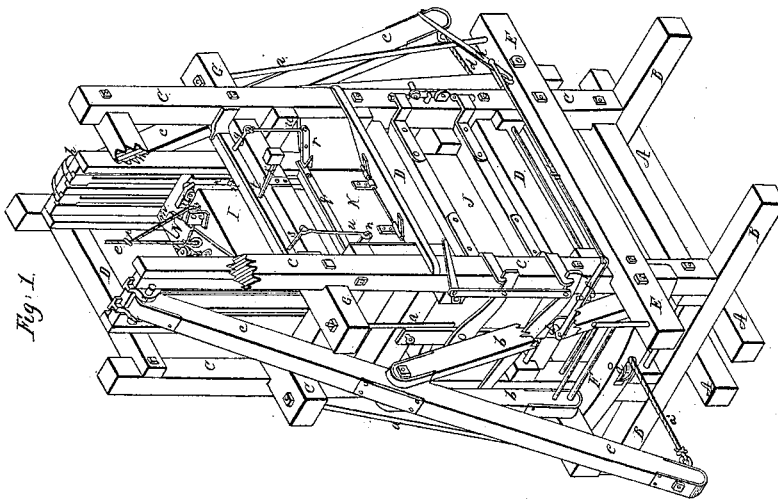


2 Sheets, Sheet 1.

N^o 50,798.

Patented Nov. 7, 1865.



Inventor:
J. F. Cornell
by Cochrane & Ford
his Attorneys

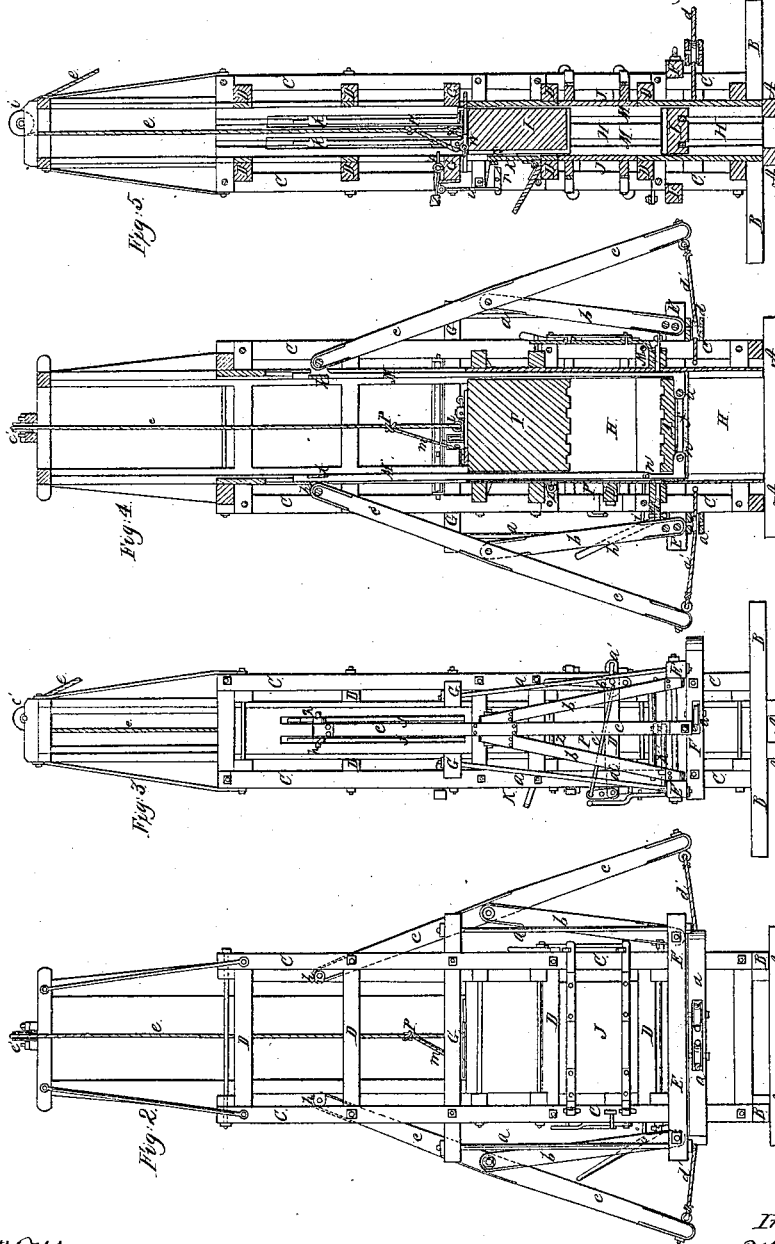
F. F. Cornell, Jr.,

2 Sheets, Sheet 2.

Hay Press.

N^o 50,798.

Patented Nov. 7, 1865.



Witnesses:
Andrew C. Ford
Attorney at Law.

Inventor:
F. F. Cornell, Jr.
by *Cochran & Ford*
Attorneys

UNITED STATES PATENT OFFICE.

F. F. CORNELL, JR., OF NEW YORK, N. Y.

IMPROVEMENT IN CONSTRUCTION OF BALING-PRESSES.

Specification forming part of Letters Patent No. 50,798, dated November 7, 1865.

To all whom it may concern:

Be it known that I, FREDERICK F. CORNELL, Jr., of the city and county of New York, and State of New York, have invented certain new and useful Improvements in the Construction and Mode of Operating Baling-Presses; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, forming part of this specification.

In constructing a press to bale any fibrous substance by pressure it is essential to effective operation that the press box or chamber, when closed upon its contents for the purpose of applying the compressing-power, should be free from open spaces. This end was originally obtained by the use of a screw operating on the center of the platform and forcing the platen up into the chamber; but this plan being far too slow for the economical dispatch of business when much packing had to be done, it is now almost entirely abandoned, because of the greater quickness and facility in the work afforded by those presses which are operated by the toggle system of levers. In examining baling-presses thus operated, however, it will be seen that the close chamber, as used in the screw-press, has been sacrificed to the greater speed of operation and saving of power effected by the toggle-lever press, and that, in fact, such presses have been built apparently with a total disregard of the manifest advantages of the close chamber, as though expedition in the process of baling was paramount to all other considerations.

Lever-presses as heretofore constructed may be divided into two classes. In the first or more primitive style of these the lever or levers are immediately under the platen and act directly upward against it; but in the second class the levers are placed outside of the press, at the lower part of the framing, and are caused to act upon the platform by being jointed to the outer ends of the lifting-beam upon which the platen rests, which outer ends of the lifting-beam have to project for this purpose through the side framing of the press, and also through the sides of the press box or chamber. An open slot or space is accordingly left in each side of the press-box for the lifting-beam to move in for the whole length of its traverse. In the said first class of presses two opposite

sides of the chamber, for nearly the whole width, have to be left open, so as to afford necessary space for the operation of the levers in moving the platen, while in the second class this evil is so far diminished as to require the space to be no wider than is necessary for the thickness of the lifting-beam of the platen. The practical results of this mode of construction are these: On filling the press-chamber with the material to be baled such material will be forced through or into the aforesaid openings or spaces by the action of the platen, thereby making loose appendages to the bale, known to the trade as "ears," which are very objectionable, on account of the great waste they occasion in the handling of the bales, as well as because of the additional room they require in stowing and transportation. Again, if, in filling the chamber, the material is carefully placed in it, so as to keep it away from the said openings as much as possible, a bale may be formed that will be free, or nearly so, from these objectionable appendages; but such bale will be of uneven density and of less weight than what is due to the capacity and power of the press, which is also regarded as a great objection by the trade and dealers generally.

It is impossible to use either of the said modes of construction in combination with a beater, as the descent of the beater in the chamber causes the air to rush out with such force through the said openings as to carry a large portion of the loose material out of the press with it, while at the same time the force of the blow given by the beater would impact a portion of the said material so tightly into the said side openings that the bale could not be removed in a finished state from such chamber without previously taking the press to pieces.

To remedy these difficulties I have constructed a baling-press with traveling sides secured to the platen, thereby making a close chamber, the side openings before referred to being effectually closed up, the top ends of the toggle-levers being jointed to the upper ends of the traveling sides of the platen, thus using the said sides as lifting-bars for the platen, for which improvement in baling-presses a patent of the United States was issued to me on the 23d day of May, 1865.

To obtain the advantages of a close cham-

ber, (the importance of which I have just recited,) whereby I can dispense with the traveling sides, which have already been patented to me, is the object of the first part of the present invention, and this I accomplish by the employment or use of bars or strips of metal or other suitable material, arranged and located between the posts of the framing so that their inner faces shall be flush, or nearly flush, with the inner surface of the press box or chamber, said bars or strips being connected at one end to the platen or follower, and being connected at their other end, or at some intermediate point of their length, to the upper end of the toggle-levers, whereby I obtain a close press-box and retain the advantages of a connection between the toggle-levers and the platen or follower.

My invention also relates to the manner of fastening and connecting the lower ends of the bars or strips to the follower or platen, as will be hereinafter described.

My invention also relates to a new and peculiar arrangement of the fulcrum-points of the radii of the toggle-levers, in combination with a framing exterior to the press-chamber, containing sheaves to carry the chains, which operate said levers, around the chamber and deliver them in a position proper for winding on the capstan at any point desirable above the sills of the press-chamber, so that the plane of the base of the press-chamber may be depressed any required depth below the plane of the motion of the capstan, and yet allow a direct communication, through a horizontal chain or rope, between the lower ends of the levers and the drum of the capstan, thus entirely obviating a great objection to lever-presses—namely, the fact that the plane of the motion of the lower ends of the toggle-levers is always the same or below, never above, the plane of the base of the press-box—and compelling the erection of the power on a floor below the floor on which the bale is delivered. In this press, however, the power may be as readily situated on the same floor with the delivery of the bale, or on a floor above, if desired, as in side-hill buildings.

My invention also relates to a peculiar construction of the lower part of the press, whereby the press-box can be extended below the plane of the motion of the lower ends of the toggle-levers, and whereby the pressed bale may be delivered from the press on the plane of the capstan, or lower, which greatly facilitates the operation of baling.

My invention also relates to certain mechanism for retaining the beater to make it serve as a head-block or cope to the press.

My invention also relates to certain mechanism employed, for throwing open the feed-door of the press for the purpose of enabling an operator to throw the desired quantity of hay or other substance to be pressed into the press-box during the ascent of the beater.

My invention also relates to the means employed for immediately liberating the beater after it has served its purpose as a head-block during the compressing of the bale.

To enable others to understand my invention and construct a press accordingly thereto, I will proceed to describe the same, reference being had to the accompanying drawings, in which—

Figure 1, Sheet 1, is a perspective view of a baling-press constructed according to my invention. Fig. 2, Sheet 2, is a front elevation of the same. Fig. 3, Sheet 2, is an end elevation. Fig. 4, Sheet 2, is a longitudinal vertical section, taken in the plane of the line $x x$, Fig. 3. Fig. 5, Sheet 2, is also a longitudinal vertical section, taken in the plane of the line $y y$, Fig. 2. Fig. 6, Sheet 1, is a transverse section, taken in the plane of the line $z z$, Fig. 2. Fig. 7, Sheet 1, is a plan view of the mechanism for securing the beater to make it serve as a head-block or cope against which to press.

Similar letters indicate like parts in the several figures.

Upon the ground-sills A A, I place the transverse sills B B, and into these I frame the corner-posts C C, which I further secure together by the cross-framing D D D D.

To the posts, at any desired height from the sills B B, I secure the horizontal lever-sills E E and the sheave-frame F F F, and at a suitable height above the same, to receive the pressure of the beater when used as a head-block, I also secure to the posts the horizontal head-beams G G.

Upon the lever-sills E E, I place the fulcrum-points of the radii of the toggle-levers, or they may be placed upon the sheave-beams F F at the ends of the press, and these head-beams and lever-sills or sheave-frame I bind together by means of the bolts $a a a a$; or, instead of securing the lever-sills and sheave-frame to the posts, they may rest upon the floor of the building, or upon a suitable foundation, and in that case would only be attached to the press by means of the bolts $a a a a$. In this last mode of construction the lever-sills are properly dispensed with, the sheave-beams serving in their stead.

In the sheave-beams at the end of the press I so place a sheave that the draft on the lower end of the lever is always in the same plane and same line; and between these end beams I frame a cross-beam with two sheaves in the center, and far enough apart to admit the two chains attached to the levers, and at such a distance from the press as to allow the chains $d' d'$ to draw against the guide-sheaves $d d d d$ and clear the press-chamber, and thus be carried around it, as shown in Fig. 6, Sheet 1.

In case the power is located above the plane of the door where the bale is delivered, the head-beams G G may be dispensed with, and the lever-sills E E be made to resist the beater

when used as a head-block, all of which is clearly shown in the accompanying drawings, and particularly in Figs. 1 and 6 on Sheet 1.

By this construction I am enabled to extend the press-box down to the sills A A. The lower part of this press-box answers the purpose of a packing-chamber, and inasmuch as I construct it with closed sides all around (as will be hereinafter explained) the hay or other substance beat or compacted in this box cannot be forced out, as with ordinary presses, to form knots or ears, such as I have heretofore mentioned as being a great hinderance to rapid baling and pressing. The hay is thus beaten or compacted in a chamber below the point where it is usual in ordinary presses to locate the bottom of the press-box.

The packing-chamber H H is furnished with front and back doors, J J, together with the necessary hinges and latches or fastenings, as usual in baling-presses; it is also furnished with the top door, K, through which the chamber is filled with the material to be baled.

The beater I is operated by a cord or chain, *e*, passing over the sheaves *l'*, to which power is applied in the usual way. The beater or cope I is provided with a holding mechanism (which will be presently explained) when it is desired to have it perform the office of a head-block for the press.

M M' are the bars or strips I employ for a connection between the follower and the toggle-levers in order to obtain a close press-box. These bars or strips may be made of metal or other suitable material, and there may be one or more at each end of the press, as expediency may suggest. These bars or strips are placed between the upright posts of the frame in such manner that they will fill up or occupy all or nearly all the space that is usually left between the said posts, and thus a close press-box is formed for the whole and more than the whole extent of the traverse of the platen or follower. Upon the lower ends of these bars or strips lugs or feet *n' n''* are formed, on which the platen or follower rests; and each pair of these lugs are connected to those opposite by rods *f*, as shown clearly in Fig. 4, in order to strengthen them and to form a better carriage for the platen or follower to rest upon, as well as to prevent any uneven pressure of the material in the press-box from crowding them out of place, or in any manner that would create much friction. In the example illustrated in the drawings these bars or strips M M', which I shall call "suspension-rods," are let into grooves made for that purpose in the interior sides of the chamber, as shown at *g g*, Fig. 6, Sheet 1, which is the arrangement I prefer; but instead of grooves there may be slots or spaces of the necessary width cut or made through the sides of the chamber for their reception, or thin bars may be used for this purpose, and made to stand flatwise against the insides of the chamber. These rods or bars should extend to a point above the top of the

packing-chamber, but a less height will answer, and at or near their top ends I make upon each of them a projecting lug, *h*, so as to extend completely through the side of the chamber, and to these lugs I attach the top ends of the toggle-levers *c c c c*, (shown particularly at *h h*, Fig. 4, Sheet 2,) there being a slot or long narrow opening, *j*, made through the chamber for each of said lugs to project through, of sufficient length for the whole traverse of the suspension-rods, and upon each of said rods, immediately at the sides of the said lugs, to the interior side of the chamber, I attach projecting flanges *k*, (shown in Fig. 5, sheet 2,) so as to form bearings for the said rods upon the inner sides of the chamber, to resist the outward strain upon the rods by the action of the toggle-levers *c c c c*.

The cope I, as has been stated, is also made to act as a beater while filling the press, and is furnished with a mechanism by which it is held in position, when used as cope, so as to resist the upward pressure of the platen, which mechanism is disengaged automatically when it is to be used as a beater. This mechanism is shown in Fig. 7, Sheet 1, N being a swinging bar which is attached to the top of the cope by the pivoted eyebolt *l*, and is swung around by hand, when it is to be secured so as to serve as a cope, into the position N', (shown by dotted lines,) when the packing-chamber is filled sufficiently to support it at the proper height, in which position the projecting ends of the bar N will take under the cross-framing G G of the press, thus effectually holding the cope in position; but when the cope is to be operated as a beater it is only necessary to draw upon the lifting cord or rope *e*, which will automatically swing the bar N into the position shown by full lines in Fig. 7, Sheet 1, by means of the second cord, *m*, attached to the bar N at the point *n*, and from thence passing around the horizontal sheave *o* and vertical sheave *o'* to its connection with the lifting-rope *e* at the point *p*. In the position of the parts as shown in Fig. 7 the lifting-rope *e* is in a direct line from the eyebolt *l* to the sheave *o'*. While the parts are in this position the point of attachment *p* of the lifting-rope *e* is drawn down by the overhauling of the cord *m* in swinging the bar N by hand into the position N', (shown by dotted lines,) thus causing a slack in the lifting-rope *e* between the point *p* and the eyebolt *l*. Accordingly, when the rope *e* is drawn taut, to lift the cope I its first action will be to take up this slack, thereby hauling on the cord *m* and releasing the bar N from catch with the cross-framing G G, by which arrangement, also, the bar N can never get into catch till required.

In filling the packing-chamber H H it is necessary to close the door K before the beater descends, which operation in some baling-presses is done automatically by the action of the beater; but as such automatic movement is not attended with any saving of time or

other advantages, and is subject to many objections in practical operation, I prefer to close this door by hand and to open it automatically, which I accomplish in the following manner:

To the top edge of the door K is attached the flat bar of iron *q*, Fig. 1, Sheet 1, having its ends projecting beyond the edges of the door K so as to engage with the pivoted latches *r r* attached to the side cheeks of the door. The outer ends of these latches are connected with the arms *s s* on the rocker-shaft *t* by means of the link-rods *u u*. Upon the inner side of this rocker-shaft is an arm, *v*, placed so as to be struck by or engage with the outer end of the small lever *w*, attached to the top of the cope or beater I, and by which the rocker-shaft is partly rotated on the descent of the beater, so as to put the latches *r r* out of catch with the bar *q*, when, by means of its own gravity or the recoil of a small spring, the door K will immediately fall open, so as to be ready at the earliest proper moment for the reception of additional material to the chamber.

If the links *u u* are not heavy enough to reset the latches *r r*, this may be accomplished by the additional arm and tumbling-weight *x*, attached to the rocker-shaft *t*. The short lever *w*, attached to the top of the beater, is so hung on its pivot as to act as a fixed arm in its downward passage with the beater, its inner end being made to rest on the top of the beater, thereby enabling it, in its downward motion, to press down the inner end of the rocker-arm *v*, causing it to move sufficiently while passing to liberate the latches *r r*; but in its upward passage this lever will be tipped by the arm *v* of the rocker, thus passing it without producing any motion of the rocker, the greater weight of the inner portion of the lever *w* causing it to recover its proper position immediately after it has passed the arm *v*, and as the arm *v* has to project a short distance over the inner edge of the packing-chamber, so as to engage with the lever *w*, a small groove is made in the cope or beater I under the lever *w*, as shown at *y*, Figs. 1 and 7, Sheet 1, and Fig. 5, Sheet 2.

On finishing the bale it is important to have a ready means of removing it from the press, and for this purpose it is necessary to relieve it from lateral and vertical pressure, which I accomplish in the following manner: I make a side door in the chamber of the press opposite to the place of the finished bale, as shown at P, Figs. 3 and 4, Sheet 2, and which has a joint or hinge, *z*, upon its top edge, and nearer its lower edge a transverse bar, D', Fig. 4, Sheet 2, to strengthen it crosswise. This door is kept closed while the chamber is being filled, and during the process of compression, by means of the sliders (shown in dotted lines at *a' a'*, Fig. 3, Sheet 2) being placed behind the transverse bar D, both sliders being operated simultaneously by the lever *b'* and connecting link-rod *c'*, Fig. 3, Sheet 2. Upon elevating the platen L to the full height, or nearly so, I

lock it in position by the sliding bolts *d''* and *d'''*, the lever *f'* connecting, by means of the link-rod *g'*, with the hand-lever *h'* on the rocker-shaft *k'*, which also carries the arm *m''*, working in a slot in the head of the sliding bolt *d'''*, by which arrangement both sliding bolts are operated simultaneously on moving the hand-lever *h'*. The platen, on having attained its full elevation, or nearly so, is thus secured in position when the operating-ropes *d' d'* of the toggle-levers are slacked up a little, which will cause the weight of the toggle-levers to hang in part upon the suspension-rods M and M', and the rods at M' being jointed at their lower part, as at *n'*, Fig. 4, Sheet 2, the foot of the rods under the platen L will turn on their joint-pin *n''*, and thus throw the joint *n'* and suspension-rods M' outward from the bale, effectually relieving the bale from all lateral pressure. On cording the bale the platen is lowered sufficiently to permit the removal of the bale from the press, when the platen may be run down to the bottom of the chamber. The lower doors being then closed and the cope elevated, the operation of forming a bale may be again commenced.

In constructing baling-presses upon the plan or in the manner herein described I do not limit myself to the exact details herein stated, but claim the right to use all mechanical equivalents therefor, or to use fewer or more of the parts mentioned, as may be considered advisable, or to enlarge or reduce the dimensions of the several parts or the proportions of the said parts or of the different parts of the press as a whole, as may be required, so long as I retain the principles of my invention.

Having thus described the nature, construction, and mode of operation of my improved baling-press, what I claim therein as my own invention, and desire to secure by Letters Patent, is—

1. Forming a close press box or chamber by the employment or use of bars or strips of metal or other material placed between the upright posts of the framing and working in suitable guides, and arranged so that their inner faces will be flush or nearly flush with the interior surface of the press box or chamber, and connected to the platen or follower and to the toggle-levers, and operating substantially as and for the purpose herein specified.

2. Forming feet or lugs *n' n''* upon the lower ends of the bars or strips M M', and connecting together each pair of the rods *f*, substantially as and for the purposes herein shown and described.

3. The use, in a toggle-lever press, of the lever-sills E E and sheave-frame F F F, and guide-sheave *d d d d*, so arranged as to form a secure foundation for the fulcrum-points of the radii of the toggle-levers, and at the same time provide a means of carrying the chains *d' d'* around the press-chamber, so that the plane of the motion of the lower ends of the toggle-

levers, and of the capstan used for winding the chains connected with the same, may be placed at any required height above the base of the press-chamber, substantially as and for the purposes herein specified.

4. The joints in the lower part of the suspension-rods, in combination with a side door or doors for liberating the bale from lateral pressure, substantially as described.

5. The use of mechanism for retaining and liberating the platen on finishing the bale, substantially as described.

6. The use of mechanism for opening the feed-door automatically, substantially as described.

7. The use of mechanism for liberating the cope automatically from the fixed position, so as to be used as a beater, by the action of the lifting-rope, substantially as described.

F. F. CORNELL, JR.

Witnesses:

A. B. MALCOMSON, Jr.,

ANDREW I. TODD.