(No Model.)

4 Sheets—Sheet 1.

D. K. WEST.

BALING PRESS.

No. 540,472. Patented June 4, 1895.

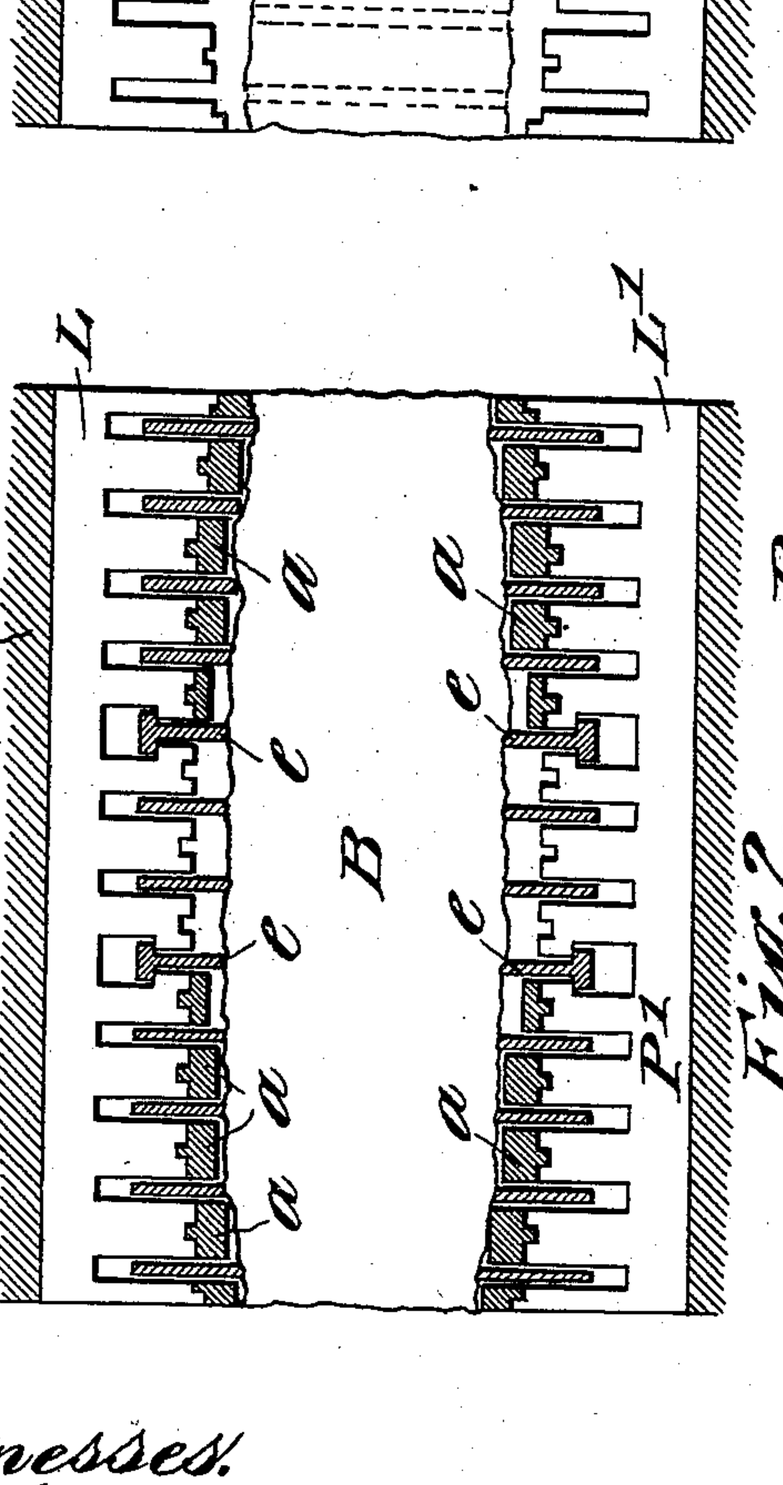

Fig. 3.

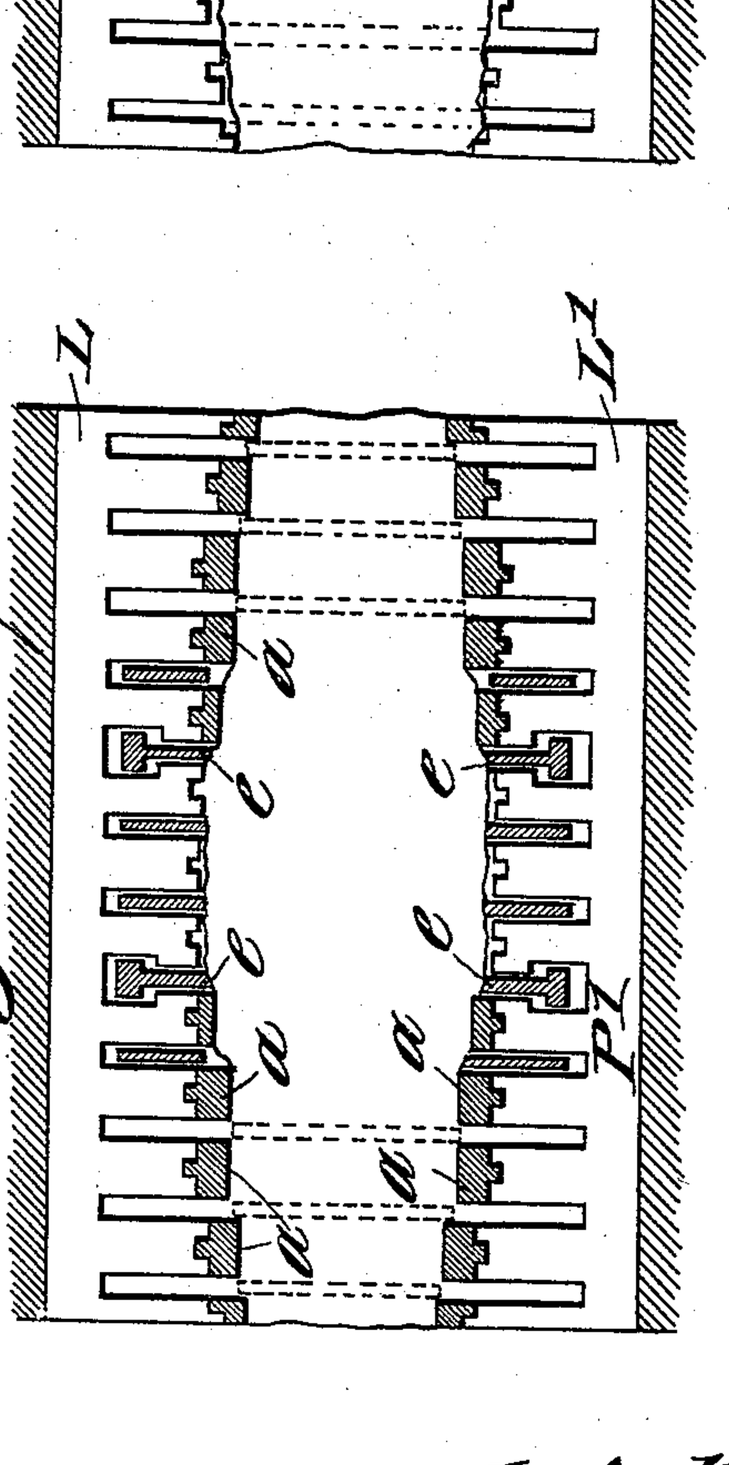

Fig. 4.

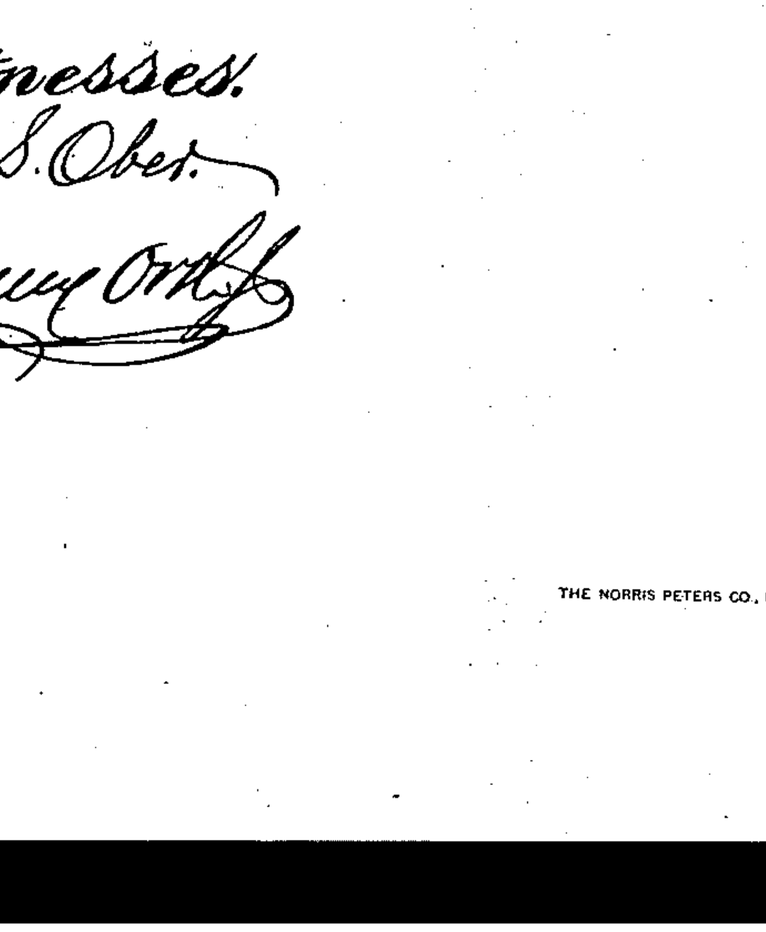

Fig. 1.

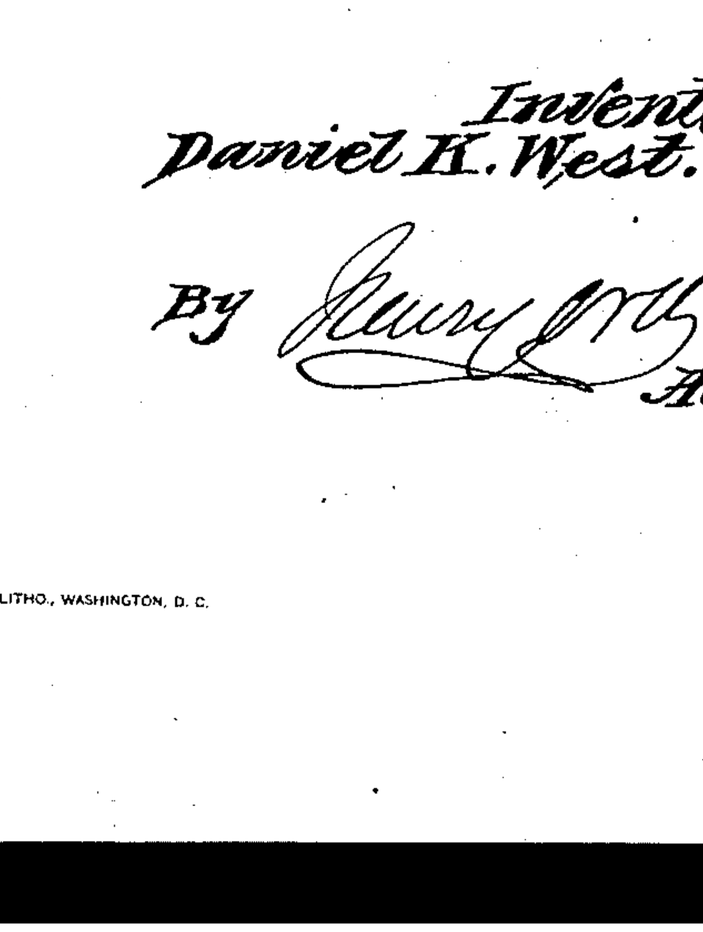

Fig. 2.

Witnesses.
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(No Model.)

4 Sheets—Sheet 2.

D. K. WEST.

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No. 540,472. Patented June 4, 1895.

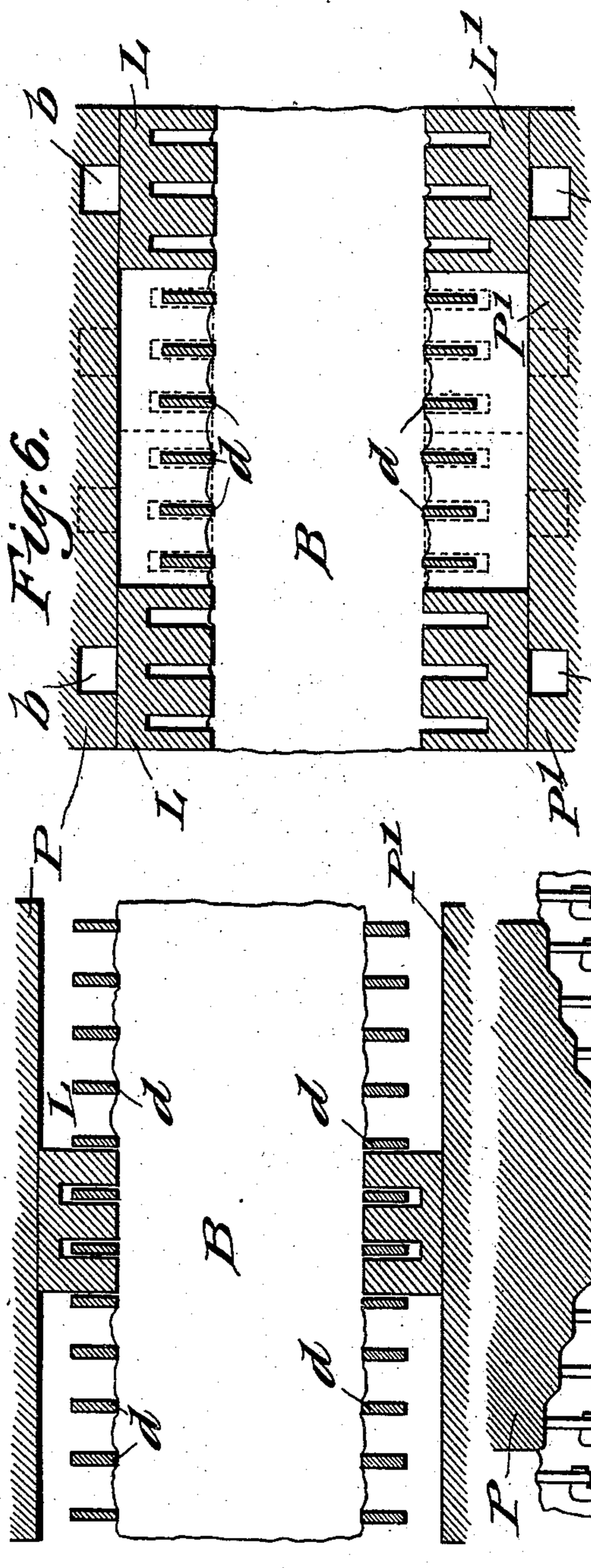

Fig. 6.

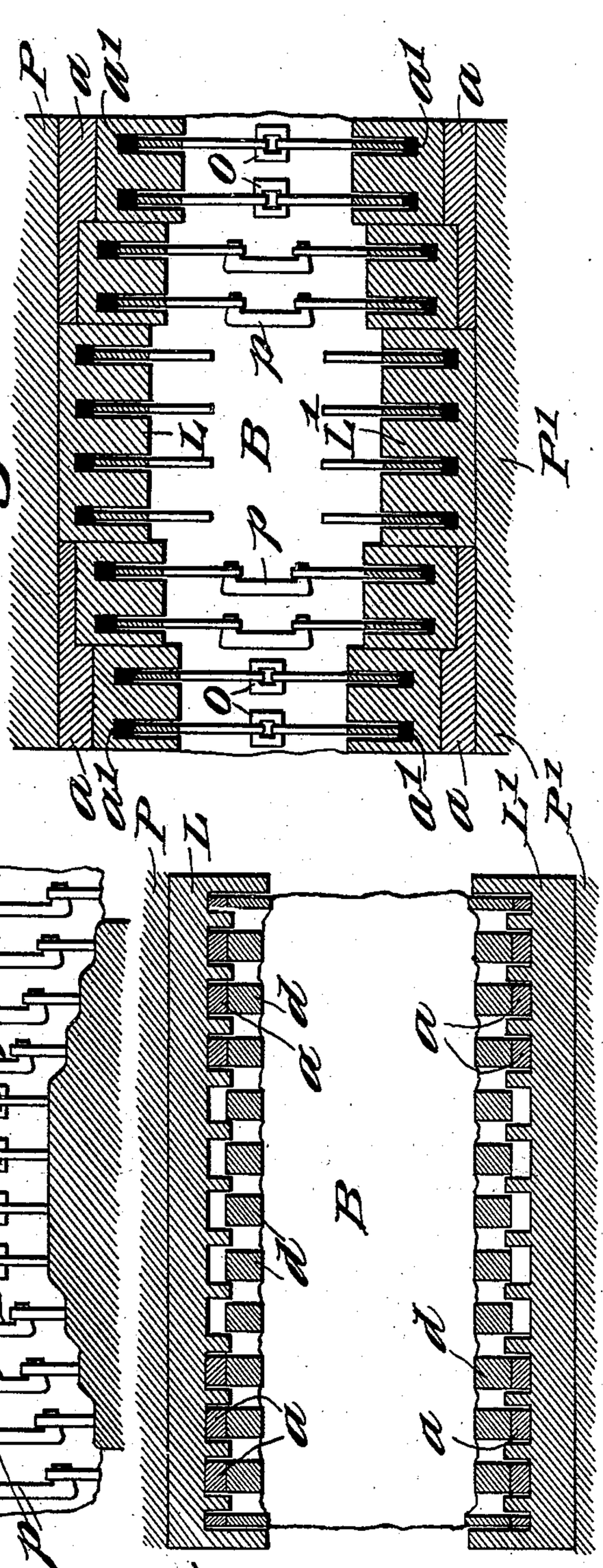

Fig. 8.

Fig. 5.

Fig. 9.

Fig. 7.

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(No Model.) 4 Sheets—Sheet 3.

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No. 540,472. Patented June 4, 1895.

Fig. 11.

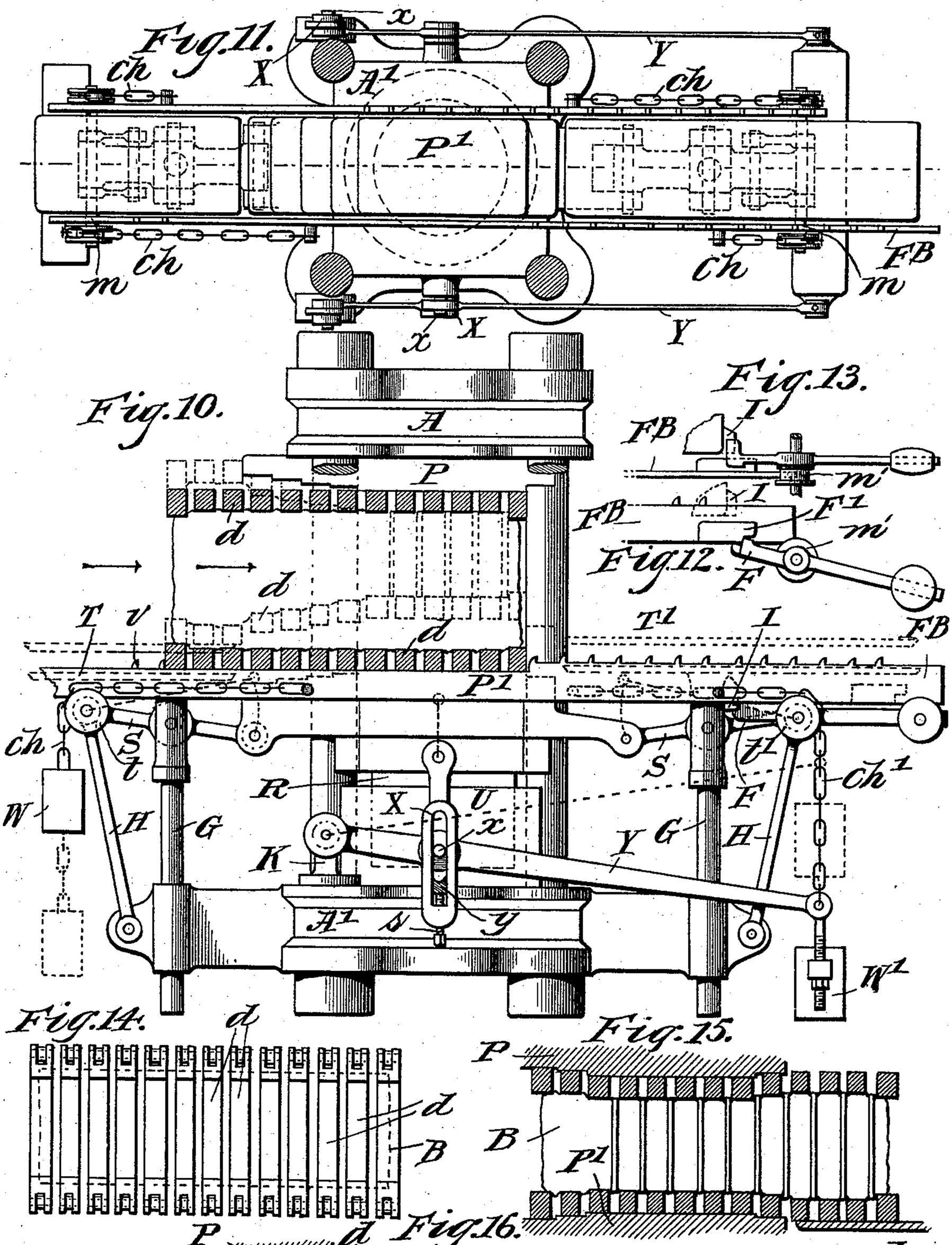


Fig. 10.

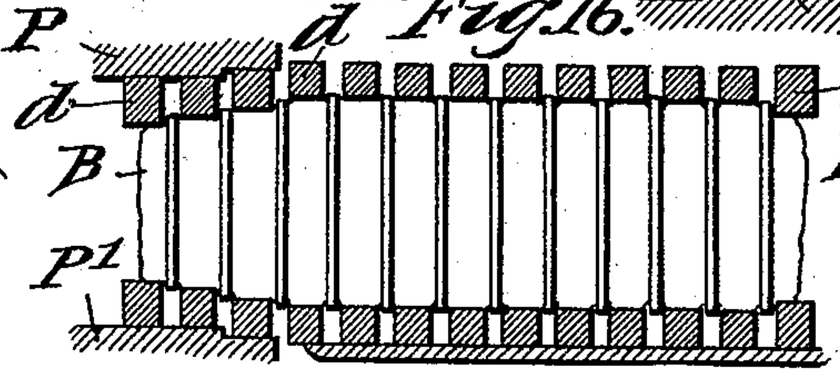
Fig. 13.

Fig. 12.

Fig. 14.

Fig. 15.

Fig. 16.



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(No Model.) 4 Sheets—Sheet 4.

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No. 540,472. Patented June 4, 1895.

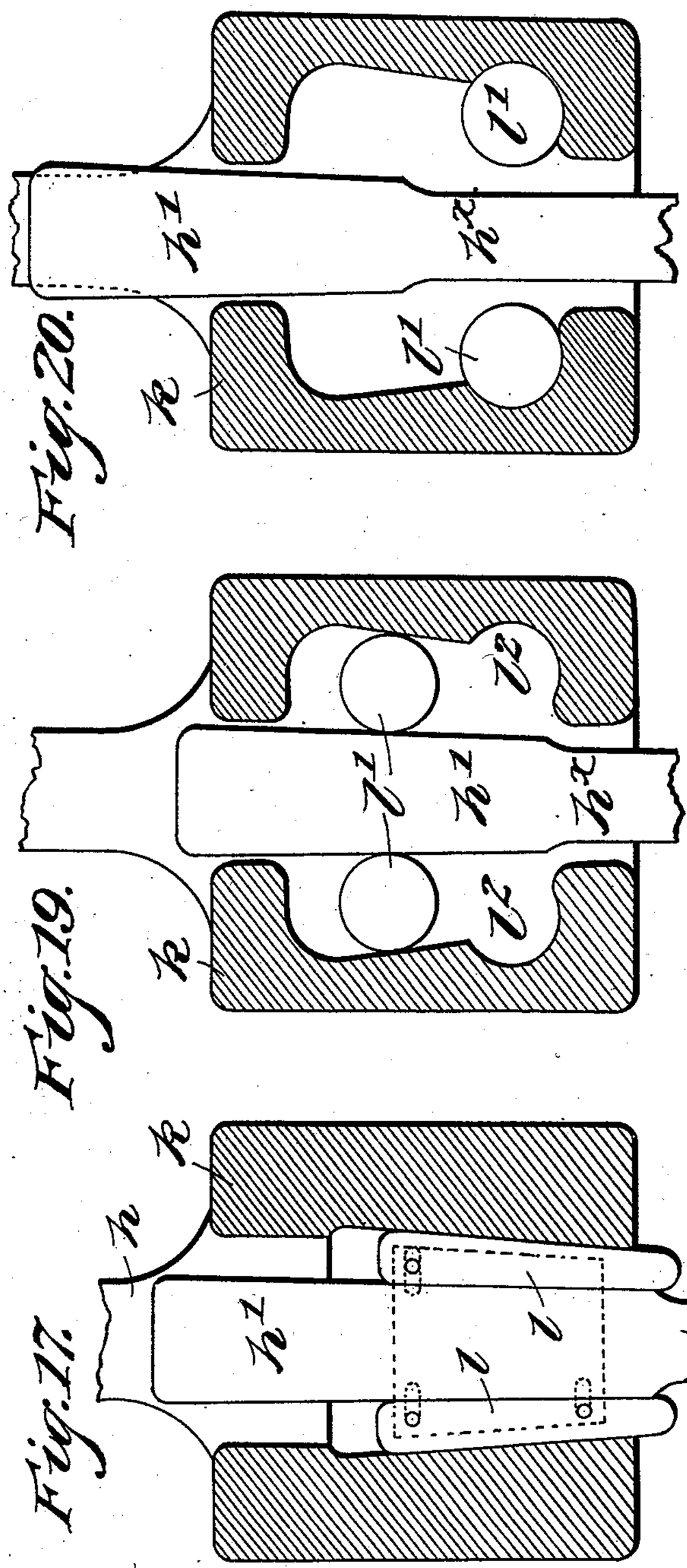

Fig. 20.

Fig. 19.

Fig. 17.

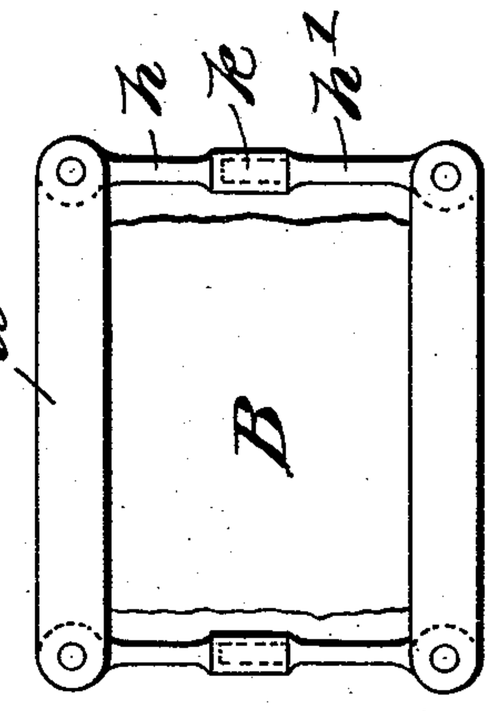

Fig. 21.

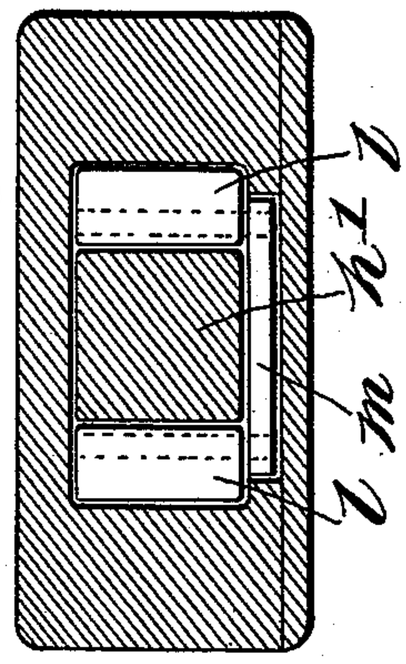

Fig. 18.

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Daniel K. West.
By Munn & Co Atty.

UNITED STATES PATENT OFFICE.

DANIEL KEMP WEST, OF LONDON, ENGLAND.

BALING-PRESS.

SPECIFICATION forming part of Letters Patent No. 540,472, dated June 4, 1895.

Application filed January 7, 1893. Serial No. 457,658. (No model.) Patented in England October 27, 1891, No. 18,476.

To all whom it may concern:

Be it known that I, DANIEL KEMP WEST, a subject of the Queen of Great Britain, residing at 23 Saint Mary Axe, in the city of London, England, have invented new and useful Improvements in and Connected with Presses for Baling Cotton and other Goods, (for which I have obtained a patent in Great Britain, No. 18,476, bearing date October 27, 1891,) of which the following is a specification.

The object of this invention is to reduce the prime cost and weight of apparatus for pressing cotton bales and other goods, and another object is by compressing the same into smaller bulk, to save freight in transport.

Instead of, as heretofore, by the usual method, applying the final pressure of the ram, rams or follower at one pressing operation to the whole surface of the bale or other package or goods, I apply the final pressure to one part after another, of the surface, and lash successively each such part after compression, until the whole length or area of the bale has been sufficiently compressed and lashed. This pressure may with advantage be considerably higher per square inch of pressing surface than heretofore, and I may thus reduce the bulk of the bale considerably below that hitherto usual. The power of the press is thus relatively increased, inasmuch as the area on which it acts at each pressing operation is decreased. I am also in a new finishing press able to reduce the width of the press very materially, if I, as I prefer it, introduce the bale from one end, instead of broadside from the front. The result is that the size, weight and price of the press are reduced, while the density of the compressed bale may advantageously be much greater, and the bulk much less than now.

In any existing press, I may, by the use of my invention, reduce the pressure per square inch of the ram or rams, and yet considerably increase the pressure per square inch of the part of the bale being compressed; but that my invention may be fully understood, I will describe the same in detail, reference being had to the accompanying drawings, in which—

Figure 1 is a fragmentary sectional elevation of the upper part of a press constructed in accordance with my invention, illustrating the operative devices in the position they occupy for the introduction of the battens, the bale being then suspended in the holders. Figs. 2, 3, and 4 are similar views illustrating the operative devices in the position they occupy during the two succeeding stages and the final stage of operation, respectively. Figs. 5, 6, and 7 are also fragmentary sectional views illustrating modifications in the arrangement and construction of the upper part of the press. Figs. 8 and 9 are like views illustrating the operative devices in different positions. Fig. 10 is a part sectional side elevation, and Fig. 11 a sectional plan view, of a compress of such construction as to admit of a bale being introduced endwise and portions thereof compressed and lashed in sequence. Figs. 12 and 13 are detail views. Fig. 14 shows the bale and holders in plan view. Fig. 15 is a sectional view showing the bale as under the second compression. Fig. 16 is a like view showing the bale as under the third or final compression. Fig. 17 shows the engaging ends of the bale-holder link. Fig. 18 is a cross-section thereof, illustrating one form of gripping device for holding and releasing one end of the link. Figs. 19 and 20 are vertical sections of the engaging ends of a bale-holder link, showing another form of gripping device; and Fig. 21 shows one of the bale-holders applied to a bale in elevation.

According to one mode of carrying out my process, I employ lashing plates adapted to operate only upon a portion, or a comparatively small portion of the platen and bale, instead, as heretofore, upon the whole. For this purpose I provide blocks or battens behind them, which blocks I shift as required, by screws, lever or handles from a portion or portions which has or have been compressed to the portion which is to be compressed next, after first lashing the portion of the bale which has previously been compressed.

To retain the loosely pressed portion of the bale while the readjustment is made for its final compression, and during such compression, I employ suitable holders, clamps, or dogs, which may also serve to remove the bale from the "half press" to the finishing press.

In Figs. 1 to 4, which illustrate so much of the upper portion of a compress as will make my invention clear to those conversant with

this class of apparatus, L and L′ indicate respectively the upper and lower lashing plates, provided with slots or grooves, some of which are made wider at the bottom to receive T-head shaped prongs *e*, of holders, which prongs are shown in section. In conjunction with the lashing plates L and L′, I use blocks or battens *a*, which are guided in some of the teeth of said lashing plates, and which serve the purpose of reducing the height of that portion or those portions of the bale to which they are successively applied, said battens being shifted from portion to portion, as each portion is lashed.

In Fig. 1 I have shown the bale B suspended in the holder prongs *e*, for the introduction of the battens *a*, the latter being shown in position at each end of the bale B in Figs. 1 and 2, and at the middle of the bale in Figs. 3 and 4, said battens being guided in the teeth spaces of the lashing plates L and L′. Fig. 2 illustrates the next stage in the process, when the press has been worked up and the bale has been compressed at each end and lashed, the holders *e*, having then been withdrawn. Fig. 3 illustrates the next stage, when the ram has been lowered again, the bale suspended in the holder and the battens *a* shifted to the central portion of the bale B. In Fig. 4 the press is next shown as worked up again, the central portion of the holder withdrawn, and the central portion of the bale compressed and lashed. The bale being now finished, it is removed, the ram having been lowered and the battens withdrawn, when the central portion of the bale B will swell out and the bale be parallel.

According to another mode of operation, I may use short lashing plates or platens, and shift the bale to receive the successive pressures in successive portions of its length between such compressing platens or plates. Fig. 5 illustrates in one view such an arrangement when the bale in its holder is inserted in a press provided only with one set of short lashing plates L and L′, the bale being pressed first in one portion, say the middle portion, then in another, say an end portion, and then in the other end portion, the portions being lashed in each position of the bale before the latter is moved into the next.

Fig. 6 illustrates an example when two pairs of lashing plates are used, the end portions of the bale being pressed first, the end portions of the holder then withdrawn, the lashing effected and the lashing plates shifted to the middle portion of the bale for compressing the same. Any suitable means may be provided for shifting the lashing plates.

In Fig. 7 I have shown a modification, in which a bale in the holder (which in this case is inserted while the bale is in the "half press") is inserted in the press between the plates L and L′, packing pieces or blocks *a* being put above the upper and below the lower prongs or battens *d* of the holder, these blocks being for convenience guided in the grooves in the lashing plates L, L′. The ends of the bale may, as here intended, be pressed and lashed first, and then the middle, the blocks *a* being shifted accordingly.

Figs. 8 and 9 refer to bales in which the pressure applied to them is so great, or the substance pressed so delicate that the same or its fibers might be damaged by being cut or forced into the grooves of the lashing plates.

Fig. 8 shows an arrangement of divided lashing plates, the teeth *e* of the holder being made to nearly fit the grooves of the lashing plates L, L′, and the blocks or packing pieces *a′* are inserted in the grooves to hold the faces of the teeth of the holder flush with the teeth of the lashing plates, thus producing a plane surface exposed to the final pressure. There being thus no grooves left for the lashing after compression, I divide the hoops or lashings and put them on above and below the bale before the holder is fixed, or I carry them in the holder.

If, as shown in Fig. 8, the ends of the bale are fully pressed and the hoops secured by the latchets *o* while the next adjoining portions of the bale are partly pressed, I hold the hoops thereon by means of longer latchets *p* and replace them at the next pressing operation by the short latchets *o*, while I apply the longer ones *p* to the next portion of the bale, and so on.

Fig. 9 shows a bale held in hoops with latchets *o* and *p* as in a finishing press, with flat plattens over and under the part of the bale to be acted upon and with sloping surfaces or easy steps to partly press other portions of the bale, and to prevent injury to the bale. The center portion is shown fully pressed and lashed by the latchets *o* and the other portions are then secured by latchets *p*. The center portion being finished, the bale is shifted and pressed in other portions, which are successively lashed.

To avoid damaging the material operated on by a too abrupt division line or ridge between a finally compressed portion of a bale and the succeeding adjoining one, I may give a part of the latter a preliminary compression first, thus forming a slight step or slope which is flatened down in the final compression of the said succeeding portion, and to retain such preliminary compression of part of the bale, the links which connect the prongs or teeth of the holders are made adjustable in length, by means, for instance, of wedges, clutches, knuckles, or other gripping appliances.

The foregoing description has relation to a compress in which the compressing devices are so arranged as to admit of the bale being introduced broadside, and so that successive portions thereof may be compressed and lashed. Of course such a compress must necessarily be of the required dimensions to accommodate the entire bale.

I have first herein-above stated that by my novel method of compression I am enabled to

materially reduce the dimensions of the compress by so constructing the same as to admit of a bale being introduced endwise, and successive portions thereof lashed in sequence. This construction I have shown in Figs. 10 to 16.

In Fig. 11 the direction of travel is indicated by arrows. The two halves of the view illustrate the feed bars in the two extreme positions, namely, toward the left and right, respectively, and the head of the compress is supposed to be removed, while in Fig. 10 the front columns are supposed to be removed.

A is the press head, and A′ the base, U the press cylinder and R the ram.

P and P′ are the platens, which have flat surfaces in the middle portion, a series of gentle steps to the left, and one or two steps to the right.

The bale is shown in a holder having separate battens or teeth *d* above and below, which battens are connected by the links *h* with sliding joints *k*, such as are shown in detail in Figs. 17 to 21, and serve to retain the partial compression of the second or other portion of the bale. The links *h* may be divided, or formed with a sliding joint *k*, and the necessary grip on or cohesion of this joint may be given by means of wedges *l* or rollers *l′* in a box on one part of the link.

In Figs. 17 and 18 the box *k* forming the lower end of upper part *h* of the link, is provided with wedges *l* which grip the upper end of the lower part *h′* of said link, and are connected to a plate *m* by means of pins working in slots. The wedges bind tightly upon the part *h′* and while allowing the latter to travel upward, prevent its descent. When the limit of travel is reached the lower narrower part $h^{\times}$ of *h′* passes up beyond the upper end of the wedges, and the links thus become released from each other.

Instead of the wedges *l*, rollers *l′* may be employed, as shown in Figs. 19 and 20, said wedges or rollers dropping into suitable wells l^2 as shown in said Figs. 19 and 20 when the limit of travel is reached, and the narrower part $h^{\times}$ of the link portion *h′* has passed up beyond the rollers, Fig. 19 showing the rollers in the gripping position, and Fig. 20 in the released position, the part of *h′* which operates with the wedges or rollers being by preference slightly tapered, Fig. 14 showing the bale B and holders in plan view.

In Fig. 10 the battens *d* are shown in section, while the dotted lines indicate their position when under the first compressing action of the press. Fig. 15 shows the bale as under the next compressing action, and Fig. 16 shows it under the third or final compressing action. Each portion of the bale is thus successively brought between the platens P and P′ and lashed. The bale is fed forward to the right after each pressing operation and when the ram is lowered. The bale is carried by the toothed feed bars F B which receive reciprocating motion, that is to say, to the left or under and free from the bale when the ram has risen sufficiently to clear the battens *d* of the holder from the teeth of the feed bars F B, and to the right when the ram is down and the holder battens *d* have fallen between the teeth of the feed bars, so that the latter carry the bale with them the distance of their travel.

The tables T and T′, one at the bale entrance end and the other at the bale exit end of the press, are mounted on stems G which work in guides on the base A′. For raising and lowering these tables with the rise and fall of the ram, but at half the speed or thereabout as stated, each table is jointed to the middle of a lever S. The latter is at one end connected to the platen P′ (or to the ram) and at the other end to the base A′ by means of links H. The upper joint pins of the latter also serve to carry the guide pulley *t* for the chains *ch* and *ch′*, but this is a mere matter of convenience, for the pulleys might be mounted in any other suitable manner.

To give the required motion to the feed bars, I connect them at each end with weights W and W′ respectively, the latter being the heavier. The feed bars F B are supported on wheels *m′* shown in the detail views, Figs. 12 and 13 and are connected to the weights by chains *ch* and *ch′*, which run over pulleys *t t′* respectively. The weight W′ is lifted by means of the lever Y which has its fulcrum in the bracket K and has a pin *x* at the center of the press where it works in the slot of a link X which rises and falls with the ram. The acting length of the slot is adjusted to meet the varying circumstances by means of the block *y* and adjusting screw *s*. The slot permits the ram to rise sufficiently to allow the holder battens *d* to rise clear of the feed bar teeth, and then the block *y* and pin *x* in the link slot lift the lever Y and the weight W′. The weight W being now free, drags the feed bars to the left and under the bale as the weight W′ rises and until the press is up, when the feed bars F B are under the bale and some of their teeth exactly under the space between the holder battens *d* (Fig. 15) which are over the flat portion of the platen P′. The pawl F now falls into gear in the stop F′ and prevents the feed bars from returning. The pawl gear is shown in the side view, Fig. 12, and under side plan, Fig. 13. The bale having been lashed in its pressed portion, the ram is caused to descend, the weight W′ and the lever Y being suspended by the chain until the press is just down, when a discharge arm I upon the table T′, Figs. 10, 12 and 13, releases the pawl F, and the weight W′ being heavier than the weight W falls and drags the feed bars F B to the right and the bale with them, into the next position for pressing. The lever Y falls with the weight W′ and resumes its original position. The arm I may be connected to the ram instead of to the table T′. The reciprocating action of the feed bars being constant

with each rise and fall of the ram a second bale may be dragged in behind the first one, and so on, thus producing continuous action. There may for this purpose be supplementary teeth *o* on the feed bars (as shown in Fig. 10) and as the lever Y is unfettered by the link X when the ram is down this lever on the feed bar may be connected with hand gear to produce the reciprocating action of the feed bars without working the press ram. This is useful in drawing the bale into the press at the beginning of the day's work, or after any break in the work.

Having thus described my invention, what I claim as new therein, and desire to secure by Letters Patent, is—

1. The process of compressing bales and the like, having undergone a preliminary pressure, which consists in the further or final compression of each portion of the bale in sequence, and the successive lashing of the successively compressed portions.

2. The process of compressing bales or the like having undergone a preliminary compression, which consists in the further or final compression of each portion of the bale in sequence to a uniform density, and the successive lashing of the successively compressed portions.

3. The process of compressing bales and the like having undergone a preliminary compression, which consists in the further or final compression and lashing of each portion of the bale in sequence.

4. In a baling press, the combination with the platens of compressing devices adapted to be shifted from one portion of the platens to the other to compress portions of a bale in sequence, for the purpose set forth.

5. The combination with the platens P and P′, of the divided lashing plates L and L′ having grooves for receiving bale holders or fastenings, bale holders which are adapted to be inserted into said grooves and to be withdrawn therefrom, and blocks *a* adapted to be inserted between the bale holders, substantially as and for the purpose set forth.

6. A finishing press comprising compressing devices constructed and arranged to receive the bale head on, and adapted to compress portions thereof in sequence, substantially as and for the purpose set forth.

7. A finishing press comprising compressing devices constructed and arranged to receive the bale head on, and adapted to compress portions thereof in sequence, in combination with lashing plates arranged to admit of the lashing in sequence of the successively compressed portions of the bale, substantially as and for the purpose set forth.

8. A finishing press comprising compressing devices constructed and arranged to receive the bale head on and adapted to compress portions thereof in sequence, in combination with feeding devices adapted to feed the bale to bring successive portions thereof to the compressing devices, for the purpose set forth.

9. A finishing press comprising compressing devices constructed and arranged to receive the bale head on, and adapted to compress portions thereof in sequence, in combination with feeding devices adapted to automatically feed the bale to bring successive portions thereof to the compressing devices, for the purpose set forth.

10. A finishing press comprising compressing platens having their proximate faces stepped and provided with plane surfaces intermediate of said stepped portions, for the purpose set forth.

11. A finishing press comprising platens having their proximate faces stepped and provided with plane surfaces intermediate of said stepped portions, said platens arranged to receive the bale head on, for the purpose set forth.

12. A finishing press adapted to receive the bale or other goods end on, and consisting essentially of the press head A, the base A′, columns connecting the head and base, the press cylinder U with ram, the upper and lower platens P and P′ having stepped back and front extension, a bale holder having detachably connected teeth *d*, toothed feed bars F B, for carrying the bale, means for giving the feed bars reciprocating motion, tables T and T′ for supporting the overhanging end portions of the bale, means for guiding the tables vertically, and suitable connections between the ram and tables adapted to impart the required relative movement thereto, substantially as set forth.

13. In a finishing press, the combination of the toothed feed bars F B, wheels for supporting them, chains attached to the feed bars and having weights W and W′ for propelling the feed bars, guide pulleys for the chains, the levers Y, which at one end are connected to the weight W′ and at the other end are jointed to the base of the press and at an intermediate point are provided with a pin, a link X jointed to the ram and having a slot of adjustable length, in which slot the pin works, a pawl F for stopping the motion of the feed bars in one direction, and a tripping gear connected to the ram for releasing the pawl, substantially as and for the purpose set forth.

14. In a finishing press, the combination of tables T and T′ having stems G, guides on the base A′ for guiding the tables vertically, and levers S connected in their middle part to the tables, at one end to the platen P′ and at the other end by links H to the base A′, substantially as and for the purpose set forth.

15. In a baling press, a bale holder comprising bars *d* and links connecting said bars at opposite ends, said links constructed of two parts one of which is provided at the free end with a box as *k*, for the reception of the free end of the other link section, in combination

with a gripping device within said box adapted to grip said free end and hold the same against movement in one direction, for the purpose set forth.

16. In a baling press, a bale holder comprising bars *d* and links pivotally connecting the opposite ends of said bars, said links constructed in two parts, one of the link sections provided at its free end with a box as *k* for the reception of the free end of the other link section, the end of the latter link section being of increasing diameter outwardly, and provided with a throat or contracted portion $h^{\times}$, in combination with gripping devices operating to grip and hold the tapering link end against motion out of its box until said throat or contracted portion $h^{\times}$ has moved beyond or above the gripping devices, substantially as and for the purpose set forth.

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