with horizontally and internally arranged stirrup, longitudinally-adjusted movable platen on one side, and a stationary platen and hydraulic cylinders on the opposite side of said opening, power-accumulators, connecting-pipes, and force-pumps, all constructed, arranged, and adapted to operate substantially as described.

3. In a bale-compressor car, a substantial metal frame consisting of sides, ends, bottom, and top securely riveted together and mounted on trucks adapted to travel on railways, and having a vertical opening *v*, provided with a cylindrical standard forming a part thereof, in combination with a vertical shaft carrying a horizontal arm terminating in fingers or a grid, handled by a lifting-chain, a supporting-bracket, a semicircular lever, and a projecting handle for holding in place, lowering, and discharging a compressed bale, substantially as described.

4. In a bale-compressor car, a substantial frame A, top A′, and bottom A^2, all securely riveted together and having a central opening O and mounted on trucks B, adapted to travel on railways, in combination with ways N N′, stirrup C^6, compressor-platens C^8 C^{10}, hydraulic cylinders C C′, pistons C^2, piston-rod C^3, and grooved yoke C^5, adapted to work longitudinally for compressing bales of materials, all constructed and arranged substantially as described.

5. In a bale-compress car, a substantial frame A A′ A^2, mounted on trucks adapted to travel on railways, and having a central opening O, and provided with an internally-arranged longitudinally-operating hydraulic compress arranged within and substantially secured to the car-bed frame, in combination with supporting and discharging device J, having a shaft J^3, operated in a vertical opening or well *v* through the car-bed, and a horizontal arm J^2, terminating in fingers or a grid J′ for receiving, supporting, and discharging the compressed bale, the said device J being operated by means of a lifting-chain J^9 through supporting-bracket J^5, secured to the car-bed by a semicircular lever J^7, and a projecting handle J^6, all constructed and arranged substantially as described.

6. The combination, with the rectangular horizontal frame or car-body mounted on trucks adapted to travel on railways, and having a central opening, as shown, and horizontally-arranged hydraulic cylinders longitudinally secured within and forming a part of said car-body, and the pistons working in said cylinders, of the stationary platen and movable platen longitudinally arranged in a horizontal position within said car-bed on opposite sides of the central opening, and a horizontally arranged and operating stirrup working in ways in the sides of the car-bed and connecting said movable platen with the pistons for operating the compress, all substantially as described.

7. The combination, with the framing of a car-body mounted on trucks adapted to travel on railways, having a central opening-way through the same, of a compress having the stationary platen at one side of said opening, the movable platen carried to and from the same across the opening, and the connecting-stirrup supported and working in ways arranged in the sides of said opening, whereby the uncompressed bales may be inserted from above and the compressed bales removed from below the framing and the operation greatly facilitated, substantially as described.

8. The combination, with the framing of a car-body mounted on trucks adapted to travel on railways having a central opening, a compress-cylinder secured rigidly to said frame at one side of the opening, and a movable platen on the opposite side of the same, of a piston working in the cylinder, a stirrup connected to the piston and passing around the movable platen, and supporting-guides for said stirrup mounted within the framing, substantially as described.

9. The combination, with the framing of a car-body mounted on trucks adapted to travel on railways, having an opening-way through the same, a horizontal stationary cylinder, and compress-platen located within and below the level of the top of the frame, with the movable platen working across said opening, of a vertically-movable and horizontally-swinging support located below the opening on which

the bales rest while being compressed and on which they are moved horizontally from beneath the frame, substantially as described.

10. The combination, with the framing of a car-body mounted on railway-trucks, having an opening-way through the same, and a horizontal bale-compress located within and below the level of the top of the frame, with the movable platen working across said opening, of a grid or support for the bale, located below the opening, a vertically-movable shaft for supporting the grid, extending through the frame and having the arm connected thereto for rotating the same, and the lever for vertically adjusting the shaft, substantially as described.

11. In a bale-compress car mounted on trucks and adapted to travel on railways, the combination, with a horizontally-movable platen, the combined horizontal stationary platen and pressure-cylinders, the latter having pistons and a common piston-rod working therein and adapted to connect with a steam-cylinder I and its piston-rod, and connections between the two piston-rods, of the horizontally-arranged stirrup working in ways and secured by one end to said first-named piston-rods, and, after surrounding the cylinders and platens, secured by the other end to the movable platen, which, when in operation, it draws toward the stationary platen, substantially as described.

12. In a bale-compress, the combination, with the horizontally arranged and operated movable platen and the stationary platen, of a plurality of pressure-cylinders arranged horizontally in line with each other within and secured to a car-bed frame, and provided with suitable pistons and a common piston-rod, of the horizontally-arranged endless stirrup secured at one end to the said piston-rod and the piston-rod I′ of a steam-cylinder I, and at the other end to the movable horizontally-arranged compress-platen, for compressing bales of cotton or other materials, substantially as described.

13. In a bale-compress, the combination, with the horizontally-movable platen and the stationary platen, of horizontal pressure-cylinders arranged in line with each other and having suitable pistons and a common piston-rod, the latter connected to a horizontally-arranged stirrup, which is connected by the other end to the movable compress-platen, which, when in operation, it draws toward the stationary platen for compressing bales of cotton or other materials, substantially as described.

14. The combination, with the framing of a car-body having the central opening and horizontal platens located on opposite sides of said openings, of a plurality of pressure-cylinders constructed in the frame in line with each other or tandem and within or below the upper surface of the framing, whereby a large pressure-surface may be secured without the necessity of increasing the size of the cylinders so as to project above the framing, said cylinders each having a suitable piston working therein and secured on a common piston-rod, the latter connected with a horizontally-arranged stirrup, which, after surrounding said cylinder and the stationary platen, is connected to the movable platen, which it draws toward the stationary platen, secured at the end of said cylinder, substantially as described.

15. In a bale-compress, the combination, with hydraulic cylinders having a stationary compress-platen and a plurality of pistons on a common piston-rod, the latter connected with a horizontally-arranged endless stirrup, of pressure-accumulators connected to said cylinder by induction-pipes having suitable valves, and of pressure-pumps connected with said cylinders through said accumulators, and of air-pump also connected therewith through said accumulators, and of endless stirrup connected by one end to said piston-rod and at the other to a movable compress-platen, all constructed and arranged for operating the compress substantially as described.

16. A bale-compress car consisting of a substantially-built metal frame secured together, mounted on trucks adapted to travel on railways, and having an upper platform and a bottom provided with a central opening having ways in the side walls thereof, an endless compressor-stirrup connected by one end to a movable platen and by the other to the head of a piston-rod, in combination with a plurality of pressure-cylinders having pistons and a stationary platen, all arranged horizontally within and in a line with the longitudinal sides of the car-bed, substantially as described.

17. A bale-compressor car consisting of a substantially-built metal frame mounted as described, provided with longitudinally-arranged hydraulic cylinders, horizontally-arranged endless stirrup, horizontal guides or ways in the car-bed to receive the same, horizontally-arranged platens, one of which is secured to hydraulic cylinder and the car-bed frame and the other being movable in a horizontal direction and secured to one end of the endless stirrup, the other end of which stirrup is connected to the piston in said hydraulic cylinders, and all arranged and adapted for operating the compress substantially as described.

In testimony whereof I have hereto set my hand in the presence of the two subscribing witnesses.

ALBERT LIVINGSTON BLACKMAN.

Witnesses:
ALFRED J. BOULT,
HARRY B. BRIDGE.