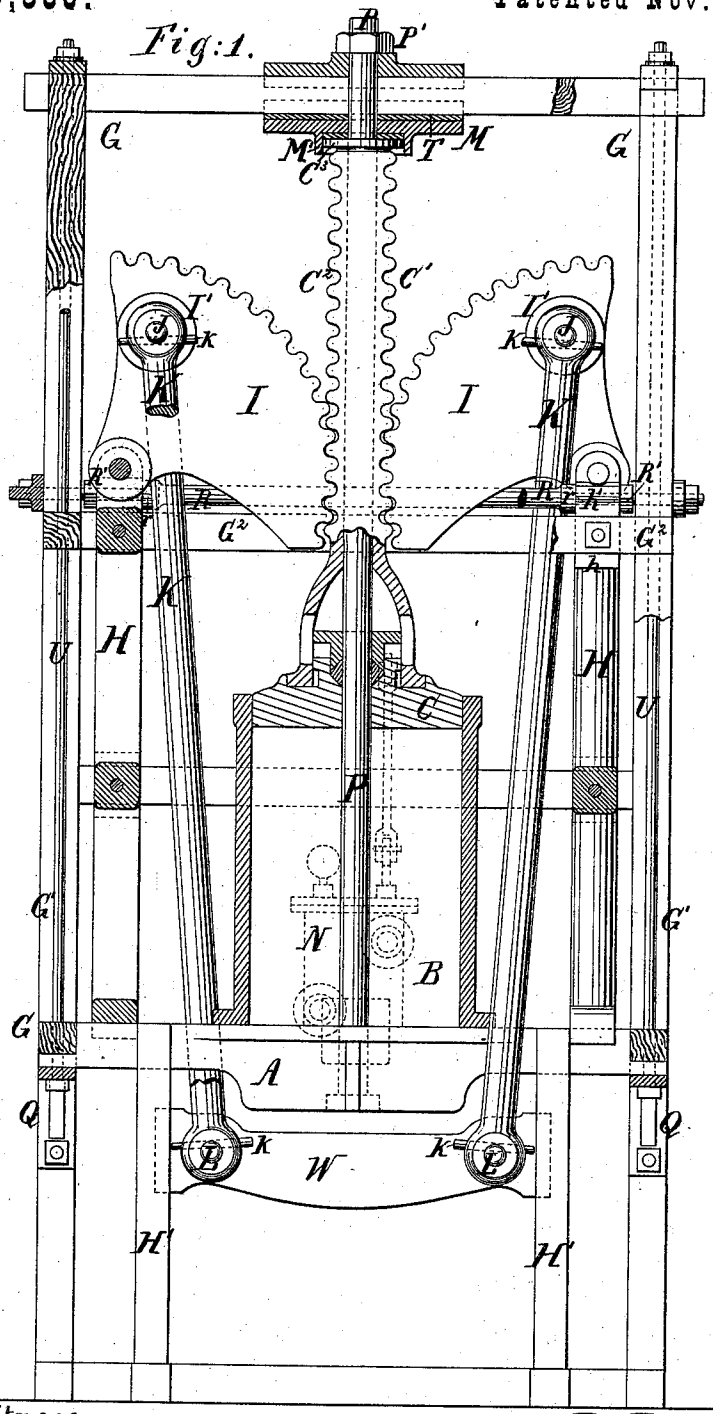
2 Sheets—Sheet 1.

G. H. REYNOLDS.

PRESS.

No. 169,588. Patented Nov. 2, 1875.

Fig: 1.



Witnesses:

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Chas. C. Stetson.

Inventor:

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by his attorney

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N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

2 Sheets—Sheet 2.

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PRESS.

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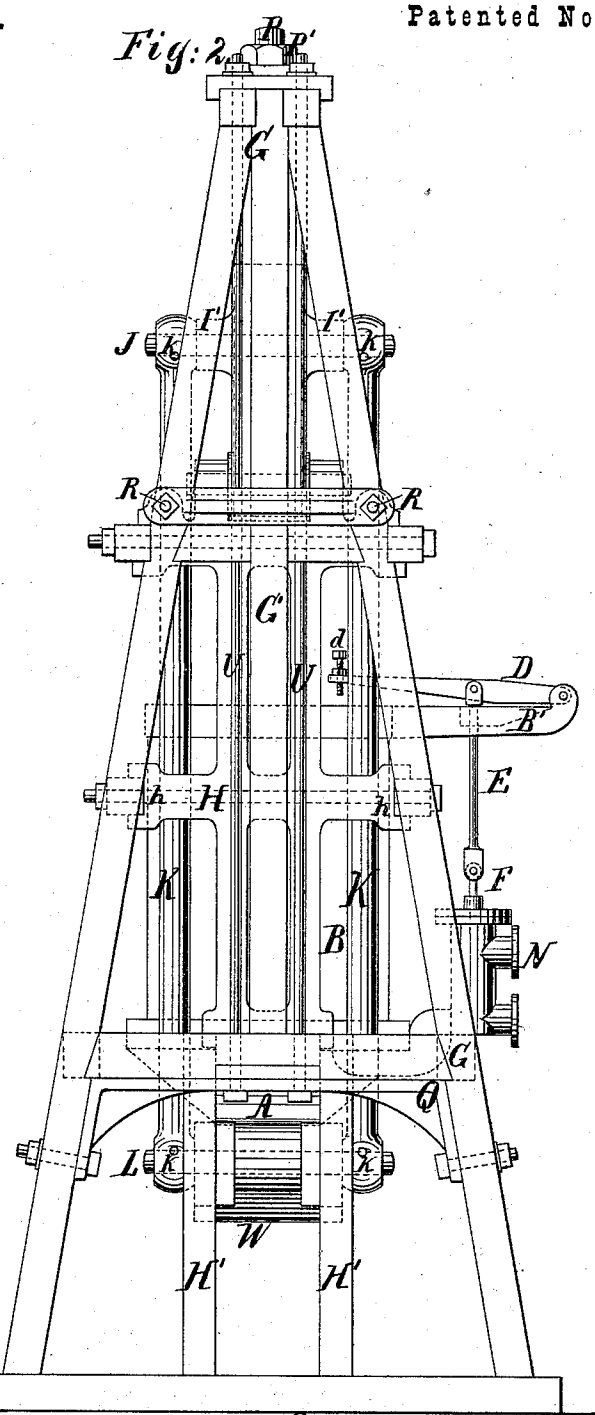
Fig: 2.



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UNITED STATES PATENT OFFICE.

GEORGE H. REYNOLDS, OF NEW YORK, N. Y., ASSIGNOR TO HIMSELF, C. H. DELAMATER, AND GEORGE H. ROBINSON.

IMPROVEMENT IN PRESSES.

Specification forming part of Letters Patent No. **169,588**, dated November 2, 1875; application filed September 2, 1875.

To all whom it may concern:

Be it known that I, GEORGE H. REYNOLDS, of New York city, in the State of New York, have invented certain new and useful Improvements in Presses, of which the following is a specification:

My improved press may be used for many purposes. I will describe it as applied for re-baling cotton.

It has long been common in presses to connect the power to a geared sector, so that the power shall apply equally in all points in the motion, to give an angular motion to the sector, and to connect the platen thereto by means of rods and pins, so arranged that while in the first part of the motion the platen traverses with a velocity equal, or nearly equal, to that of the periphery of the sector, in the last part of its motion it traverses much slower, and with a greater purchase or leverage. I do this, and I also employ the pressure of steam or water or other fluid upon the piston to bring up the platen and compress the material rapidly. The piston is directly and firmly connected to a double rack, which engages with a sector on each side.

I have devised an arrangement of framing by which massive struts of cast-iron or analogous material are interposed in a right line between the bearings of the sectors and the press-bed, while the bed is held up and all the parts are supported against other strains by a lighter framing, which is of wood, conveniently arranged.

The invention consists in improved combinations and arrangements of the details.

The accompanying drawings form a part of this specification, and represent what I consider the best means of carrying out the invention.

Figure 1 is a central vertical section through the cylinder, with an elevation of the remainder, some of the parts being broken away to better show the construction. Fig. 2 is an elevation of the entire construction, in a plane at right angles to the view in Fig. 1.

Similar letters of reference indicate like parts in both the figures.

A is what I will term the top platen, or sometimes bed, although the work of compression is done from its under instead of from its upper side. It is a massive part, forming a foundation or bottom for the cylinder B, which carries a piston, C, having an extension on its upper side, carrying a double rack, C^1 C^2, and terminating in a stout circular disk, C^3, capable of serving as a piston or check by being received in a corresponding tight chamber, in case the bursting of a bale or other accident relieves the press from resistance. M is a casting, having on its under face a short hollow cylinder. This casting is also equipped with a thick mass of rubber, T, which is peculiarly adapted to resist the powerful upward force which it occasionally receives, as will be described below. These provisions for arresting the motion will allow the impelling of the piston by steam or other elastic fluid received through the regulating-chamber N.

The bed or top platen A is supported on a gallows-framing of wood, which I will represent collectively by the letter G. Upright pieces of iron N′ form guides for the stout movable piece W, which I will term the platen. This receives the bale on its upper surface when depressed, and performs its function of powerful compression by being elevated to compress the bale between itself and the bed A. Near each end of the top platen or bed A is a pair of stout posts or struts, H, connected together and to the framing G. These are connected by through-bolts to the gallows-framing at a sufficient number of points to insure the stability of the machine, and their principal function is to resist a powerful compressing force received during the latter portion of the action of the press.

I I are geared sectors, each having a stout central pivot or axis, supported in the upper end of the corresponding pair of struts H. Each sector I is formed with a long transverse bearing, I′, in which is received a stout cylindrical pin or cross-shaft, J, which extends out on each side, and is firmly connected to an eye in the upper end of one of the four rods K. The corresponding eye at the lower end of each rod is firmly fixed to a pin or short shaft, L, which extends across in a bearing in the platen W. A bale of cotton is re-

ceived when the platen W is down. On admitting steam or water below the piston C the latter moves promptly upward, turning the sectors I I by means of its double-rack connection C^1 C^2, and lifting the platen W through the intervention of the rods K. In the last portion of the upward movement the piston C moves much more rapidly than the platen, and the purchase or mechanical advantage from the action of the fluid on the piston is greatly multiplied. Shafts or pivots L and J afford long bearings in the platen and segments, respectively. The rods K are keyed firmly thereto by means of the simple keys K, which are not exposed to strain. Their whole function is to keep the parts K and J rigidly connected. When from any cause the machine is relieved, in whole or in part, from the proper resistance due to the powerfully-compressed bale, the piston C and its connections are liable to move upward with dangerous rapidity. In such case the piston C^3 momentarily imprisons a liberal quantity of air within the cylinder M′, and the shock is greatly lessened by reason of the elasticity thereof. The cylinder M′, with its associated parts, forming the casting M, is bolted upon the under side to the top timbers of the framing G. On the upper side thereof is a corresponding casting, strongly attached. The center of the upper casting is formed with a stout boss, which receives a massive nut, P′, fitted upon a correspondingly-threaded end of a stout central rod, P. This rod extends downward in a right line through the center of the short cylinder M′, through a hole formed for it through the piston C^3, through the double-racked rod C^1 C^2, and through the piston C and cylinder B. It also extends downward through the center of the bed A, and terminates in a stout head sunk or let up into the under face of the bed. When the piston and its connections tend to rise too high, and are cushioned on the mass of rubber T, this rod P connects the latter by a right line with the strong bed-piece below, and is in the best position to prevent any breakage or springing.

I attach much importance to the means by which I resist the tendency of the upper portion of the main iron framing to spread apart. Two rods, R, extend one across the front of the machine and one across the back, securely connected at each end to arms h', cast on the struts H. Stout nuts R′, applied on the threaded ends of the rods R, force the projections or arms h' against collars r, which receive the pressure through the intervention of one or more thin shimming-pieces. With proper care these parts can be mounted exactly right; but if, for any reason, it becomes desirable to cause the sectors I I to work more loosely or more closely in their engagement with the double rack-piece C^1 C^2, by changing the thin pieces on the faces of the collars, this may be accomplished. Nuts may be employed at these points, if preferred.

The framing G is supported by, and reciprocally serves to support, the stouter internal framing A H, through the medium of the jaws h, formed on the latter, and through bolts U and nuts thereon. The weight of the bed-piece or top platen A, and its associated internal parts, is transmitted favorably to the gallows-framing G by means of vertical rods U. The rod P performs two important functions—one that of tying the top of the gallows-frame G, and consequently the top casting M, and its adjuncts, by a direct and strong connection to the top platen A, and another that of guiding the rack C^1 C^2 and disk C^3, and supporting it against all lateral deflecting forces.

The ends of the top platen A rest on a broad casting, Q, the ends of which are made to exactly correspond with the inclination of the sides of the gallows-frame G, and are firmly secured thereto by bolts. The vertical tie-rods U extend, through the casting Q and through the ends of the top platen A, and, guided through holes in the cross-piece of the gallows-frame, to the saddle-castings placed one on each end of the gallows-frame. The nuts on the upper ends of these rods being properly set up, the whole weight of the massive iron-work is suspended, by means of the vertical rods U, to the top of the triangular gallows-frame G. This affords the strongest and most efficient kind of support. As it is impossible to avoid some amount of elasticity in the several parts, I make a stiffer and firmer frame by setting up the rods U U with a tension more than sufficient to sustain the weight, and receiving the excess of strain on the vertical struts G′, which stand between the rods U, and form a part of the end of the framing G.

The cross-rods R not only hold the uprights H rigidly at a fixed distance apart, by means of nuts or collars thereon, bearing against the inner faces of the projections on the uprights, and also hold the same uprights firmly together, so that they cannot get too far apart, by means of the nuts R′, screwed against the outer faces of the same projections, but they also, by means of extensions of smaller diameter, reach through corresponding holes in the gallows-frame G, and, by taking hold of cross-pieces outside, by means of nuts, hold the gallows-frame strongly together. In order to brace the latter firmly in the opposite direction—that is to say, to keep it from being drawn too much together—the wooden cross-pieces G^2 are employed. These may be shouldered, so as to better take hold of the gallows-frame in the well-known manner. Transverse bolts hold these pieces firmly to their work; and by means of the whole the gallows-framing is very firmly stiffened.

In the absence of an efficient firm connection of the rods K to the shafts J and L the tendency of these shafts is to remain fixed in their bearings in the sector and platen, and to allow the eyes on the ends of the rods K to turn on the projecting ends of the shafts. The wear thereby induced on the limited

bearings would involve mischief. To avoid this the eyes on the ends of the side rods K are secured upon the ends of the short shafts J L by means of keys *k*. The holes for these keys are drilled after the parts are applied together, and are so located as to touch and cut a little into the cylindrical body of the shaft. It follows that when the keys *k* are driven tightly, the side rods K are thereby prevented from slipping off the respective shafts J L, and are also held rigidly to the overhanging ends thereof, so that as the machine works the shafts J and L perform a partial rotation in their bearings, respectively, in the sectors I, and in the platen W. D is a light lever, pivoted on an arm, B′, extending horizontally from the top of the cylinder B. When the piston C has risen to its highest permissible point it elevates the lever D through the medium of the adjustable screw *d*. This motion is transmitted through a connection, E, to a valve, F, which compels the fluid, in case it continues to enter the cylinder, to be discharged without affecting the press. The lever D may also, by suitable connections, (not shown,) control the passage for the introduction of the steam or water. For some kinds of work it is desirable to keep the full force of the press applied for some seconds or minutes. Under these conditions, should leakage or other cause induce a yielding, so that the piston C would sink a little, such yielding instantly, by lowering the lever D, would allow the introduction of more steam below the piston, and the full pressure would be instantly restored.

I attach importance to the air-cushion formed by the disk C^3 striking within the cylinder M′, in addition to the rubber cushion or buffer of rubber located in said cylinder. It is not unusual for the severely-strained bale of cotton to burst out laterally and relieve the press very suddenly. Acting with high-pressure steam, conditioned as in my press, so that a little movement of the platen W near the close of its upward motion is accompanied with a large movement of the piston, such a diminution of resistance allows the piston C to dart upward with dangerous speed. The air-cushion is required to moderate the velocity, and becomes more effective in proportion as the concussion is more terrific.

I claim as my invention—

1. The cross-rods R, arranged to not only connect the struts H at points adjacent to the centers of the sectors I, but also to hold the press in position within the gallows-frame, in combination with said frame, as herein specified.

2. The central tie-rod P, extending down from the top of the gallows-frame to the top platen, and serving both as a tie for these parts, and as a guide for the racked bar and its connections, as herein specified.

3. The cushion T, in combination with the central tie-rod P, and with the actuating-piston C and its connections, as and for the purposes herein specified.

4. In combination with the piston C and its connections, a valve, F, arranged to automatically control the motion when the press has reached the limit of its movement, as and for the purposes herein specified.

5. In combination with the sectors I, receiving motion from the piston C, as shown, the shafts J L, fixed to the rods K, and turning with the changing inclination thereof, as herein specified.

6. In combination with a suspended press, the vertical ties U, connecting the massive iron parts of the press to the top of the wood gallows-frame G, with the vertical struts G′ between the said ties U, and serving therewith, as and for the purposes herein specified.

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

GEO. H. REYNOLDS.

Witnesses:

PHILLIPS ABBOTT,

CHAS. C. STETSON.