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M. L. HOLT

2,934,002

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4 Sheets-Sheet 1

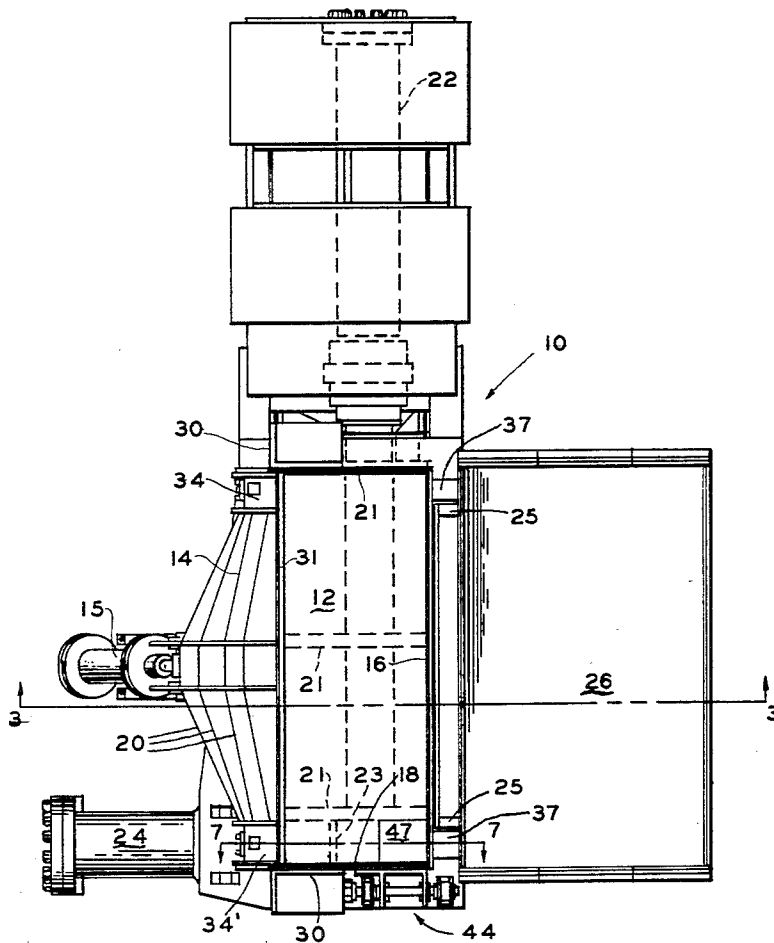


FIG. 1.

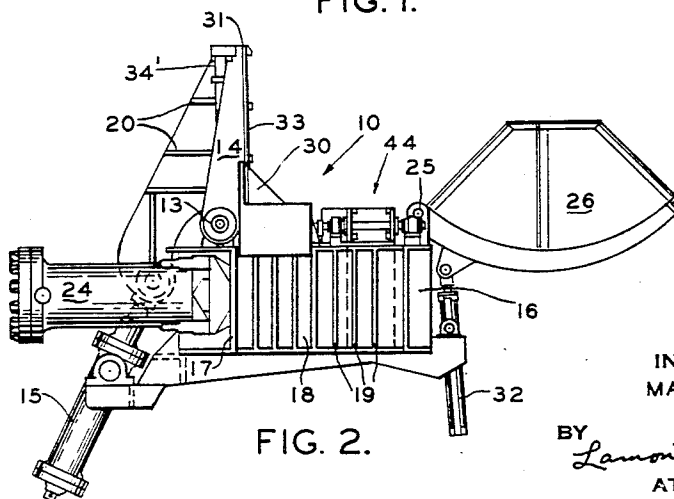


FIG. 2.

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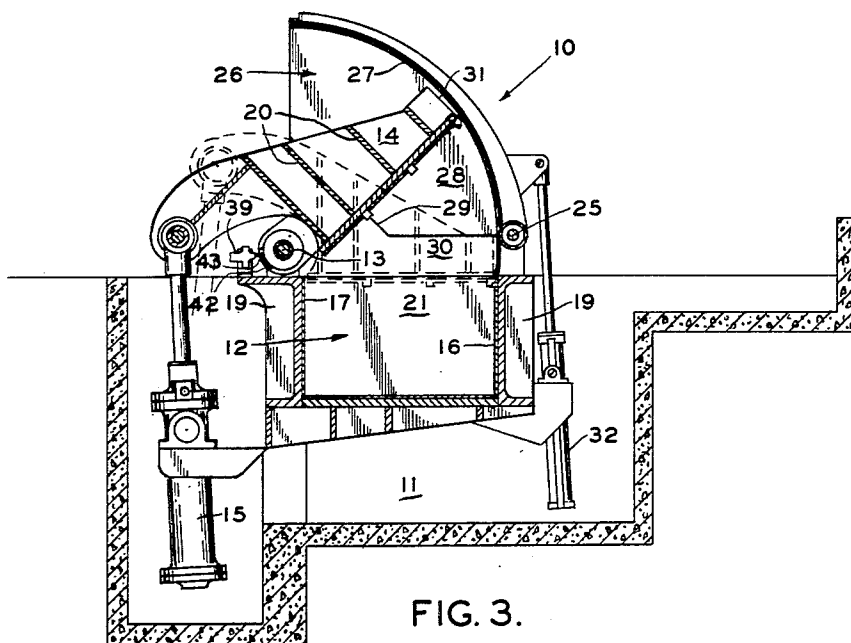
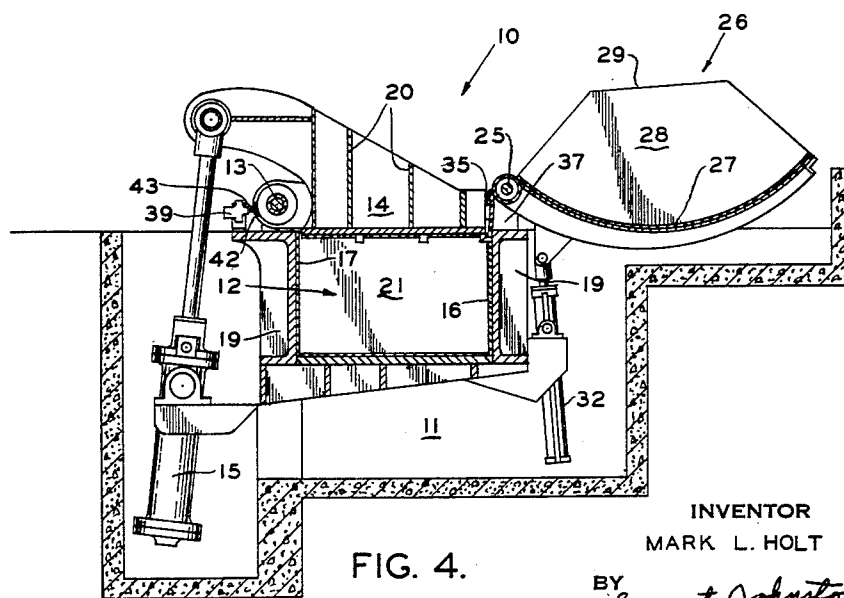
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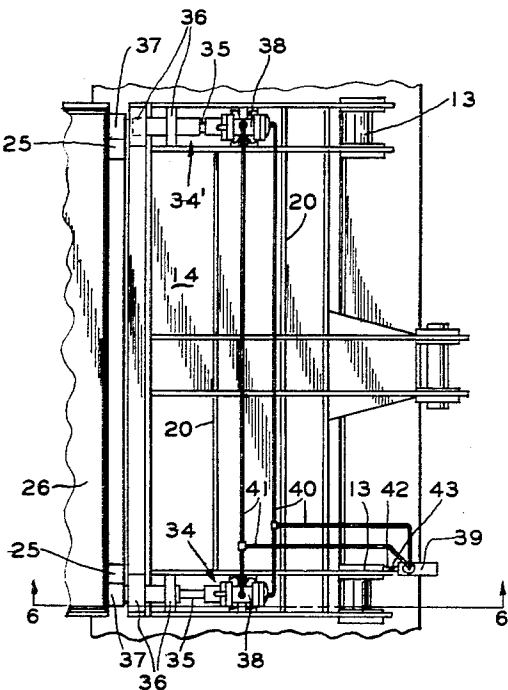


FIG. 5.

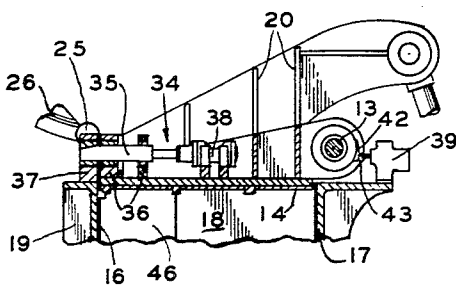


FIG. 6.

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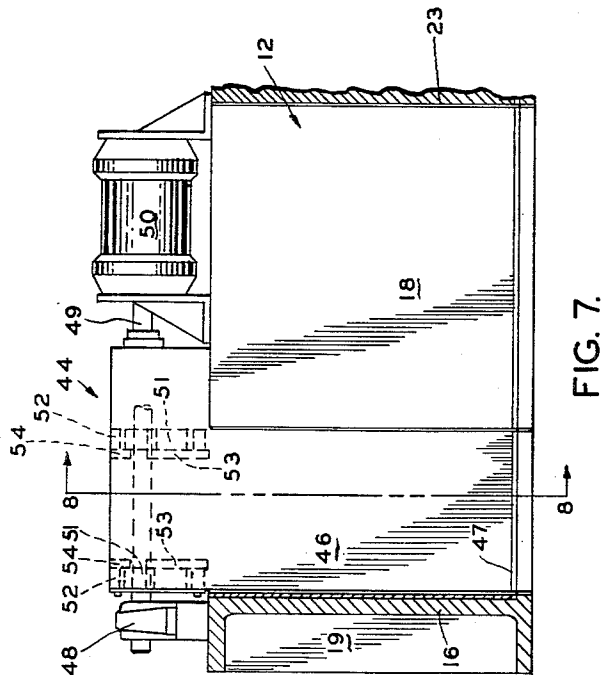


FIG. 7.

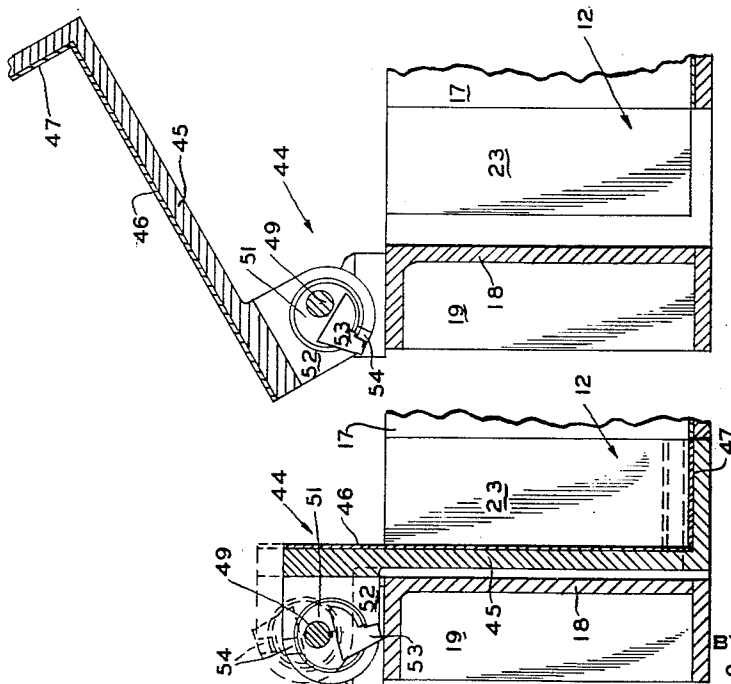


FIG. 9.

FIG. 8.

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Application October 25, 1956, Serial No. 618,212

4 Claims. (Cl. 100—218)

This invention relates to a baling press and more particularly to a baling press in which the feeding, compressing and ejecting operations are semi-automatic.

One object of this invention is to provide a baling press in which the feeding mechanism is not only semi-automatic but more efficient than any feeding mechanism heretofore known.

Another object of this invention is to provide a hopper for a baling press designed to cooperate with the tamping door to completely empty the contents of the hopper into the compression chamber of the baling press.

Another object of this invention is to provide a baling press hopper for dumping material into the compression chamber, the hopper having an arcuate bottom adapted to continuously engage in dumping position the moving edges of a tamping door pivoted to the compression chamber.

A further object of this invention is to provide a baling press having novel latching means for locking the tamping door in closed position.

Another object of this invention is to provide a baling press having novel bale ejecting means for lifting, pivoting and discharging a compressed bale outside the compression chamber.

Further objects and advantages of the invention will be apparent from the following description taken in conjunction with the drawings, wherein:

Fig. 1 is a top plan view of the invention with the hopper in loading position and the tamping door in open position;

Fig. 2 is an end elevation of the invention disclosed in Fig. 1;

Fig. 3 is a section taken along the lines 3—3 of Fig. 1 with the hopper in dumping position and the tamping door in an intermediate position in solid lines and in closed position in dashed lines.

Fig. 4 is a view similar to Fig. 3 with the hopper in loading position and the tamping door pivoted to closed position;

Fig. 5 is a top plan fragmentary view of the closed tamping door illustrating the latching mechanisms;

Fig. 6 is a section taken along the lines 6—6 of Fig. 5;

Fig. 7 is a section taken along the lines 7—7 of Fig. 1;

Fig. 8 is a section taken along the lines 8—8 of Fig. 7 disclosing the lifting operation of the bale ejecting mechanism; and

Fig. 9 is a view similar to Fig. 8 disclosing the bale ejecting mechanism in pivoted discharge position.

Referring now to the drawings in more detail, a baling press 10 may be mounted in an open pit 11, as best disclosed in Figs. 3 and 4, or in any other suitable manner. The baling press 10 is provided with a compression chamber 12 of a generally rectangular shape having an open top. Pivoted along one side of the compression chamber 12 by hinges 13 is a tamping door or cover 14 also of a generally rectangular shape and adapted to pivot to close the opening in the top of the compression chamber 12.

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The tamping door 14 is provided with a fluid pressure cylinder 15 to pivot the door 14 to open and closed position with respect to the compression chamber 12. In order to withstand the tremendous pressure built up within the compression chamber 12, the front wall 16, the rear wall 17 and the end wall 18 of the compression chamber 12, are heavily reinforced with ribs 19, and the tamping door 14 is also reinforced with ribs 20.

Comprising one end of the compression chamber 12 is a ram platen 21, adapted to be moved longitudinally of the compression chamber 12 by means of fluid-operated ram cylinder 22 as indicated by the dashed lines in Fig. 1. Comprising a portion of the rear wall 17 adjacent the end wall 18 is a ram platen 23 adapted to be moved by means of fluid-operated cylinder 24 transversely across the face of the ram platen 21 when fully extended as indicated by the dashed lines in Fig. 1.

Pivoted by means of hinges 25 to the top of the front wall 16, is a hopper 26 for receiving a charge of material, such as scrap metal, to be compressed by the baling press 10. The hopper 26 has the shape of a cylindrical segment having an arcuate bottom 27 and side plates 28. The side plates 28 are beveled at 29 to abut against the inclined stops 30 mounted on top of and at the rear corners of the compression chamber 12, when the hopper 26 has been pivoted to dumping position, as disclosed in Fig. 3. The radius of curvature of the arcuate bottom 27 is equal to the distance between the pivotal axis of the tamping door hinges 13 and the front edge 31 of the door 14. The pivotal axes of the hinges 13 and the hinges 25 are parallel and spaced in such a manner that while the hopper 26 is being pivoted to its dumping position by means such as fluid cylinder 32, the front edge 31 and end edges 33 of the tamping door 14 will continuously engage the cylindrical bottom 27 and the end edges 33 of the door will also be in constant engagement with the side plates 28 while the door 14 is being pivoted from open to closed position. Such a construction provides means for scraping the hopper 26 clean of any residual scrap material which might remain after the hopper is moved from loading to dumping position.

In order to maintain the tamping door 14 closed while the compressing operations are being carried out by the ram platens 21 and 23, fluid pressure-operated locking mechanisms 34 and 34¹ are provided to automatically lock the door 14 when the door has assumed its closed position and to keep the door locked until the compressing operations have been completed. As best disclosed in Figs. 5 and 6, the locking mechanisms 34 and 34¹ comprise bolts 35 slidable in bearings 36 mounted on the top and at opposite ends of the door 14. Keepers 37 are mounted on top of the front wall 16 of the compression chamber 12 and below hopper hinges 25 to receive the bolts 35. Fluid pressure cylinders 38 provide means for actuating the bolts 35 to slide into and out of engagement with keepers 37. Fluid pressure valve 39 is mounted on the rear wall 17 of the compression chamber 12 to control circulation of fluid through conduits 40 and 41 to actuate the locking cylinders 38. A cam 42 is mounted on one of the door hinges 13 and is adapted to engage the cam follower 43 when the door 14 is closed, the cam follower 43 actuating the valve 39 to introduce fluid into the locking cylinders 38 and force the bolts 35 into the keepers 37. The bolts 35 are thus locked by fluid pressure in the keepers 37 throughout the compressing operations and until such time as controls, not shown, are actuated to reverse the flow of fluid through valve 39 and lines 40 and 41 to retract the bolts 35 from keepers 37 to the position of locking mechanism 34¹ in Fig. 5. When the tamping door 14 is open (Figs. 1 and 2) or is in any intermediate position except closed (Fig. 3), the cam 42 is dis-

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engaged from the cam follower 43 so that the valve 39 is actuated to maintain the bolts 35 in retracted positions.

In order to discharge the compressed bale of material formed in the compression chamber 12 by the ram platens 21 and 23, a bale ejecting mechanism 44 (Figs. 7, 8 and 9) of novel construction is formed in the end wall 18. The bale ejecting mechanism 44 comprises an L-shaped ejector arm 45 having a vertical wear plate 46 forming a portion of the end wall 18 and a foot wear plate 47 forming a portion of the bottom of the compression chamber 12, as disclosed in Fig. 1. Mounted on top of the end wall 18 in bearings 48 is a rotary shaft 49 adapted to be driven by hydro-motor 50. Eccentrically mounted on the rotary shaft 49 are a pair of disc cams 51. The cams 51 are journaled to rotate within ears 52 projecting from the top of the ejector arm 45. A lug 53 fixedly mounted to each cam 51 is adapted to engage a projection 54 fixed to each ear 52 after the shaft 49 has rotated approximately 180° to provide a vertical lifting motion to the ejector arm 45, as disclosed in broken lines in Fig. 8. The purpose of this limited lifting motion is to raise the foot plate 47 above the bottom of the compression chamber sufficiently to provide clearance for the subsequent pivotal motion of the ejector arm 45. After the ejector arm 45 has been elevated and upon continued rotation of the shaft 49, the lug 53 engages the projection 54 causing the ears 52 and the ejector arm 45 to rotate with the cams 51 and shaft 49. When the ejector arm 45 has been rotated to the position of Fig. 9, a compressed bale carried by the plates 46 and 47 is discharged to an area outside the baling press 10.

The operation of the machine is as follows:

For the initial operation of the baling press 10, the operating parts are in the solid-line positions disclosed in Figs. 1 and 2. The hopper 26 is in its loading position; the tamping door 14 is pivoted upward to open the top of the compression chamber 12; the ram platens 21 and 23 are in their retracted positions, ram platen 21 forming one end wall of the compression chamber 12 and ram platen 23 being flush with the rear wall 17; and the bale ejecting mechanism 44 assumes the solid-line position of Fig. 8 with the wear plate 46 being flush with the end wall 18 and the wear plate 47 being flush with the bottom of the compression chamber 12. In its initial loading position, the hopper 26 is filled with a charge of material, such as scrap metal. The hopper 26 is of such capacity that when filled, it provides a complete charge for the compression chamber 12. Controls, not shown, are then operated to actuate the fluid pressure cylinder 32 and pivot the hopper 26 upward to its dumping position (Fig. 3) in which material from the hopper drops into the compression chamber 12. Controls are then operated to actuate the pressure cylinder 15 and pivot the tamping door 14 downward in an arc so that the front edge 31 will move contiguously with the cylindrical bottom 27, to scrape any remnants of scrap material from the bottom 27 into the compression chamber 12.

When the door 14 has completely closed the top of the compression chamber 12, the cam 42 engages the cam follower 43, actuating the locking valve 39 which in turn actuates the locking cylinders 38 to thrust the bolts 35 into engagement with their respective keepers 37. The tamping door 14 remains locked in closed position until the material within the chamber 12 is completely compressed into a bale and it is desired to open the door 14 and eject the bale. Control means are then operated to actuate the cylinder 32 to pivot the hopper 26 back to its original loading position, as disclosed in Figs. 1, 2 and 4.

The ram cylinder 22 is then operated to urge the ram platen 21 longitudinally of the compression chamber 12 to compress all material within the chamber against the end wall 18. The ram platen 21 is stopped when it assumes a position flush with the end of the foot plate 47 and the edge of the transverse ram platen 23. After the movement of the ram platen 21 is stopped, the transverse

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ram cylinder 24 is then operated to move the transverse ram platen 23 across the face of the ram platen 21 and compress the material into a bale in the space over the foot plate 47. After the bale is completely compressed, the ram platens 21 and 23 are withdrawn to their original positions, the locking mechanisms 34 and 34' are unlocked, and the fluid pressure cylinder 15 is actuated to pivot the door 14 to its open position. The bale ejecting mechanism 44 is then actuated by starting the hydromotor 50 to rotate the shaft 49 causing the disc cams 51 to rotate approximately 180° and lift the ejector arm 45 to the position shown in the dotted lines in Fig. 8. Continued rotation of the shaft 49 causes the lugs 53 to engage the projections 54 and pivot the ejector arm 45 to the tilted position disclosed in Fig. 9, thereby discharging the bale of compressed metal to an area outside the baling press 10.

It will be apparent to those skilled in the art that various changes may be made in the invention, without departing from the spirit and scope thereof, and therefore the invention is not limited by that which is shown in the drawings, and described in the specification, but only as indicated in the appended claims.

What is claimed is:

1. A baling press comprising an open compression chamber, a rectangular tamping door pivoted along one side of said chamber to close said chamber, a hopper pivoted along the other side of said chamber for receiving material to be dumped into said chamber, said hopper having an arcuate bottom of a radius equal to the distance between the pivotal axis of said door and the opposite edge of said door, means for pivoting said hopper to dumping position, means for pivoting said door so that it will continuously engage the bottom of said hopper in dumping position and force all material in the hopper into the compression chamber, means for compressing material in said chamber into a bale while said door is closed, means for pivoting said hopper to loading position, means for pivoting said door to open position, and bale ejecting means comprising an L-shaped plate for receiving said bale, there being a recess within the bottom of said chamber for receiving the bottom of said plate, a rotary horizontal shaft above said chamber, a disc cam eccentrically fixed on said rotary shaft, means for journaling the top of said bale plate around said cam, a lug fixed to said cam, a projection fixed to said plate journal means in the path of said lug, means for rotating said shaft through a predetermined angle for lifting said cam plate from said recess, and for continuously rotating said cam until said lug engages said projection to pivot said plate about said shaft and to eject said bale from said chamber.

2. A baling press comprising an open compression chamber, a fluid pressure-operated tamping door pivoted along one side of said chamber to close said chamber, a hopper pivoted to the opposite side of said chamber and adapted to be pivoted from a loading position for receiving material to be dumped into said chamber to a dumping position above said chamber, the bottom of said hopper being shaped to be continuously scraped in dumping position by the pivotal movement of said door from open to closed position, means for locking said door in closed position, means for pivoting said hopper to loading position, a first fluid pressure-operated ram movable longitudinally into said chamber, a second fluid pressure-operated ram movable into said chamber across the face of said first ram to form a compressed bale of material dumped into said chamber by said hopper, means for pivoting said door to open position and bale ejecting means comprising an L-shaped plate for receiving said bale, there being a recess within the bottom of said chamber for receiving the bottom of said plate, a rotary horizontal shaft above said chamber, disc cams eccentrically fixed on said rotary shaft, means for journaling the top of said bale plate around said cams, a lug fixed to each cam, projections fixed to

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said plate journal means in the path of said lugs, means for rotating said shaft through a predetermined angle for lifting said plate from said recess, and for continuously rotating said cam until said lugs engage said projections to pivot said plate about said shaft and to eject said bale from said plate.

3. A baling press comprising an open compression chamber, a fluid pressure-operated tamping door pivoted along one side of said chamber to close said chamber, a hopper pivoted to the opposite side of said chamber and adapted to be pivoted from a loading position for receiving material to be dumped into said chamber to a dumping position above said chamber, the bottom of said hopper being shaped to be continuously scraped in dumping position by the pivotal movement of said door from open to closed position, means for locking said door in closed position and for unlocking same comprising fluid-operated piston latches and cam-controlled fluid valve means associated with the pivotal axis of said door for activating and holding said latches in locked position when said door has been pivoted to close said chamber, means for pivoting said hopper to loading position, a first fluid pressure-operated ram movable longitudinally into said chamber, a second fluid pressure-operated ram movable into said chamber across the face of said first ram to form a compressed bale of material dumped into said chamber by said hopper, means for pivoting said door to open position and bale ejecting means comprising rotary cam-operated means for lifting and pivoting said bale outside said chamber.

4. A baling press comprising an open compression chamber, a fluid pressure-operated tamping door pivoted

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along one side of said chamber to close said chamber, a hopper pivoted to the opposite side of said chamber and adapted to be pivoted from a loading position for receiving material to be dumped into said chamber to a dumping position above said chamber, the bottom of said hopper being shaped to be continuously scraped in dumping position by the pivotal movement of said door from open to closed position, means for locking said door in closed position and for unlocking same comprising a piston-operated bolt mounted on the unpivoted edge of said door, a keeper mounted on the edge of said chamber to receive said bolt, fluid valve means for circulating fluid to actuate said piston bolt, door hinges mounted on said compression chamber, and cam means mounted on said hinges for operating said fluid valve means to actuate said piston bolt to enter and remain in said keeper when said door is pivoted to close said chamber, means for pivoting said hopper to loading position, at least one fluid-pressure operated ram movable in said chamber to form a compressed bale of material dumped into said chamber by said hopper, means for pivoting said door to open position and means for ejecting said bale from said chamber.

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