Sept. 25, 1934. S. B. MINNICH 1,975,013

BALING PRESS

Filed May 1, 1934 2 Sheets-Sheet 1

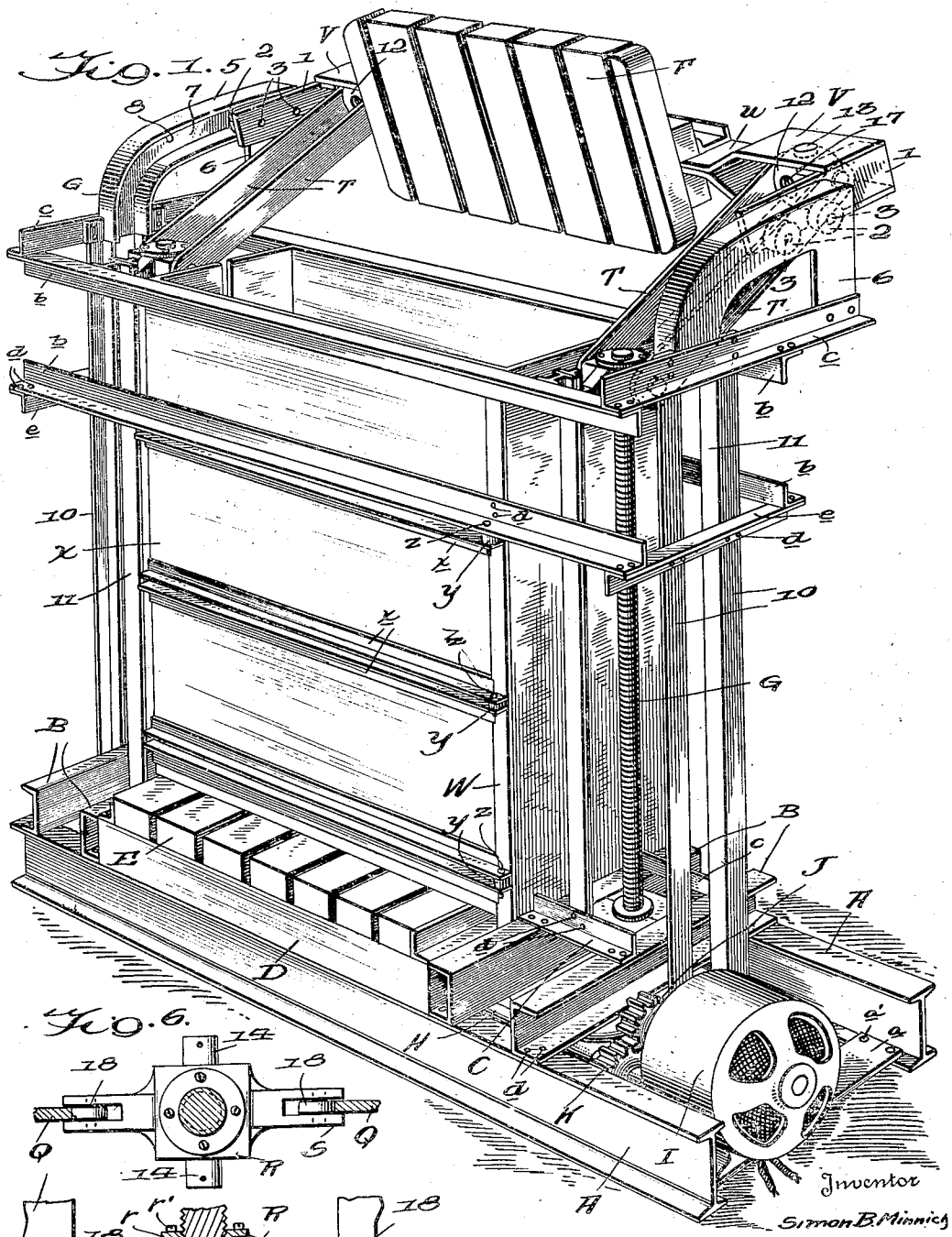


Fig. 5.

Fig. 6.

Inventor
Simon B. Minnich

By Richard E. Babcock
Attorney

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Fig. 2.

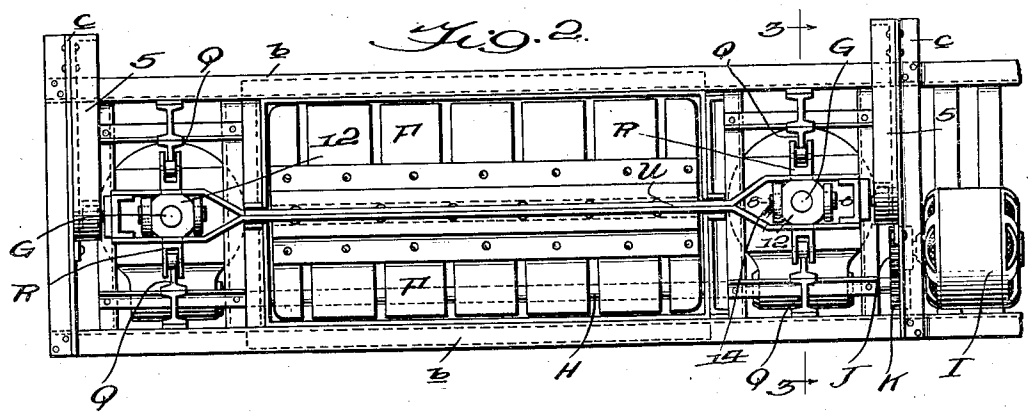


Fig. 4.

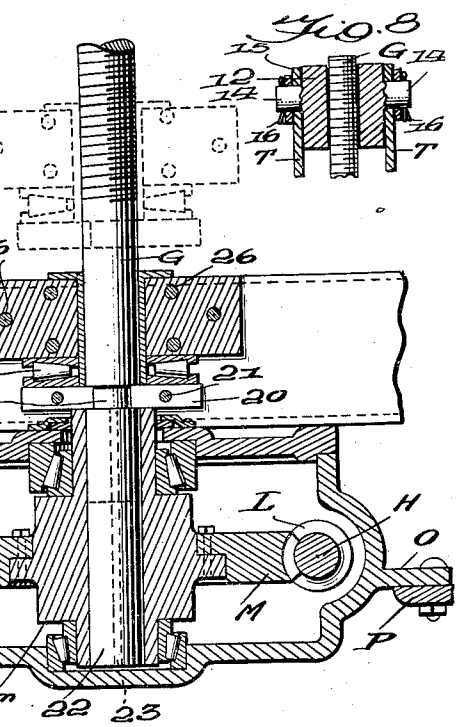


Fig. 3.

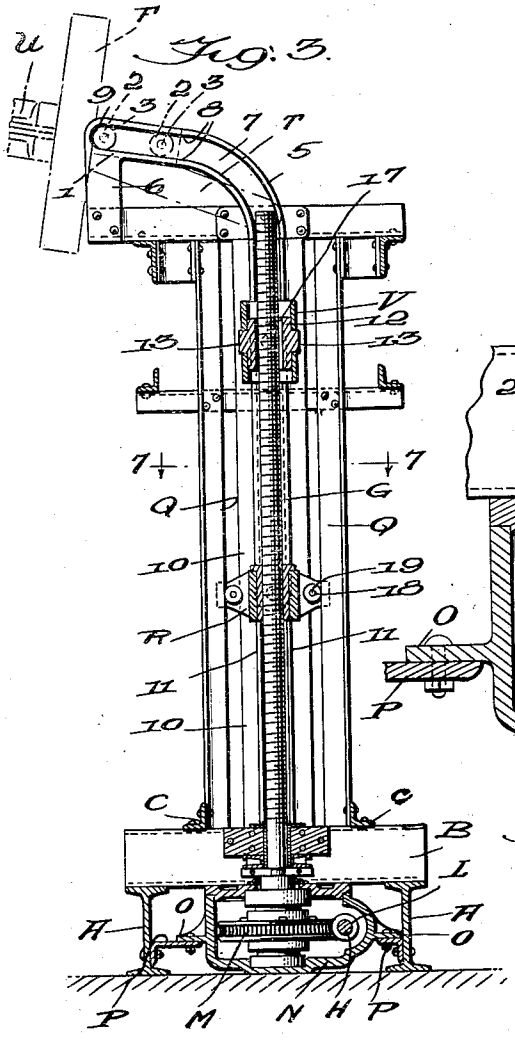
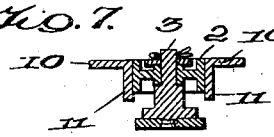


Fig. 7.



Inventor
Simon B. Minnich

By Richard E. Babcock
Attorney

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BALING PRESS

Simon B. Minnich, Landisville, Pa., assignor to Minnich Machine Works, Landisville, Pa., a corporation of Pennsylvania

Application May 1, 1934, Serial No. 723,385

6 Claims. (Cl. 100—8)

This invention relates to reciprocating plunger or platen baling presses of the type wherein the plunger or platen as it approaches the upper end of its reciprocatory movement is caused to swing, move or turn to clear or leave unobstructed from above the top of the baling chamber. The press may be driven by any suitable power means, for instance, by an electric motor as shown. Also, if desired, any suitable known control means, such as now commonly employed in many fields in connection with electrically driven machinery, presses and other apparatus, may be provided, though no such control means has been illustrated or even conventionally indicated in the accompanying drawings.

The primary objects of the present invention are, to provide in a baling press of the type described automatic means for swinging the platen laterally out of the way as it approaches the upper end of its movement and for returning it to operative pressing position in the baling chamber all automatically without the need of intervention or attention of the press operative, maintaining said plunger or platen under the control of the automatic operative mechanism of the press at all times; to simplify the parts used in such controlled automatic shift and return movement of the plunger or platen; to avoid excessive strain incident to such operation; to avoid downward swinging movement of the platen under its own weight as it is shifted laterally out of operative pressing position whereby shock and strain on the parts and loss of energy in raising the platen incident to returning it to operative position will be avoided; to provide a rigid guided slide for each end of the plunger or platen in association with cooperating guides whereby throughout its shifting movement in both lateral directions the platen will be always under control and when in its extreme lateral outward position and in all intermediate positions so held that its own weight will have the tendency to move it back to normal operative pressing position; to provide means in association with said slides for guiding said plunger or platen throughout its operative reciprocatory movement in the baling chamber to prevent wobbling, twisting or binding of the former in the latter; to provide universal joints in the connections between the platen and the reciprocating means therefor; to provide a baling press which may be shipped in knocked-down condition ready for erection to conserve space in shipping and nevertheless with the driving heads or gears, their common drive shaft and the driving motor all rigidly and permanently mounted on or in the base or bed in fixed operative position with relation to each other and to this end to so form and construct the lower end portions of the reciprocating screw and their related parts that said screws may be removed endwise from, and inserted endwise into locking engagement with and to turn with, their respective driving heads or gears and may be detachably held in the latter position, all without disturbing the mountings for said driving heads or gears or their bearings or any part of the drive assemblage.

In this application I show and describe simply the present preferred embodiment of my invention to illustrate the practice thereof as by law required. However, I am aware that my invention is capable of other embodiments and that the several details thereof may be modified in various different ways, all without departing from my said invention. With this situation in mind, the drawings and description hereof are to be considered merely as illustrative and not as exclusive.

In the accompanying drawings:

Figure 1 represents a perspective view of a baling press embodying my invention;

Figure 2, a top plan view thereof;

Figure 3, a sectional view on the line 3—3 of Figure 2, looking in the direction of the arrows, the reciprocating screw, drive-head or gear for the latter together with associated parts, the nut slideway bars and the spacing blocks at the tops of the latter all being shown in elevation;

Figure 4, a detail view in the same plane as Figure 3 on an enlarged scale through the screw driving head or gear, its casing and associated bearings;

Figure 5, a greatly enlarged fragmentary detail sectional view of the nut R, its cooperating slideway bars Q and the operating screw G of one end of the press, this construction being duplicated at the other end of the press;

Figure 6, a top plan view on the same scale of the parts shown in Figure 5;

Figure 7, a detail fragmentary sectional view through one of the slides 1, one of its rollers 2 and associated parts and the cooperating vertical posts 10 with their opposed parallel inwardly extending guiding flange faces 11 in guiding relation to said roller 2, said view being taken in a plane corresponding to line 7—7 of Figure 3; and

Figure 8, a detail fragmentary sectional view on line 8—8 of Fig. 2.

Referring now in detail to the drawings, A designates two long supporting beams, preferably metal I beams, preferably at each side of the press, extending lengthwise thereof and cross-connected by two pairs of cross-beams B preferably bolted to the top flanges of said beams A. The bed D is mounted on the top flanges of the beams A between the two pairs of cross-beams B as illustrated in Figure 1 and supports the lower platen E.

A pair of spaced vertical angle bars or posts

having sidewise extending flanges 10 and parallel spaced endwise extending slide guiding flanges 11 is arranged at each end portion of the bed closely adjacent the respective outer cross-bar or beam of each of the resepctive pairs of cross-beams B and is preferably rigidly secured in any suitable and convenient manner to either the cross beam B mentioned or to the I-beams A, or both to the said cross-beam B and the I-beams A so as to give a sturdy rigid mounting of said vertical bars. Such connection may be to a cross-bar similar to the cross-bars *a* on which the motor I is mounted and similarly secured by bolts or rivets to the lower inner flanges of said beams A. The means of connection between said vertical angle bars and the said cross-bar or other part on which they are mounted is to be detachable, preferably by means of bolts and nuts so that the parts may be separated and knocked-down for shipment.

Similarly the fixed end walls W of the baling chamber will be secured by removable means, such as bolts or screws not shown, to the bed D or the adjacent cross-beam B, or both, or clamped between the two.

In assembled relation two vertically spaced rectangulalr frames each rigidly connected together and each bolted to each of the vertical angle bars and to the flanges of the respective members W of the rigid end wall of the baling chamber serve to maintain said parts rigidly in proper spaced relation. The upper frame is mounted flush with the top of the baling chamber and two long angle form metal side bars *b* respectively detachably secured by bolts *d* to the outer vertical edge flanges of the baling chamber wall members W and also detachably connected at each end portion respectively to the corresponding respective end portions of each of the respective short similar angle form metal end bars *c* in similar detachable manner by bolts *d*, said end bars *c* each being detachably connected by bolts *d* to the upper end portions of each of the vertical angle bars of the respective pairs of said vertical angle bars.

An electric motor I is mounted on cross-bars *a* preferably permanently connected as by welding or as by rivets or bolts *a'* to the upper faces of the lower inner flanges of the beams A and has mounted on its shaft a gear or pinion J meshing with and driving a pinion K secured to the shaft H. Said shaft H is mounted in suitable bearings in the gear-housings N and on that portion located in each housing M is provided with a worm gear L meshing with and driving a drive-head or gear M rotatably mounted in each housing. Each said housing N has a top cover securely held in position by any suitable means, such as screws, and the corresponding drive-head or gear M is held properly centered and mounted for rotation between suitable upper and lower bearing means respectively held in proper position by the top and bottom respectively of each said housing N, and if desired, a felt or similar washer may be held to the top surface of each said cover concentric with the upwardly projecting hub *m* of said gear, which hub *m* extends through and slightly above said cover, all as shown in Figure 4, this felt or similar washer having the function of keeping out dust, dirt, grit and other foreign matter.

Each housing N is formed with suitable flanges O or other portions having the same general function, to rest on and be secured to, preferably detachably as by bolts, to projecting parts or flanges P projecting from or welded, riveted or bolted to the respective beams A, whereby each of said housings N will be secured to each of said beams A and rigidly supported between said beams A.

The operating screws G driven respectively by the drive-heads or gears M extend upward therefrom through their respective reciprocating nuts R which in turn have bifurcated end portions S receiving the adjacent portions of the slideway bars Q respectively, which bars prevent the nuts from turning with their respective screws G and also keep said screws G properly centered throughout their lengths between their respective cooperating pairs of slideway bars Q. If preferred the nuts R may each be provided with a removable and replaceable central threaded preferably bronze bushing *r* secured in place by screws *r'* or other suitable means. Said nuts R are respectively connected by pairs of links T to a sleeve block 12 pivotally mounted between the furcations of the bifurcated end portions V respectively of the rigid cross-beam U carrying the plunger or platen F.

The doors X are reinforced lengthwise by spaced angle irons *x* and respectively hingedly mounted on the edge flanges of the fixed end wall members W by means of perforated lugs Y projecting at spaced intervals from said edge flanges closely adjacent to, and substantially in rubbing contact with, the horizontally extending flange portions of said angle irons *x*, which are perforated in registry with the corresponding perforations in said lugs, pins Z inserted in said registering perforations serving to hingedly connect the doors W to said edge flanges respectively. As thus mounted in closed position each door X extends lengthwise of one side and partially across one end of the baling chamber, the two adjacent ends of the doors in closed condition being spaced from each other at an interval sufficient to permit the upward and downward movement of the platen beam U. Said doors X may be secured together in closed position by any usual and suitable means, not shown, and in closed position defined, in association with the fixed rear end wall members W, the baling chamber.

The slideway bars Q will have their respective lower ends detachably held rigidly in proper position, as by being secured by bolts *d* to bars or brackets C which may be similarly detachably secured by bolts *d* to the cross-beams B, and will have their respective upper end portions suitably held or connected to suitable spacing blocks detachably connected as by bolts *d* to the adjacent portions of the side bars *b* of the upper rectangular frame.

All elements and parts above referred to by letters broadly considered are old and known in this art, but have been referred to in detail to give the proper setting of the novelty of the present invention.

The platen beam U is suitablly reinforced by angle beams and suitably rigidly connected to the platen by bolts, screws or other suitable means as shown in Figure 2 and receives between the furcations of each of its bifurcated ends V a sleeve block 12 having aligned trunnions 13 received in corresponding recesses, holes or bearings in the respective furcations to mount each said sleeve block 12 in its respective bifurcated end portion V for rocking or turning movement in a plane coincident with the axis of said beam U. Each said sleeve block 12 is formed

with a central bore 17 to freely slidably receive the upper end portion of its corresponding operative screw G and is provided with studs 14 having a common axis extending perpendicular to, and preferably in the same plane as, the common axis of the trunnions 13. The upper ends of the corresponding pair of links T are formed with holes to receive said studs 14 respectively, after which washers 15 are respectively slipped over the free end of the respective studs 14 and cotter pins 16 are inserted and secured in the transverse holes in the said studs 14 respectively to engage the outer faces of the respective washers 15 to maintain the same and the upper ends of the links T on the respective cooperating studs 14. The lower ends of the said links of each pair may be similarly pivotally connected to the corresponding nut R.

The slides 1 respectively are preferably welded between the extreme outer end portions of the respective bifurcated ends V of the beam U to be rigidly held with relation to said beam and have straight downwardly depending arms provided at an interval below said beam U with a pair or plurality of spaced projections of such transverse dimensions as to be just snugly slidably received between and guided by the opposed flanges 11 of the vertical guideway whereby rocking or wobbling of the platen in the baling chamber will be at all times prevented. Said projections will be of such size and so spaced with relation to each other as to be slidably received between the opposing upper and lower walls of the channels 7 of the guiding platen tilting castings 5, and so that they can travel around and through the arc or abrupt bend in said channels 7. Preferably each said slide 1 will have a pair of such projections, and said projections will preferably be in the form of wheels or rollers 2 mounted on pins or spindles rigidly mounted in or on the respective slides 1 in any suitable known manner, and washers applied to the outer ends of the pins or spindles 3 and held thereon by cotter pins, as shown, or in any other suitable and known manner, serve to retain said wheels or rollers 2 on said spindles. However, while this wheel or roller form of projection is preferred, it is not essential.

The castings or guides 5 for the tilting and return movement of the platen are respectively to be mounted on the respective upper cross-bars c with the inner faces of their walls 8 flush, or in alignment, with the opposed faces of the cooperating faces of the respective pairs of opposed flanges 11, and slightly above this point the guide channels 7 are bent rather abruptly transversely of the press and continued thereafter on a gentle upward curve or incline laterally of the press, whereby the slides 1 in following the path of movement defined by said guides 7 will travel laterally outward beyond the vertical plane of that side of the press and cause the similar movement in a partially rotated nearly vertical position of the platen, thus permitting the unobstructed charge or filling of the baling chamber preliminary to the succeeding compressing operation.

Each pattern or guide 5, preferably a casting, is formed with a rear supporting leg 6 and is preferably removably secured, as by bolts *d* to the upper cross bar *c* of its end of the press at two points, that is, through the lower portion of said leg 6 and adjacent the lower end of the channels 7. Also, preferably each said guide 5 will have the rear end of its channel closed by an end wall 9 as providing a sturdier construction.

Preferably a roller or anti-friction wheel 18 will be mounted by a pivot pin 19 between the furcations of each of the bifurcated ends S of the nut R and so as to rollingly engage the respective opposed edge faces of the respective slideway bars Q.

Each drive-head or gear hub *m* is formed with a central vertical hole or bore to snugly slidably receive the lower end portion 22 of its corresponding operating screw G, which is formed immediately above said portion 22 with an annular groove 20' to receive the members of a split collar 20 fitting into said groove and held clamped in position by bolts 21. The said hole or bore in the hub *m* and the said lower end portion 22 of the screw G are to be of such shape in cross section, or so formed or related or interlocked, that the two will rotate together when said portion 22 is located in said hole or bore. To this end the said bore or hole may be formed with a long inwardly extending tooth or rib 23, and the portion 22 may be formed with correspondingly shaped slot receiving said tooth or rib 23, or the rib 23 may be provided on and projecting radially from portion 22 and the hole or bore may be formed with a slot to receive said rib, or this same function may be obtained in various other ways as, for instance, by flattening one segment of the portion 22 for a part or all of its length and similarly shaping and sizing the hole or bore in the hub *m*.

An anchor piece 25, which may be a solid piece slipped endwise on the screw G, say from the end of portion 22 prior to the mounting of the split collar 20 is removably secured in proper centered position between the corresponding pair of U-beams B by bolts 26, which in the assembled operative relation of the parts serve to hold the screw G against endwise movement with the portion 22 extending for its full length in the hub *m* and with the collar 20 resting on the upper end of the hub *m*. An endthrust bearing assemblage 25 will preferably be interposed between the upper face of the collar 20 and the lower face of the anchor block 25.

From the foregoing description it will be seen that by reason of the location of the projections or wheels or rollers 2 on the slides 1 in a plane below the lower face of the platen F the latter will have cleared the level of the top of the compression chamber before it commences its partial rotary movement and so cannot bind in the said chamber, also that there is no complicated leverage arrangement. Further, that as the tilting operation progresses the platen moves upwardly on a gentle incline and at its extreme laterally outward movement is at the highest point of its movement with its weight acting to force it back in the reverse direction, so that on the initiation of the reverse movement there is no lost energy or dead weight to overcome or lift.

Likewise, it will be obvious that the same projections or wheels or rollers 2 also cooperate with the guideways 11 to maintain the platen F in proper position throughout its compression stroke and reverse movement as well as guiding or directing it in its tilting movement.

Also, it will be apparent that by removal of the bolts *d*, or some of them, the press can be taken apart or knocked down and that by removal of the bolts 26 the screws G may be pulled from position without in any degree disturbing the drive assemblage and that as thus knocked down the press can be shipped in flat or knocked-down condition with the drive assemblage in condition for driving operation.

I claim:

1. In a baling press having a baling chamber formed with an open upper end, a movable platen beam, a platen rigidly secured to said beam, slides respectively rigidly connected to the respective end portions of said beam and depending below the lower face of said platen, vertical permanently centered actuating screws, means for rotating said screws, guided nuts respectively mounted on said screws and engaged by the threads thereof, sleeve blocks pivotally mounted in the respective end portions of said beam and adapted to loosely move endwise of the respective screws, pairs of links respectively pivotally connected to the respective sleeve blocks and to the respective corresponding nuts, and pairs of spaced vertically aligned outwardly projecting rollers mounted on the lower portions of the respective slides in such position that the common axis of the lower rollers of said pairs of rollers is at least as low as the lower face of said platen, in combination with a pair of opposed tilt guide plates respectively rigidly connected to the respective upper end portions of the press and formed with correspondingly shaped upwardly and laterally curved guide slots respectively receiving the respective pairs of rollers, and pairs of spaced vertical guide flanges respectively disposed at the respective end portions of the press and in vertical alignment with the lower ends of the side walls of the guide slots and serving to receive therefrom and guide throughout the operative compression and reverse movement of the platen the said pairs of rollers respectively, said slots having their highest points at their extreme lateral outer ends and inclining downward from said points toward their front ends to merge said inclines into abrupt downward curves, and said pivotally mounted sleeve blocks permitting slight relative vertical variations between the ends of said beam.

2. In a baling press having a baling chamber formed with an open upper end, a movable platen beam, a platen rigidly secured to said beam, slides respectively rigidly connected to the respective end portions of said beam and depending below said platen, means for raising and lowering said beam, and pairs of spaced outwardly projecting rollers mounted on the lower portions of the respective slides in such position that the common axis of the lower rollers of the said pairs of rollers is disposed below the lower face of said platen, in combination with a pair of opposed tilt guide plates respectively rigidly connected to the respective upper end portions of the press and formed with correspondingly shaped upwardly and laterally curved guide slots respectively receiving the respective pairs of rollers, and pairs of spaced vertical guide flanges respectively disposed at the respective end portions of the press and in vertical alignment with the lower ends of the side walls of the guide slots and serving to receive therefrom and guide throughout the operative compression and reverse movement of the platen the said pairs of rollers respectively, said slots having their highest points at their extreme lateral outer ends and inclining downward from said points toward their front ends to merge said inclines into abrupt downward curves.

3. In a baling press, a movable platen beam, slides respectively rigidly connected to the respective end portions of said beam, a platen rigidly secured to said beam, means for raising and lowering said beam, and pairs of spaced outwardly projecting rollers mounted on the respective slides in such position that the common axis of the lower rollers of said pairs of rollers is disposed below the upper face of said platen, in combination with a pair of opposed tilt guide plates respectively rigidly connected to the respective upper end portions of the press and formed with correspondingly shaped upwardly and laterally curved guide slots respectively receiving the respective pairs of rollers, said slots having their highest points at their extreme lateral outer ends.

4. In a baling press, a movable platen beam, slides respectively rigidly connected to the respective end portions of said beam and depending therefrom, means for raising and lowering said beam, and pairs of spaced projections extending endwise outwardly from the lower portions of the respective slides, in combination with a pair of opposed tilt guide plates respectively rigidly connected to the respective upper end portions of the press and formed with correspondingly shaped upwardly and laterally curved guide slots respectively receiving the respective pairs of projections, said slots having their highest points at their extreme lateral outer ends.

5. In a baling press, a movable platen beam, slides respectively rigidly connected to the respective end portions of said beam and depending therefrom, means for raising and lowering said beam, and pairs of spaced projections extending endwise outwardly from the lower portions of the respective slides, in combination with a pair of tilt guide plates respectively rigidly connected to the respective upper end portions of the press and formed with correspondingly shaped upwardly and laterally curved guide slots respectively receiving and guiding the respective pairs of projections.

6. In a baling press, a movable platen beam, a detachable knock-down press frame, a long substantially rigid supporting base, a pair of operating screws, and connections between said screws and said beam for causing operative movement of the latter, in combination with a pair of drive heads permanently mounted in position in said base and being adapted respectively to engage and rotate said screws, anchor means disposed about said screws respectively and adapted to be detachably secured in their respective positions in said frame, and stop means respectively engaging the respective screws between and cooperating with the respective anchor means and the respective heads to prevent the endwise movement of the respective screws with relation to their respective drive heads in the assembled operative relation of the parts, said screws being respectively insertible and removable in the respective heads in the direction of the axis of the latter, and the respective driveheads and their corresponding screws being so formed as to rotate together when in assembled operative relation.

SIMON B. MINNICH.