

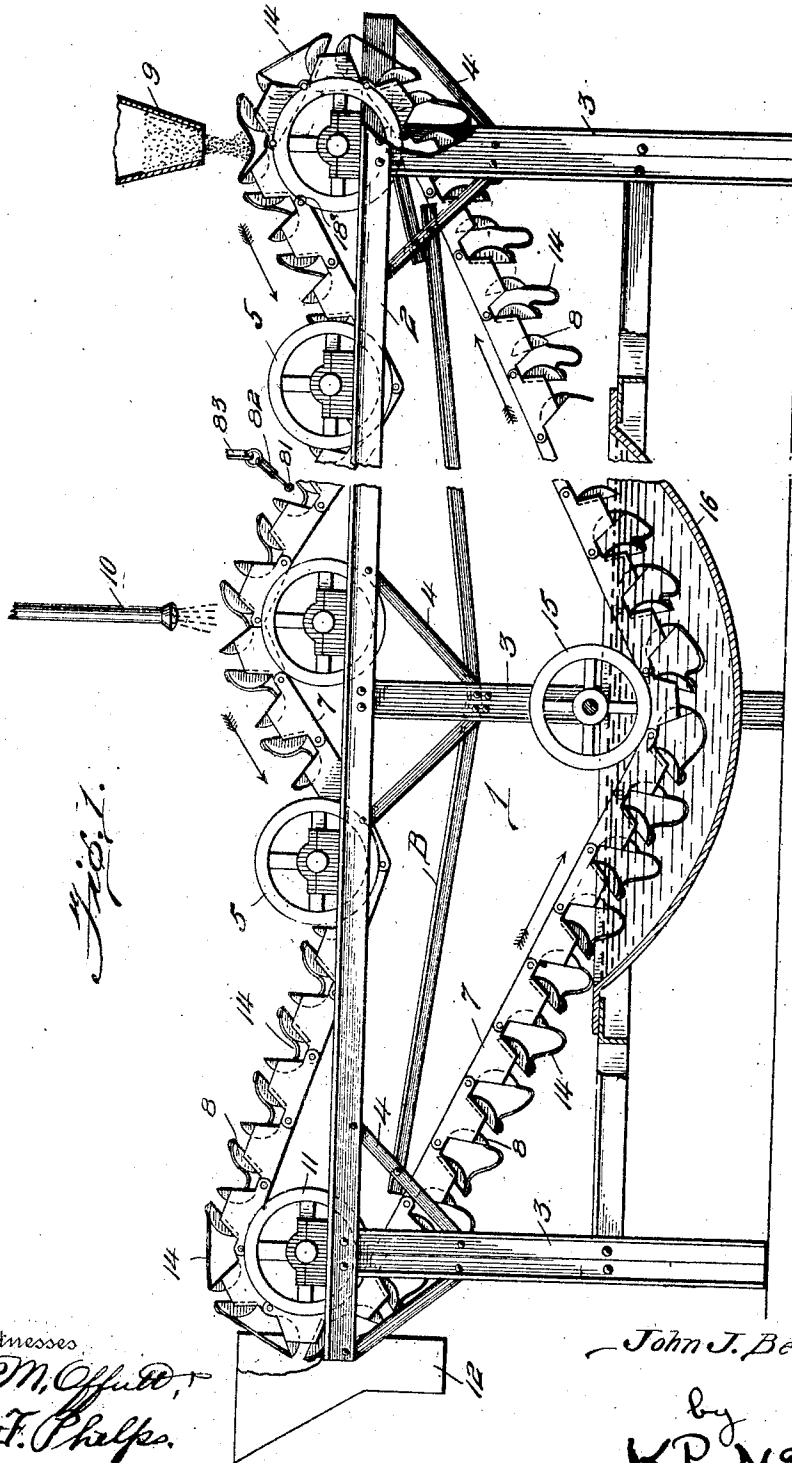
J. J. BERRIGAN.
PRESS.

APPLICATION FILED JUNE 10, 1910.

994,632.

Patented June 6, 1911.

6 SHEETS-SHEET 1.



Witnesses
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by
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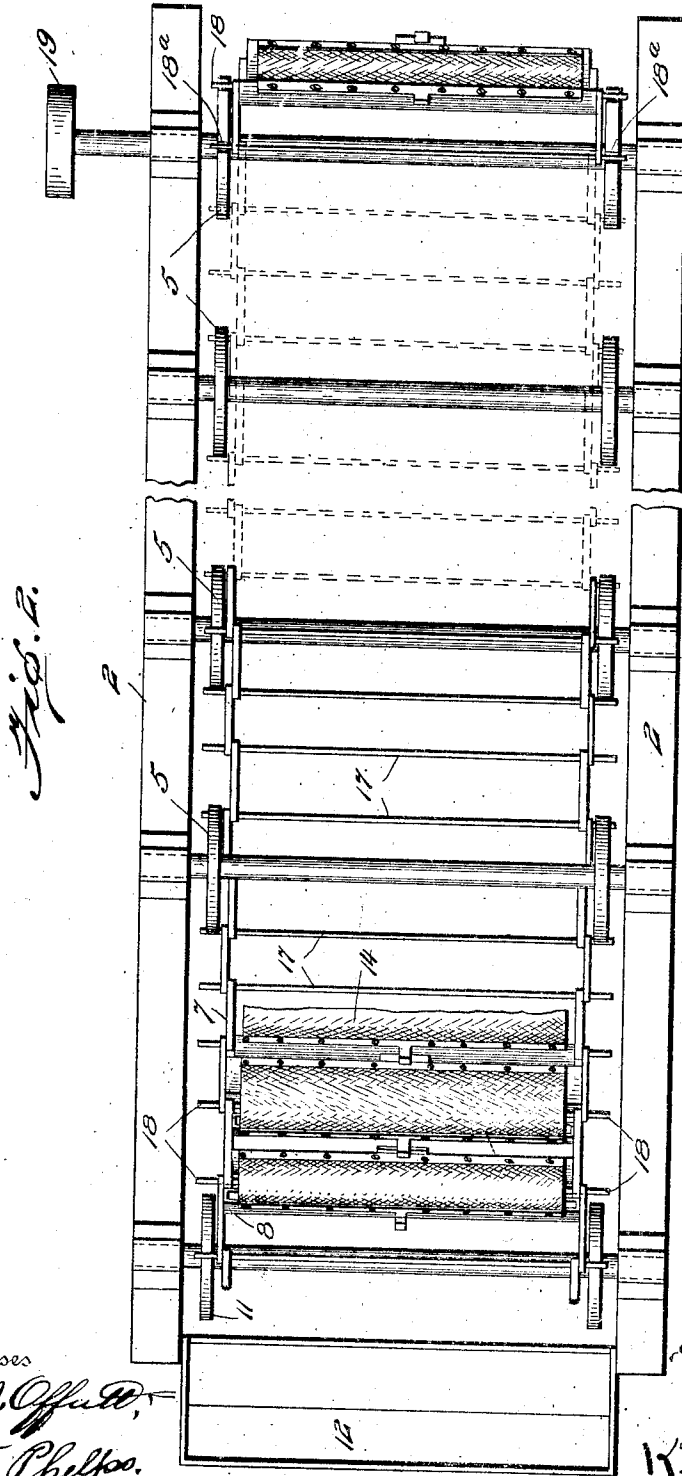
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6 SHEETS—SHEET 2.



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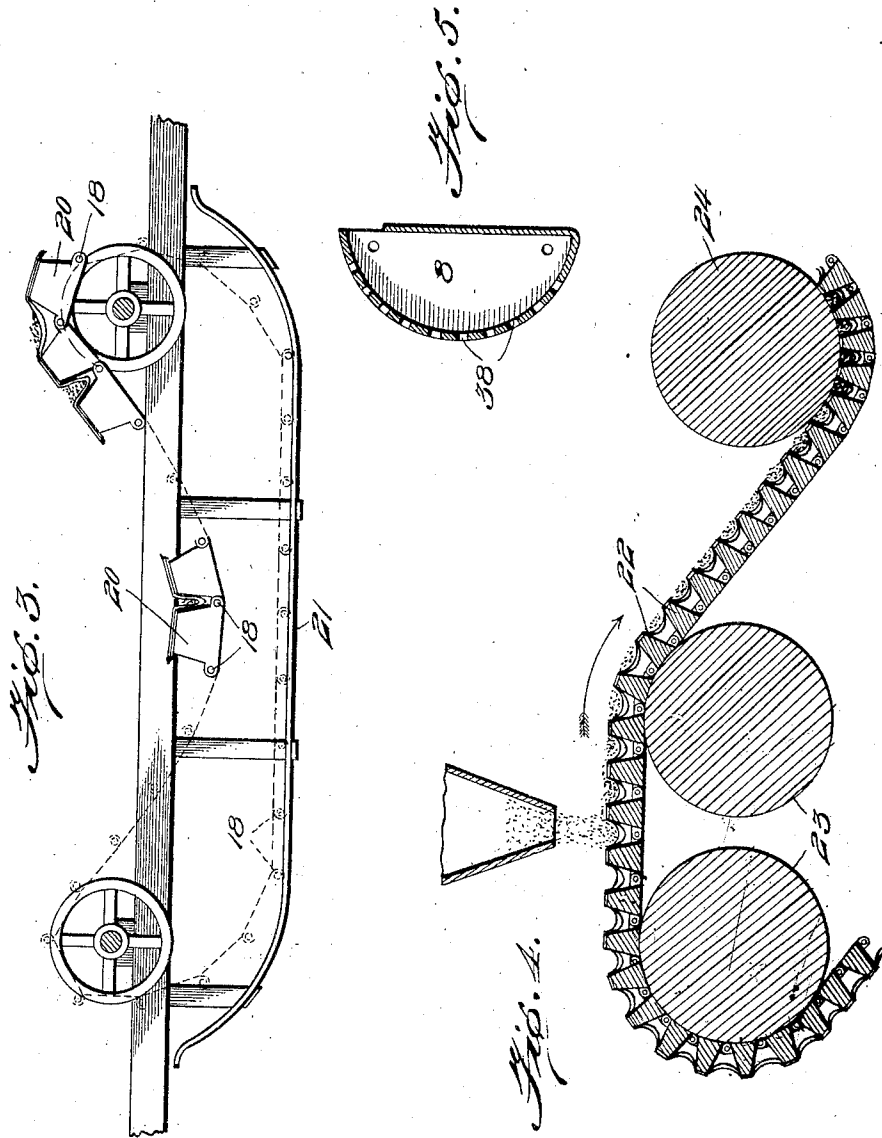
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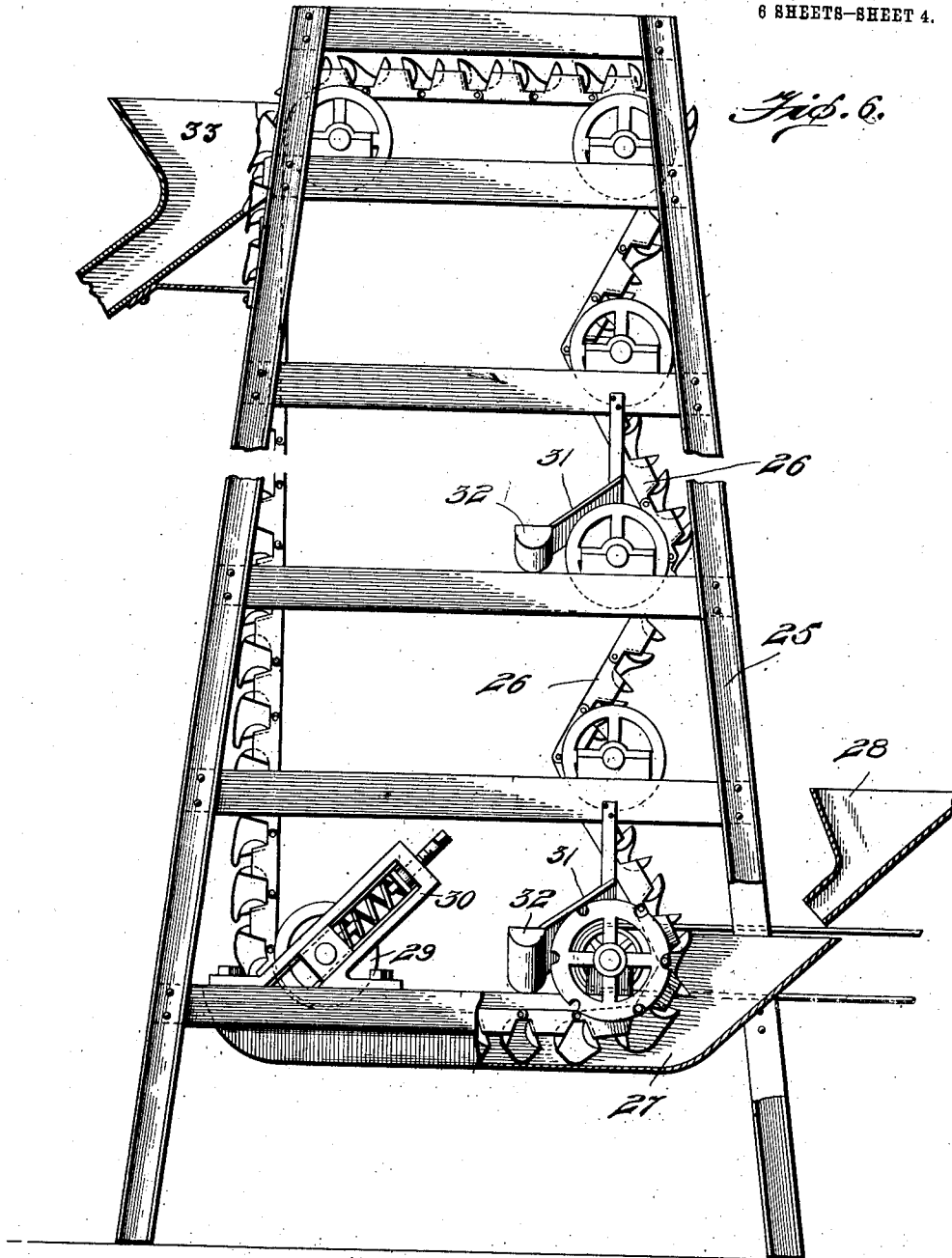
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6 SHEETS—SHEET 4.



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6 SHEETS—SHEET 5.

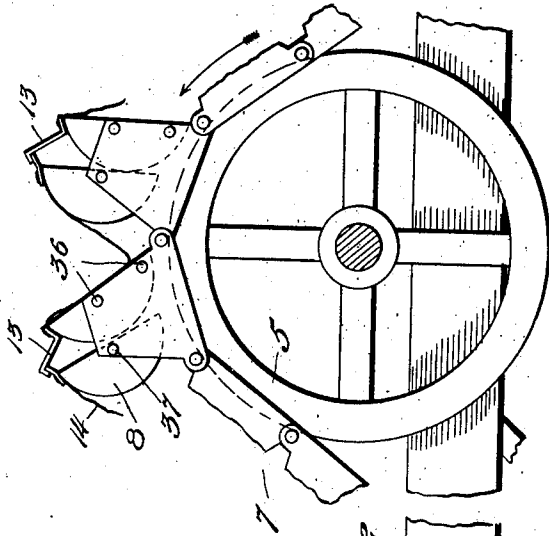


Fig. 7.

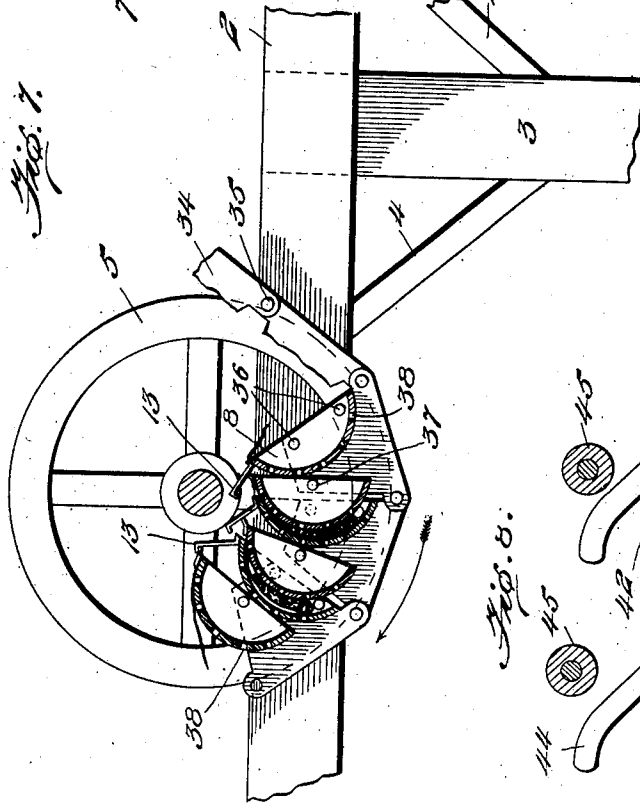


Fig. 8.

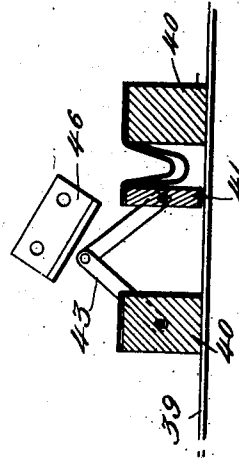
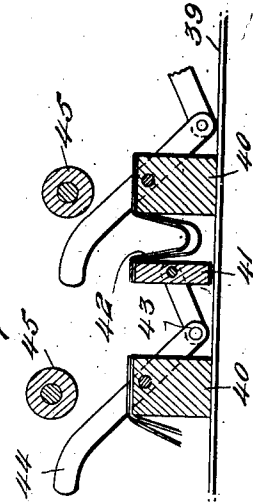


Fig. 9.



Witnesses
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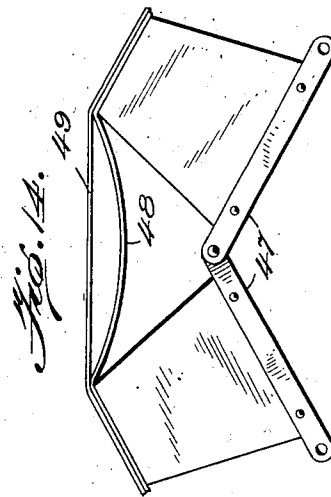
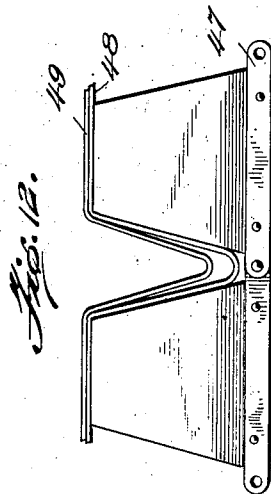
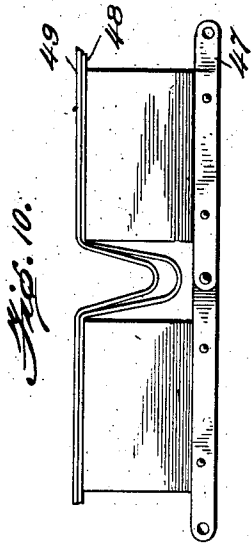
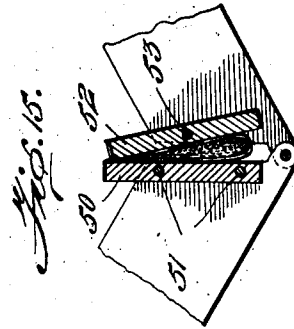
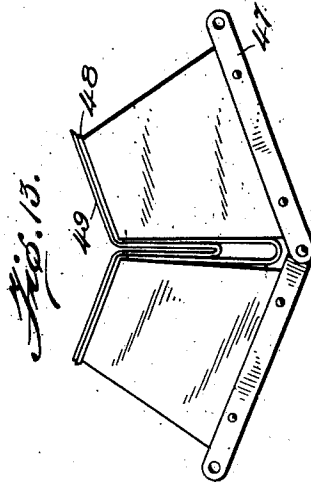
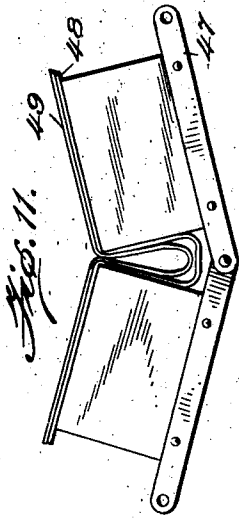
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6 SHEETS—SHEET 6.



Witnesses
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UNITED STATES PATENT OFFICE.

JOHN J. BERRIGAN, OF ORANGE, NEW JERSEY.

PRESS.

294,632.

Specification of Letters Patent. **Patented June 6, 1911.**

Application filed June 10, 1910. Serial No. 566,208.

To all whom it may concern:

Be it known that I, JOHN J. BERRIGAN, a citizen of the United States, residing at Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Presses, of which the following is a specification.

This invention relates to presses; and it comprises a stationary press body provided with a belt-like presser member having depressions or projections on one face forming press chambers, means for feeding relatively small portions of material to be pressed into such depressions or between such projections and means for alternately giving said presser member concave and convex bends, whereby such material is pressed in the presser chambers during a concave bend and extricated therefrom in a convex bend; all as more fully hereinafter set forth and as claimed.

The ordinary presses employed for seeds, fish scrap, slaughter house scrap, short bagasse and many other materials when continuously operating suffer from a number of disadvantages. In the coned conveyer types, the friction is great; and in the belt and roll types no great pressure can be used with granular or short material since such material will not enter the pinch under high pressure, neither can the feed well be forced. The material will tend to bank up before the rolls. The rolls also tend to carry up the expressed material away from the belt. With other types of presses, such as screw presses and hydraulic presses, any amount of pressure can be exerted but the operation is not continuous.

In the present invention, I have devised a new type of continuously operating press in which the stated disadvantages are absent, and in which pieces or particles as small as may occur can be handled; and in which indeed a fine state of comminution is desirable. To this end, I provide a flexible, belt-like member carrying projections or depressions forming press chambers, means for filling these chambers and means for giving the flexible member alternating inward or concave bends (as regards the face carrying the chambers) and convex or outward bends. In the concave bends, pressure on the included material is produced be-

tween the lateral walls of the press chambers while in a convex bend the pressure is relaxed. If the cooperating walls of the press chamber be vertical with the flexible member horizontal, on a concave bend the chamber becomes narrower and in section approaches more or less the shape of an inverted V; that is the mouth is narrower than the bottom. Or if the chamber be V-shaped in normal position, on concaving the flexible member the walls approach each other, and, if the curvature in the bend be on the correct radius, the chamber tends to become obliterated and the cooperating opposite walls produce a right-line pressure on the contents of the chamber.

The flexible member carrying the press chambers may be a traveling belt, or belt-like member, traveling over rolls in the concaving operation, but the closeness of the "pinch" between belt and roll does not, as in the ordinary belt-and-roll press, have anything to do with the feed or with the pressing operation directly, and the pressure between belt and roll may be as high as desired since there is no material between them. The face of the roll indeed in such a structure serves largely as a closure for the press chambers, preventing material yielding outward at this time. The pressure between belt and roll is not directly exercised upon the material in the chambers; it is indirectly exercised in lessening the volume of the chambers and of the contained material. For mechanical reasons, the member carrying these press chambers is preferably a belt or belt-like structure, flexible enough to be carried around rollers or the like adapted to give it alternating concave and convex bends. It may be a belt carrying projecting transverse cross members such as bars or slats forming press chambers between them. Or the transverse members may be carried at their ends by a pair of narrow belts, sprocket chains or the like, or be simply linked together at their ends. With such a structure there should be a filter cloth or porous fabric belt of such length as to adapt it to enter the chambers when the presser face is flat or concave to become flat or belly out on a convex bend. Such a belt-like member may be carried around a plurality of rolls with its presser

face alternately concave and convex, the material being fed into the chambers in a convex bend when the chambers are opened, expression performed during the concave bend when they are narrowed and the material subsequently removed when the chambers open out subsequent to the concaving. Pressing should be in a plurality of stages, the belt being given a number of successive concave bends. This allows the cake to assume new positions prior to a re-pressing. Between pressures, sprays of water, steam or oil may be directed on the expanding and porous press cakes. The chambers may be of such shape and dimensions that they may be filled while the flexible member is in a flattened position. After the final pressure, the belt-like member may be passed around a roll of such radius as to cause the filter cloth to straighten out to form a flat surface from which the cake may be easily scraped off. Where the belt-like member turns in a vertical plane, the bags of the filter cloth in the chamber when the presser face is uppermost, may turn inside out and hang down when the presser face is on the lower turn.

In the stated structure, it will be obvious that while the pressing is performed on a series of successive separate small cakes, yet the structure as a whole is continuously operating in the sense that material is always being fed to and removed from it.

In another application, Ser. No. 514,851, filed Aug. 27, 1909, I have described and claimed the stated method of expression and have also claimed broadly apparatus designed for use in its performance. In said application, I have described and shown several types of apparatus and have claimed specifically a type wherein the flexible belt or chamber is mounted in a revoluble housing adapted for rotation about an included axis whereby centrifugal force is caused to act upon the material to be expressed. The present application is devoted more specifically to a type wherein the flexible belt or member is mounted in a stationary housing, certain embodiments of said type being shown but not specifically claimed in said acknowledged application.

As stated the shape of the cross members modifies their action somewhat. With rectangular slats or bars in a horizontal position of the belt the press chamber is vertical walled, on a convex bend is V-shaped and on a concave bend may become the shape of an inverted V. With slats or bars having a section of a truncated triangle, a better pressing action is secured since with a concave bend on a curve of the proper radius, the press chamber will lessen in breadth symmetrically. A still better operation is obtained by using curved cross pieces. The cross pieces may be crescent-shaped in cross

section. If the bars are mounted pivotally at their ends, on parallel sprocket chains a desirable structure is obtained; and particularly where such bars are curved or crescent shaped. The material falling into the bottom of the bag between the presser members will tend to push the bars apart near the bottom and with the pivotal mounting they will concomitantly approximate near the top, giving the pressure first near the top and also tending to seal the chamber somewhat near the top. It is better to mount one of such a pair of cooperating bars pivotally and the other fixedly, as regards the carrying of lateral linked elements.

The cross members or slats may be made of any suitable material, such as wood, iron, steel, brass, etc. Ordinarily they are best made of steel. For special purposes, such as the pressing of grapes, they may be made of, or coated with, incorrodible metals such as aluminum or copper, aluminum being the best for grapes. They are best perforated to increase the area for the escape of liquid, and while they may be individually provided with a filtering layer, it is better to provide a loose filter cloth. This cloth may be only between adjacent pairs or it may extend around the whole succession of pressing elements as a belt.

Where the flexible belt-like member carrying the press chambers is mounted in a stationary horizontal framework with the upper turn operative in the pressing, the weight of the belt-like member may do much of the pressing. The simple sag of a long flexible member may be sufficient to produce the required concaving for exerting pressure in the press chambers. The use of rolls or wheels for producing a positive concaving is, however, much more desirable. In any embodiment, the pressing action between adjacent presser members is lateral. In effect it is a sort of toggle action, and other forms of toggle pressure may be substituted, though less effectively, for the described alternate bendings of the flexible member. A belt may, for example, carry alternate fixed and movable vertical members forming press chambers therebetween. By providing a series of such alternating vertical members with a toggle joint between each successive pair, and then providing a cam or toothed member adapted to press upon this toggle joint, materials in the press chambers may be submitted to a succession of consecutive alternating compressions and relaxations of pressure. With such a structure, giving a plurality of successive compressions on the same cake, say eight, with the length of the belt-like member and the speed of travel so adjusted that in each compression the material is under pressure for three minutes, obviously the material will be submitted to pressure for a period totaling 24 minutes.

In the expression of liquid, in a way, pressure and time are reciprocal, the longer the pressure the more liquid being removed. In this structure any length of pressure can be given while still making the operation continuous. It is merely a matter of lengthening the flexible member so as to get as many successive compressions as may be desired. This method of operating has a further great advantage that while the total time of compression may be as great as is desired, it is subdivided into a plurality of successive compressions with the cake disarranged before each following compression; which gives a much better extraction.

In the accompanying illustration I have shown, more or less diagrammatically, certain typical organizations of apparatus elements within the limits of the present invention.

In this showing:—Figure 1 is a view in elevation, partly in vertical section, of one form of apparatus; Fig. 2 is a plan view of the same apparatus, certain elements being omitted; Fig. 3 is a view in elevation of an alternative form; Fig. 4 is a fragmentary view in vertical section of another modified form; Fig. 5 is a detail view of one of the presser elements of Fig. 1; Fig. 6 is a view in elevation partly broken away of another modified form of apparatus; Fig. 7 is a detail view on an enlarged scale of certain elements of Fig. 1 showing the method of operation; Fig. 8 is a detail view showing a modification; Fig. 9 is a similar view of another modification; Fig. 10 shows a modified form of slat presser element; Fig. 11 shows the same in another position; Fig. 12 is a view of still another form of cross piece or slat presser element; Fig. 13 is a view of the same in another position; Fig. 14 is a view of the same in still another position; and Fig. 15 is a view of still another modified form of cross piece or slat presser element.

In the showing of Fig. 1, element 1 represents as a whole a suitable framework comprising horizontal beams 2, standards 3 and stay pieces 4. Mounted in this framework are a series of wheels or sprockets 5, over and under which passes a flexible belt-like member indicated as a whole by 7 and comprising a series of transverse crescent-shaped cross pieces or presser members 8, these cross pieces being alternately pivotally mounted and rigidly mounted (see Fig. 7). The flexible member is looped over and under the wheels in such a manner as to give it, considered as a whole, a succession of alternating concave and convex bends on the upper or presser face. At a point prior to the first concave bend and at a point where chambers of the belt-like member are in an open position is mounted a feeding means 9 for supplying material to be pressed. At another

point above a convex bend, where the presser members open out, is mounted nozzle 10 through which steam, water, oil or other fluid may be supplied to the expanding press cake. At the farther end of the apparatus the belt-like member passes over wheel 11, and the press chambers are opened out to discharge into conduit 12 for removing expressed material. Liquid expressed from the material is received by pan B. For purposes later stated, each alternate presser member may be provided with a retaining hooked member or keeper 13. Between each pair of presser members is mounted a piece of filter cloth 14. At the end of the apparatus the bend given by wheel 11 these cloths, which are bag-like in the concaving bend, open out to permit a ready discharge of material. The return loop of the belt-like member passed under wheel 15 and through a pan-like member 16, wherein the cloths may be washed. In this passage the bags hang downwardly, permitting a good washing. The showing in Fig. 2 is of the same structure, but it discloses more clearly the relation between the wheels and the belt-like member. As will be noted, for the sake of strength the belt-like member is provided with cross rods 17 having prolongations 18 which are for the purpose of engaging the wheels and riding thereover and thereunder. These wheels may be provided with cooperating notches 18^a. Motion is given to the belt-like member by drive member 19. In Fig. 3 no special means are shown for producing the concave curvature of the belt, the natural sag caused by the weight of the belt-like member producing the necessary concave bend and compression. The presser members provided in this form are shown as cross slats or bars 20 of a cross-section approximately that of a truncated triangle (see Fig. 12). In order to allow this sag to produce the full concaving in the upper loop the return loop is supported on runway 21 which engages the pins (18). In Fig. 4 the belt-like member is shown provided with cross pieces 22 also having a section of the general form of a truncated triangle. The belt-like member is shown as carried by rolls 23. In a concave bend roll 24 operates to seal the mouths of the press chambers between the slats. In Fig. 6, a structure like that of Fig. 1 is shown mounted in a vertical housing 25, and built in a general way like a bucket conveyor. The belt-like member 26 travels up one side of this housing and down the other and at the bottom passes through a feeding chamber 27, supplied from hopper 28. A suitable degree of tension in the belt-like member may be secured by the use of a roll or wheel 29, in spring pressed bearings 30. The liquid expressed in a concave curvature falls upon plate 31 and is taken away by sloping gutter 32.

The solid matter is removed through hopper 33.

In Fig. 7 is shown in more detail the crescent-shaped presser members of Figs. 1, 2 and 6, as well as the linked carrying member which together with these cross pieces constitutes the belt-like element. Members 34, linked at 35, are each provided with a pair of crescent-shaped cross pieces (8). One of these cross pieces is fixedly mounted as at 36, while the other is pivotally mounted as at 37. The bag-like filter-cloth member is between the fixedly mounted and swingably mounted cooperating members. As will be seen by an inspection of these members, to the left of Fig. 7, the weight of the material in the bag tends to swing the pivotally mounted member against the top of the other, thereby forming a seal at the top. These crescent-shaped members are perforated as shown at 38 (see Fig. 5).

Fig. 8 discloses an alternative method of securing a lateral pressure in press chambers carried by a belt-like member without the concaving and convexing of the previous figures. In this showing a belt-like member 39 is provided with a succession of alternating fixed members 40, and movable members 41, there being a press chamber between the movable member and the fixed member, carrying a bag of textile material 42 therebetween. As shown, there are two layers of textile material, one being heavier and designed for strength, while the other is of closer meshed material. As these members travel along with the belt-like member toggle members 43, provided with projecting arms 44, meet and are engaged by roller 45 producing a lateral pressure within the press chamber. The operation of Fig. 9 is the same, save that the toggle member projects above the general level of the press chambers and is adapted to be engaged by member 46.

In Fig. 10, the cross pieces are shown as being of generally rectangular cross section and as carried by linked members 47, which space them somewhat apart. Over these cross pieces are two layers of textile material 48 and 49, which are respectively of strong textile material and close meshed textile material. As shown in Fig. 10, with this arrangement when the belt-like member is in a flat position the chamber therebetween is of rectangular cross section. On a concave bend, as shown in Fig. 11, the two cross pieces come together at the top and form a seal for the press chamber at that point. In this operation the press chamber has the general shape of an inverted V. This structure is desirable for many purposes, since wet materials fed into the bag-like element accumulate at its base, giving a body therein which is thicker at the base than at the top. With the presser

elements forming a chamber of an inverted V-shape the pressure may be proportionate to the thickness of the material within such chamber. In the structure shown in Figs. 12 and 13 the cross pieces have sides at an angle sufficient to give a substantially parallel walled chamber in the pressing position, as shown in Fig. 13. When the belt-like member is convexed, with a proper length of textile material, such textile material may be as shown in Fig. 14, drawn flat, thereby allowing an easy removal of the press cake therefrom. In Fig. 15 is shown diagrammatically, a pair of presser members which instead of being crescent-shaped as in Fig. 1, etc., are substantially straight. One of these presser members 50 is rigidly mounted as at 51, while the other, 52 is swingably mounted as at 53. This allows the same sealing of the press chamber at the top.

In the operation of the structure shown in Fig. 1, the material fed from 9 goes between the cross pieces 8, while the belt-like member is traveling in convexed position over a wheel and is in a position enabling the press chambers to open out. The material tumbling into the bottom of the bag formed by the filter cloth 14 tends to swing forward the top of the swingably mounted member to form a top seal before the pressure is exerted upon such material. Passing forward to the left in the direction of the arrow the belt-like member is given a concave bend by the next rotary member 5, as shown more clearly in Fig. 7. With a proper curvature of the two crescent-shaped members a right line lateral pressure is produced between them. The expressed liquid flows out through the bottom of the bag and through its sides and the perforations 38. Still passing forward to the left the material is opened up in a convex bend and may be showered as by 10 with water or oil, or steamed, as may be desired. The liquid flowing out in a concave bend is received by pan B. Passing forward still to the left, the belt-like member is given as many more concave bends as may be desired to give the total time of pressure. Finally, in passing over the end wheels of the series the cloth is opened out and the material tumbles off it into the hopper 12. Passing downward and to the right the belt-like member is carried into a layer of water in pan 16 and the bags which are now depending are washed. The keeper 13 serves to restrain undue swinging of the swingably mounted cross member.

In Fig. 3 the sag of the upper loop of the belt produces the necessary concave curvature and the pressure between transverse presser members 20. In the apparatus of Fig. 4 the structure is generally like that of Fig. 1, but the presser members in lieu

of being crescent-formed and swingable are fixed and have a section like that of a truncated triangle. In a concave bend these presser members approximate more rapidly at the top than at the bottom, converting a V-shaped press chamber into a chamber of more rectilinear form. In passing under roller 24 the tops of the press chambers are sealed. The operation of Fig 6 is exactly the same as that of Fig. 1 in so far as the pressing function is concerned. But at one point of its travel the belt-like member is carried through a pan 27 filled with material to be pressed and scoops it up in much the same manner as would a bucket conveyor. The press chambers having been filled in this manner the material is subjected to pressure in the same manner as before.

In the operation of the structures of Figs. 8 and 9, material is fed into the press chambers and given a lateral or side squeeze by the toggle mechanism 43, operated by 44 and 45, or by 46.

In the operation of the structure of Figs. 1, 2, 3, 4, 6, etc., the cake formed in a concave or pressure bend tends to tumble and break in a convex or releasing bend so that its particles assume new relative positions, thereby much facilitating expression in the next pressure bend. A swinging bar 81 carried by a chain 82 from holding means 83 may be employed to aid in this tumbling and breaking action.

The terms "concave" and "convex" bend as used in connection with the belt-like member of course refer to the working face and are chosen as convenient for designating the alternating hollow and reverse bends of such face.

What I claim is:—

1. In a press, a stationary framework, a plurality of rotary members journaled therein, a belt-like element carrying spaced transverse presser elements and looped around such rotary members to give alternating concave and convex bends, means for rotating one of the rotary members and means for delivering material to be expressed between such presser elements.

2. In a press, a stationary framework, a plurality of rotary members journaled therein, a belt-like element carrying spaced transverse presser elements and looped around such rotary members to give alternating concave and convex bends, a filter cloth overlying said transverse presser elements, means for rotating one of the rotary members and means for delivering material to be expressed between such presser elements.

3. In a press, a stationary framework, a plurality of rotary members journaled therein, a pair of parallel belt-like members connected by spaced transverse presser elements and looped around such rotary ele-

ments to give alternating concave and convex bends, means for rotating one of the rotary elements and means for delivering material to be pressed between such presser elements.

4. In a press, a stationary framework, a plurality of rotary members journaled in the upper part thereof, a pan in the lower part thereof, a belt-like element carrying transverse spaced presser members and looped around said rotary members to give alternating concave and convex bends and having a loop depending into said pan, means for rotating one of said rotary members, and means for delivering material to be pressed between said presser members prior to a concave bend.

5. In a press, a stationary framework, a plurality of rotary members journaled in the upper part thereof, a pan in the lower part thereof, a belt-like element carrying transverse spaced presser members and looped around said rotary members to give alternating concave and convex bends and having a loop depending into said pan, a filter cloth overlying said transverse presser elements, means for rotating one of said rotary members and means for delivering material to be pressed between said presser members prior to a concave bend.

6. In a press, a stationary framework, a plurality of rotary members journaled in the upper part thereof, a pan in the lower part thereof, a pair of parallel belt-like members connected by spaced transverse presser members and looped around said rotary members to give alternating concave and convex bends and having a loop depending into said pan, means for rotating one of said rotary members and means for delivering material to be pressed between said presser members prior to a concave bend.

7. In a press, a stationary framework, a plurality of wheels carried thereby, a pair of parallel linked members connected by transverse spaced presser members and looped over said wheels to give alternating concave and convex bends, means for imparting movement to the linked members and means for feeding material to be pressed between the presser members.

8. In a press, a stationary framework, a plurality of wheels carried thereby, a pair of parallel linked members connected by transverse spaced presser members and looped over said wheels to give alternating concave and convex bends, a filter cloth overlying the presser members, means for imparting movement to the linked members and means for feeding material to be pressed between the presser members.

9. In a press, a stationary framework, a plurality of wheels carried thereby, a pair of parallel linked members looped over

said wheels to give alternating concave and convex bends, transverse presser members swingably connected at their ends to said linked members, means for imparting movement to the linked members and means for feeding material to be pressed between the presser members.

10. In a press, a stationary framework, a plurality of wheels carried thereby, a pair of parallel linked members looped over said wheels to give alternating concave and convex bends, transverse presser members swingably connected at their ends to said linked members, a filter cloth overlying the presser members, means for imparting movement to the linked members and means for feeding material to be pressed between the presser members.

11. In a press, a stationary framework, a plurality of wheels carried thereby, a pair of parallel linked members looped over said wheels to give alternating concave and convex bends, transverse presser members swingably connected at their ends to said linked members, said presser members having reciprocally shaped opposing sides, means for imparting movement to the linked members and means for feeding material to be pressed between the presser members.

12. In a press, a stationary framework, a plurality of wheels carried thereby, a pair of parallel linked members looped over said wheels to give alternating concave and convex bends, transverse presser members swingably connected at their ends to said linked members, said presser members having reciprocally shaped opposing sides, a filter cloth overlying the presser members, means for imparting movement to the linked members and means for feeding material to be pressed between the presser members.

13. In a press, a stationary framework, a plurality of wheels carried thereby, a pair of parallel linked members looped over said wheels to give alternating concave and convex bends, transverse presser members swingably connected at their ends to said linked members, said presser members being of a crescent shaped cross-section, means for imparting movement to the linked members and means for feeding material to be pressed between the presser members.

14. In a press, a stationary framework, a plurality of wheels carried thereby, a pair of parallel linked members looped over said wheels to give alternating concave and convex bends, transverse presser members swingably connected at their ends to said linked members, said presser members being of a crescent shaped cross-section, a filter cloth overlying the presser members, means for imparting movement to the linked members and means for feeding material to be pressed between the presser members.

15. In a press, a stationary framework, a

plurality of wheels carried thereby, a pair of parallel linked members looped over said wheels to give alternating concave and convex bends, perforated transverse presser members swingably connected at their ends to said linked members, means for imparting movement to the linked members and means for feeding material to be pressed between the presser members.

16. In a press, a stationary framework, a plurality of wheels carried thereby, a pair of parallel linked members looped over said wheels to give alternating concave and convex bends, perforated transverse presser members swingably connected at their ends to said linked members, a filter cloth overlying the presser members, means for imparting movement to the linked members and means for feeding material to be pressed between the presser members.

17. In a press, a stationary framework, a plurality of wheels carried thereby, a pair of parallel linked members looped over said wheels to give alternating concave and convex bends, perforated transverse presser members having a crescent-like cross-section and swingably connected at their ends to said linked members, means for imparting movement to the linked members and means for feeding material to be pressed between the presser members.

18. In a press, a stationary framework, a plurality of wheels carried thereby, a pair of parallel linked members looped over said wheels to give alternating concave and convex bends, perforated transverse presser members having a crescent-like cross-section and swingably connected at their ends to said linked members, a filter cloth overlying the presser members, means for imparting movement to the linked members and means for feeding material to be pressed between the presser members.

19. A press comprising a stationary framework, a series of spaced rotary members journaled at intervals at or near its top, an endless belt-like member carrying spaced transverse presser members and looped around said rotary members in such manner as to have alternating concave and convex bends, said endless member also having a loop passing through the base of the standard from one end to the other, a pan-like collecting member located beneath the last-stated loop, means for imparting movement to one of said rotary members, and means for delivering material to be pressed between said presser members prior to a concave bend.

20. In a press, a stationary framework carrying wheels at or near its top, an endless belt-like member comprising parallel linked members and spaced transverse presser members connecting the same, said belt-like member having a horizontal extension

sion looped over such wheels in such a manner as to have alternating concave and convex bends and having a return extension through the base of the machine, means for imparting movement to wheels and belt-like member, means for feeding material to be pressed between the presser members prior to a concave bend, pan-like means for collecting expressed liquid located between the two extensions, and means for removing and collecting treated solids beyond the first-mentioned extension.

21. In a press, a stationary framework carrying wheels at or near its top, an endless belt-like member comprising parallel linked members and spaced transverse presser members connecting the same, said belt-like member having a horizontal extension looped over such wheels in such a manner as to have alternating concave and convex bends and having a return extension through the base of the machine, a filter cloth overlying the presser members, means for imparting movement to wheels and belt-like member, means for feeding material to be pressed between the presser members prior to a concave bend, pan-like means for collecting expressed liquid located between the two extensions, and means for removing and collecting treated solids beyond the first-mentioned extension.

22. In a press, a stationary framework carrying wheels at or near its top, an endless belt-like member comprising parallel linked members and spaced crescent shaped transverse presser members connecting the same, said belt-like member having a horizontal extension looped over such wheels in such a manner as to have alternating concave and convex bends and having a return extension through the base of the machine, means for imparting movement to wheels and belt-like member, means for feeding material to be pressed between the presser members prior to a concave bend, pan-like means for collecting expressed liquid located between the two extensions, and means for removing and collecting treated solids beyond the first-mentioned extension.

23. In a press, a stationary framework having a top carrying a series of wheels, means for imparting motion to the wheels, an endless horizontally extending belt-like member comprising parallel linked members and spaced transverse presser members connecting the same, said belt-like member being looped around such wheels in such a manner as to have alternating concave and convex bends, and having a return extension passing through the lower part of the framework, an endless filter cloth overlying the presser members, means for supplying material to the spaces between the presser members prior to a concave bend, and pan-like liquid collecting means between the up-

per and lower extensions of the belt-like member.

24. A press comprising a belt-like member carrying presser chambers in one face, means for giving alternating concave and convex bends to said belt-like member, means for feeding material to the presser chambers prior to a concave bend and means for disturbing the cake during a convex bend.

25. A press comprising a stationary framework, an endless beltlike member provided with transverse presser chambers and looped within said framework in such a manner as to permit a concave curvature of the upper surface of the belt-like member, means for imparting motion to the beltlike member and means for feeding material to be expressed to such presser chambers.

26. A press comprising a stationary framework, an endless beltlike member provided with transverse presser chambers, means for concaving the upper surface of said beltlike member to produce lateral pressure between the side walls of such presser chambers, means for imparting motion to the beltlike member and means for feeding material to be expressed to such presser chambers.

27. A press comprising a stationary framework, an endless beltlike member provided with transverse presser chambers, means for producing lateral pressure a plurality of times between the side walls of such presser chambers during the travel of the endless member, means for imparting motion to the beltlike member and means for feeding material to be expressed to such presser chambers.

28. In a press, a presser member comprising a pair of cooperating crescent-shaped presser elements, one of which is pivotally mounted, a bag-like filter cloth therebetween, means for feeding material into the bag and means for producing a lateral approximation between such elements.

29. In a press, a presser member comprising a pair of cooperating crescent-shaped presser elements, one of which is pivotally mounted while the other is relatively rigidly mounted, a bag-like filter cloth therebetween, means for feeding material into the bag and means for producing a lateral approximation between such elements.

30. A press comprising a stationary framework provided with a series of successive rotary members, an endless flexible beltlike presser member carrying a succession of presser chambers on one face looped around such rotary members in such a manner as to bring said face alternately above and below a given plane in the progress of such beltlike member, means for imparting motion to the beltlike member and means for feeding material into such presser chambers.

31. A press comprising a stationary framework provided with rotary members, an endless beltlike presser member provided with a series of successive presser chambers on one face and mounted in such framework on such rotary members in such manner as to give a generally horizontal extension with such face uppermost, means for producing a concave curvature in such face in such extension, means for imparting motion to the beltlike member and means for feeding material into such presser chambers.

32. A press comprising a stationary framework, a plurality of successive pairs of parallel wheels mounted in the framework, a pair of endless parallel carrying members mounted upon such wheels in such manner as to produce a plurality of alternating bends in each direction, each such carrying member being composed of a plurality of linked metal elements, transverse presser bars connecting opposite metal elements, a filter cloth disposed in bag-like arrangement between succeeding pairs of such bars, means for imparting motion to the carrying members and means for feeding material into the bag-like portions of the filter cloth.

33. A press comprising a stationary framework, a plurality of successive pairs of parallel wheels mounted in the framework, a pair of endless parallel carrying members mounted upon such wheels in such manner as to produce a plurality of alternating bends in each direction, each such carrying member being composed of linked metal elements, transverse presser bars connecting opposite metal elements and swingably mounted therein, a filter cloth disposed in bag-like arrangement between succeeding pairs of such bars, means for imparting motion to the carrying members and means for feeding material into the bag-like portions of the filter cloth.

34. A press comprising a stationary framework, a plurality of successive pairs of parallel wheels mounted in the framework, a pair of endless parallel carrying members mounted upon such wheels in such manner as to produce a plurality of alternating bends in each direction, each such carrying member being composed of linked metal elements, transverse presser bars connecting opposite metal elements and swingably mounted therein, cooperating presser bars rigidly mounted therein, a filter-cloth disposed in bag-like arrangement between the swingable and the fixed presser bars, means for imparting motion to the carrying members and means for feeding material into the bag-like portions of the filter cloth.

35. A press comprising a stationary framework, a plurality of successive pairs of parallel wheels mounted in the framework, a pair of endless parallel carrying members mounted upon such wheels in such manner

as to produce a plurality of alternating bends in each direction, each such carrying member being composed of a plurality of linked metal elements, transverse presser bars of crescent section connecting opposite metal elements and swingably mounted therein, cooperating presser bars rigidly mounted therein, a filter-cloth disposed in bag-like arrangement between the swingable and the fixed presser bars, means for imparting motion to the carrying members and means for feeding material into the bag-like portions of the filter cloth.

36. A press comprising a stationary framework, a plurality of successive pairs of parallel wheels mounted in the framework, a pair of endless parallel carrying members mounted upon such wheels in such manner as to produce a plurality of alternating bends in each direction, each such carrying member being composed of linked metal elements, transverse presser bars of crescent section connecting opposite metal elements and swingably mounted therein, cooperating presser bars also of crescent section rigidly mounted therein, a filter cloth disposed in bag-like arrangement between the swingable and the fixed presser bars, means for imparting motion to the carrying members and means for feeding material into the bag-like portions of the filter cloth.

37. As a press, a stationary framework having horizontal extension, a plurality of wheels mounted therein in two parallel series, a looped endless member composed of a series of linked metal bodies disposed over the wheels of each series in such manner as to form a generally horizontal loop through the top of such framework but passing alternately above and below successive wheels in such loop and having a return loop through the base of the framework, a pair of cooperating transverse presser bars having cooperating crescent-shaped faces connecting each pair of opposite metal bodies, one of each such pair of bars being rigidly mounted and one swingably mounted thereon, a filter-cloth arranged to form a bag-like pocket between each such pair, means at one point in the horizontal extension for depositing material in the successive pockets coming thereunder, means for imparting a traveling motion to the looped endless member and means for removing expressed material at the point where the top loop merges in the return loop.

38. In a press, a fixed mounting, a carrier member arranged to travel in a closed path in said mounting, means for imparting motion to said carrier member, a plurality of press chambers each having a laterally movable side mounted on said carrier member, means for giving lateral movement to said movable sides during said motion, means for filling said chambers prior to such lateral

movement and means for discharging said chamber subsequent to such lateral movement.

39. In a press, a plurality of spaced transverse presser elements, carrying means uniting said elements into a belt-like assemblage, means for giving said assemblage a traveling motion in a closed path and means for giving successive portions of one face of said assemblage a hollow bend to produce pressure between said spaced members.

40. In a press, a pair of spaced presser members, a depending baglike presscloth therebetween, means for feeding material into said cloth and means for producing approximation of said members, one of said presser members being stationarily mounted and one being pivotally mounted at its ends and free to swing its upper edge against the cooperating member.

41. In a press, a pair of spaced cooperating presser members, one of said members being pivotally mounted in such a manner as to permit a lateral swinging motion, a depending press bag of flexible material between said presser members, means for feeding material to be pressed into said bag and means for approximating said presser members to produce pressure therebetween and on the contents of said bag, said pivotal mounting being of such nature as to permit the upper edge of one such member to swing against the other such member under the weight of said material in said bag and permit the formation of a sealing closure between the tops of said members prior to the application of pressure.

42. In a press, a pair of spaced cooperating presser members, a depending press bag of flexible material between said presser member, means for feeding portions of material to be pressed into said bag, means for approximating said presser members to produce pressure therebetween and on the contents of said bag and means for allowing

the tops of said presser members to close and seal after deposition of material in said bag and prior to the production of pressure.

43. In a press, a pair of spaced presser members having cooperatively shaped faces, a depending bag of flexible material therebetween, means for feeding material to be pressed into said bag in an open position and means for approximating said members to produce pressure therebetween subsequent to said feeding, one of said members being pivotally mounted at its ends to allow a lateral swinging and being sufficiently light in weight to permit the weight of a normal portion of material in said bag to swing its upper edge against the upper edge of the other said member and produce a top closure and sealing prior to the application of pressure.

44. In a press, a stationary framework, a plurality of wheels carried thereby, an endless beltlike member looped over said wheels to give alternating concave and convex bends, said beltlike member being composed of a pair of parallel endless linked members and a plurality of spaced pairs of cooperating transverse presser members extending between and uniting said linked members, all said transverse members being perforated and of a crescent shaped section and the two members of each pair being spaced apart to form a material receiving chamber therebetween, one member of each such pair being rigidly connected to the linked members and the other swingably connected thereto, means for imparting movement to the beltlike members and means for feeding materials into said chambers between cooperating transverse members.

In testimony whereof, I affix my signature in the presence of witnesses.

JOHN J. BERRIGAN.

Witnesses:

H. O. CHUTE,

LAURA E. SMITH.