June 30, 1942. R. J. CHEESMAN 2,288,393

FRUIT PRESS

Filed June 20, 1938 2 Sheets-Sheet 1

Fig. 2.

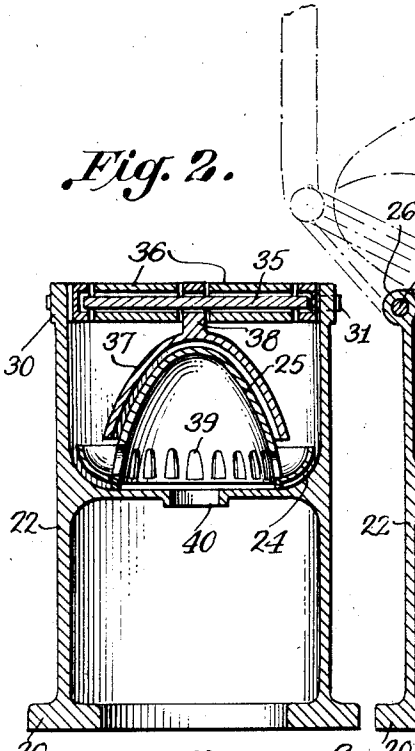
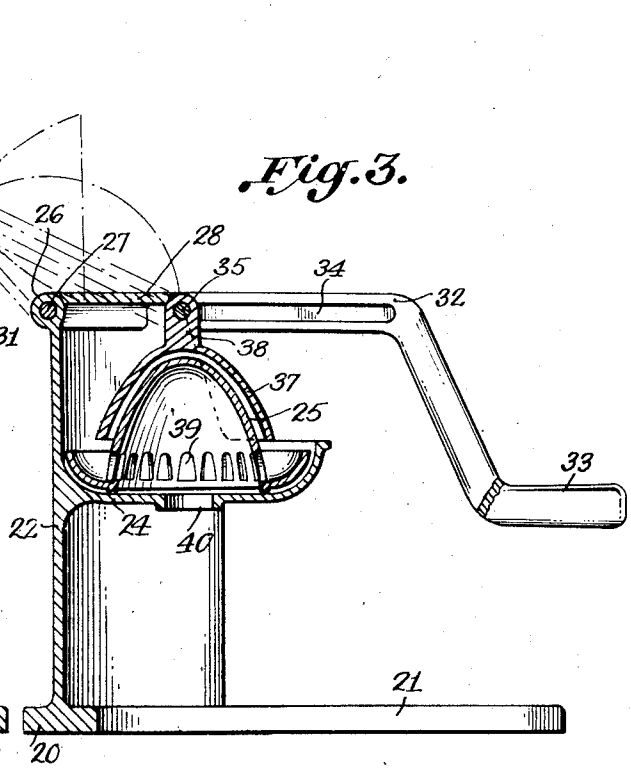


Fig. 3.



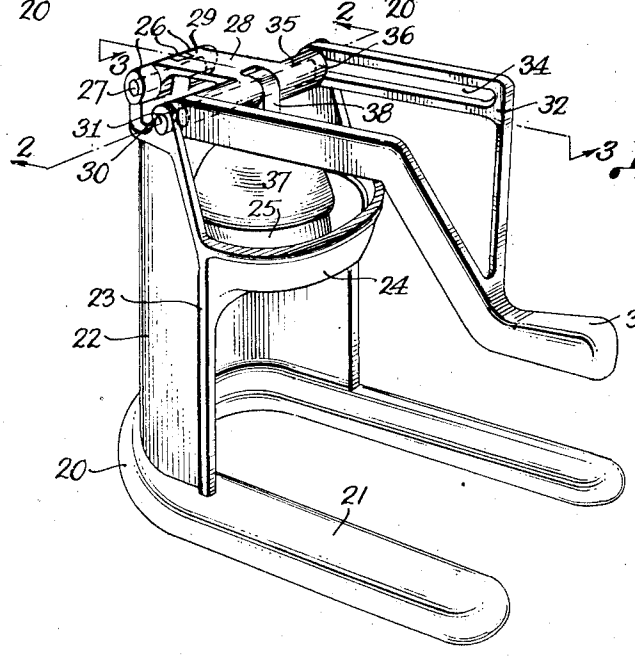


Fig. 1.

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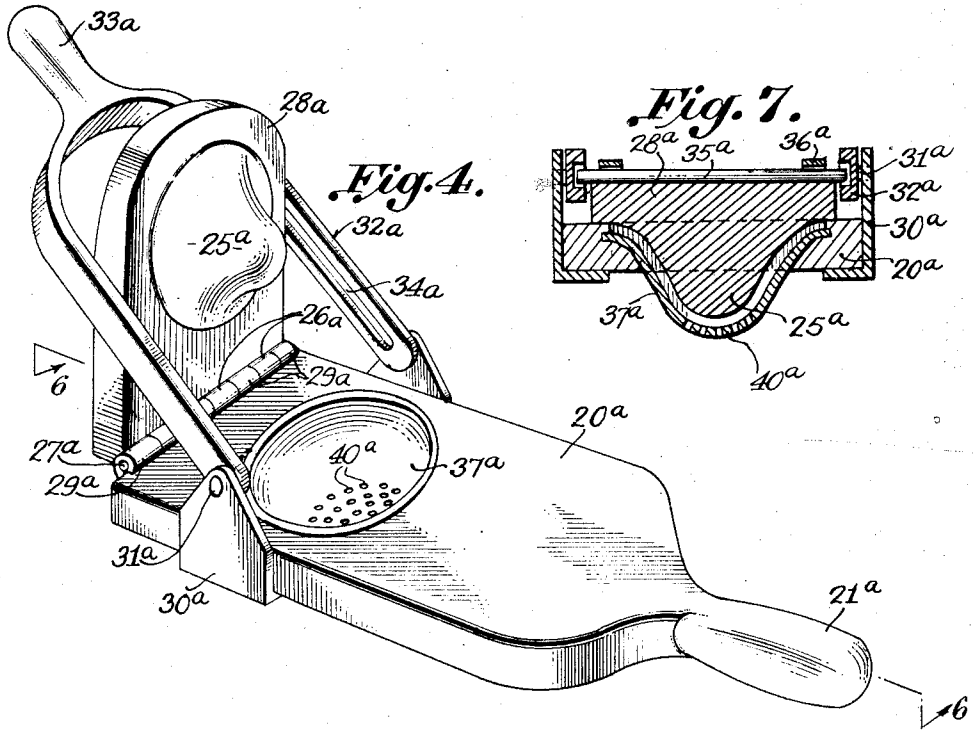


Fig. 4.

Fig. 7.

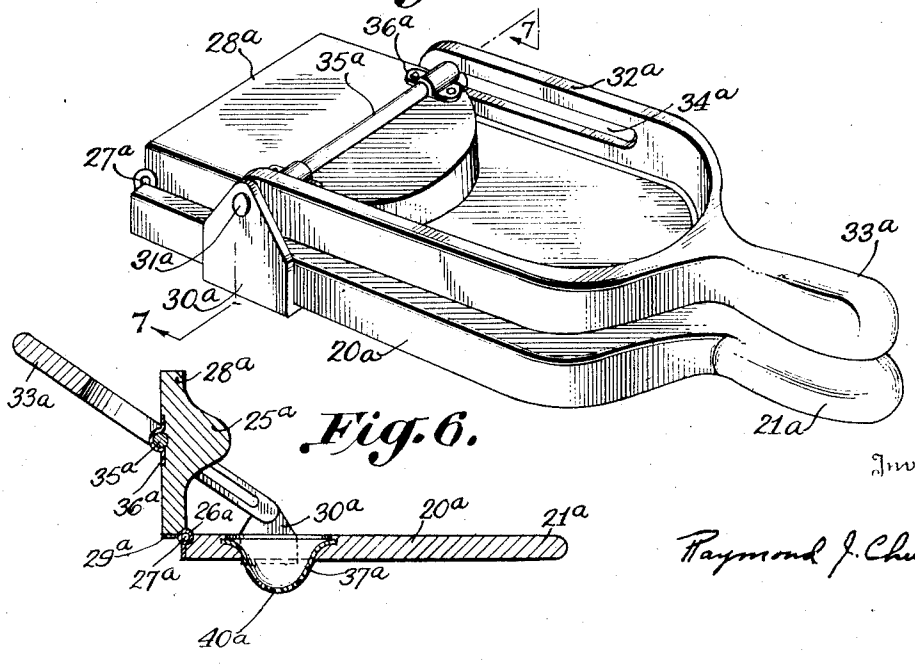


Fig. 5.

Fig. 6.

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Patented June 30, 1942 2,288,393

UNITED STATES PATENT OFFICE

2,288,393

FRUIT PRESS

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Application June 20, 1938, Serial No. 214,821

11 Claims. (Cl. 100—41)

This invention pertains to presses and more particularly to lever actuated presses for the preparation of food such as the extraction of juices from fruits and vegetables or the masticating or shredding thereof.

Many types of the general class of presses for this purpose are known to the trade but little advance has been made to obtain a compressional force greater than the manually applied force resulting in difficultly operable devices. The greatest advance has been in the construction of the screw-down plunger type which require an awkward and considerable amount of cranking.

An object of my invention is to provide a lever actuated press, having a convenient short lever, suitable for kitchen and counter use with the least possible storage and operating space, the least operating movement, and yet with a maximum compressional force with the least actuating force.

Other objects and advantages of my invention will become apparent from the following description and accompanying drawings illustrating embodiments of my invention and by which the same may be practiced.

In Fig. 1 of the drawings I have illustrated in perspective a cabinet or counter type of press embodying my invention. Other views of this embodiment are shown in the following two figures of which:

Fig. 2 is a vertical section at line 2—2 of Fig. 1; and

Fig. 3 is a vertical section at line 3—3 of Fig. 1.

In Figs. 4 and 5 I have illustrated in perspective, opened and closed views of the hand type of press incorporating my improvement, sectional views of which are shown in the following two figures of which:

Fig. 6 is a longitudinal cross-section of Fig. 4 at line 6—6; and

Fig. 7, a section taken at line 7—7 of Fig. 5.

Referring to the embodiment illustrated in Fig. 1 and the associated views, Figs. 2 and 3, my invention comprises a base 20 preferably U-shaped to receive a glass or other container and terminating in leg portions 21 of sufficient length to brace the device against tilting in the operation thereof. Upon the base is mounted a vertically disposed standard or support 22, which is preferably, though not necessarily, provided with a reenforcing edge portion 23, for the support of various elements of the device including a receiving cup 24. For the support of the receiving cup, and other purposes presently described, the support 22 preferably extends around a portion of the cup to support the same at more than one side and also to serve as a shield therearound.

One or more apertures are provided ,as shown by character reference 40 in Figures 2 and 3, through the base portion of the cup 24 through which the prepared substance may drain or pass from the cup to a container. Within the cup is mounted an element 25 which may be termed and serve as a press mold or die over which the fruit or vegetable is to be compressed. The member 25 is preferably removable for exchange and cleansing purposes and is preferably of a design, size and shape most suitable to the configuration of the fruit or vegetable intended to be compressed thereover. This member 25 is also provided with apertures 39, or notches in its base, through which the prepared substance may pass to the receiving cup 24. The size of the apertures 39 may be such as will serve as a strainer to prevent the passage of seeds or pulp into the receiving cup. Further details of construction, operation and function of the member 25 will be set forth hereinafter in connection with elements intended to cooperate therewith.

The standard or support 22 is formed or provided at its upper end or edge with means whereby a lever may be fulcrumed. Suitable means for this purpose may comprise, as shown, one or more bearings 26 adapted to operably receive a pin or shaft 27 to which a lever 28 is hingedly connected by one or more bearings 29 on one end of said lever.

The standard 22 is also formed or provided at its upper end or edge with means whereby a bifurcated lever may be fulcrumed by the arms thereof. Suitable means for this purpose may comprise, as shown, a pair of spaced axially aligned bearings 30 positioned above opposite sides of the member 25 and forwardly of and axially parallel with the bearings 26.

The bearings 30 are adapted to operably receive stud shafts 31 projecting, respectively, laterally outward from the end portions of the arms of a bifurcated lever 32 by which bearings and shafts the lever may be fulcrumed to the standard. The shank 33 of the forked lever is designed to serve as a handle.

Means are provided for actuating lever 28 by lever 32 and for transmitting the force of lever 32, resulting from the application of force to the handle 33, to lever 28. Suitable means for this purpose comprise, as shown, groove-like cams 34 in the arms of the lever 32 which are adapted to operably receive cam follower shaft 35 projecting

laterally from the sides of a bearing 36 on the free end of the lever 28.

Means designed to cooperate with the member 25 to compress an article of food is next provided. Suitable means for this purpose comprises, as shown, a press member 37 hingedly suspended from the central portion of the cam follower shaft 35 by means of a bearing 38, in a manner whereby the members 25 and 37 may cooperatively act in cameo and intaglio, respectively, upon an article of food for the purpose described.

Features of my invention are also incorporated in the readily portable nut-cracker type of press illustrated in Figure 4, and the associated Figures 5, 6 and 7, as distinguished from the counter or cabinet type heretofore described. In the disclosures of the nut-cracker type of press the elements indicated by character reference numerals bearing the suffix "*a*" are elements similar in function to the elements of the previously described type of press, which bears like character reference numerals except for the addition of the letter "*a*."

More specifically, the latter type of press comprises a base lever 20*a* having a projecting handle portion 21*a*. The press mold 25*a* is however, not carried by the base in this instance but in an inverted manner by the short lever 28*a*, which lever is fulcrumed to the base by means of bearings 26*a* and 29*a* on the lever 28*a* and base 20*a*, respectively, through which bearings a pin or shaft 27*a* is passed.

The base is also provided with bearings 30*a* whereby a forked lever 32*a*, having a handle shank 33*a* may be fulcrumed by means of stud shafts 31*a* projecting laterally from the ends of the arms of the forked lever. The arms of lever 32*a* are provided with cams 34*a* for operably controlling lever 28*a* by means of cam follower 35*a* operably held by bearings 36*a* on the lever 28*a*. The base 20*a* is provided with a press member 37*a* reversed with respect to the similar element of the previously described type of press in order that the member 37*a* may also serve as a receiving cup. By this arrangement, if the open faced portion of the fruit or vegetable, to be compressed, is placed face downward upon the press member 37*a* the cooperative function of the member 25*a* will reverse the rind of the fruit, if it contains one, or force the juices therefrom. This combined press member and receiving cup 37*a* is also provided with the customary strainer or drainage apertures 40*a* as shown in Figures 4, 6, and 7.

The members 25*a* and 37*a* of the latter type of press act in cameo and intaglio similarly as do members 25 and 37 of the counter type of press.

Having described the basic elements and general arrangements thereof of practical forms of my invention, the objects and more specific arrangements of the elements will be discussed in order to disclose the principles of operation and new results, particular attention being given the arrangement, design and size of means whereby a press mold may be guided to and receive the reaction of a lever at a point nearer the fulcrum of the lever than one-half the diameter of the press mold 25.

It may be assumed that the press herein described in primarily intended for domestic use in the preparation of food. This assumption imposes a certain maximum size which though arbitrary could hardly be justified by a length more than approximately 12½ inches.

Another consideration is the size of the article to be compressed by the device. With this in mind the receiving cup 24 and press mold 25 should be large enough to receive the largest specimen of fruit which is likely to be found in the market, and the shape should also be such as to accommodate the smallest specimen likely to be found. A suitable size for the cup 24 may therefore be approximately 5 inches in diameter while a suitable size for the press mold 25 may be approximately 3¼ inches at its greatest effective diameter.

The two necessary conditions which make the fruit press practicable are, therefore, a lever or handle of convenient length and cooperating members for the compression of the article of diameters suitable to practically all sizes of articles to be compressed.

As described, the invention employs the principle of a lever with a fulcrum at one end, the load at the other end and the reaction somewhere between the two. A lever within the arbitrary length mentioned can have nearly any ratio of load to the reaction. However, for ease of operation it is desirable to obtain the greatest possible ratio whereby maximum pressure may be brought to bear on the press mold with the same amount of load on the handle. This again is a principle of my improvements whereby better results are obtained with less exertion on the part of the user.

In order to explain the latter principle more fully, reference is made to Figures 1 and 4, particularly, wherein the fulcrum may be noted as such, the load represented by the handle, and the reaction represented by the axis upon which the press member 37 is mounted. As has been pointed out the lever 32 is forked and has its fulcrum on the sides of the cup 24 wherein the press mold 25 is positioned. By the expedient of the forked lever it is possible to place the reaction, to the axis of the press member 37, very close to the fulcrum of the lever 32, the space between the two being approximately ⅜ of an inch. In the use of a straight single armed lever, however, the proximity of its fulcrum to the reaction (press axis) would have been limited to one-half the diameter of the receiving cup, placing the fulcrum on the back rim of the standard 22 where, as shown in the drawings, the fulcrum of the lever 28 is located.

To hypothetically examine the difference between a lever fulcrumed in line with the handle and the arrangement of lever 32 employed in my improved device, all other dimensions, arbitrarily taken, remaining the same: the former being approximately 12 inches (handle to fulcrum) divided by 2¾ inches (fulcrum to reaction) equals a ratio of 12 to 2.75 or 4.36 to 1. The latter being approximately 9¾ inches (handle to fulcrum) divided by ⅜ inch (fulcrum to reaction) equals a ratio of 9.75 to 0.375 or 26 to 1. From this set of facts it will be seen that by the expedient of a two pronged forked lever a reaction of 26 pounds is obtained for every pound of load on the handle, whereas by the former method not more than 4.36 pounds could be obtained for every pound of load on the handle. The appreciable difference is acordingly an obvious desirable result.

To bring about a substantially vertical movement of the press member 37 to and from cooperative relation with the press mold 25, reference is made to lever 28 with its fulcrum on the rim of the receiving cup 24 directly behind the

press member 37, the other end of the lever 28 being the press axis. The lever 28 may be termed a convenience or delivery lever, which serves to move the press member 37 in an arc of approximately 2⅜ inches radius. While this radius is arbitrary its length must be such that it will not only lift the press member 37 substantially vertically off the press mold 25, but also carry it rearwardly off the center of the press mold 25. If the radius of the lever 28 were longer the arc of the press axis would be too slow in the acceleration of its horizontal movement in the upward swing. While on the other hand if the lever 28 were shorter the press member 37 would approach the mold 25 with too much horizontal movement in its downward swing. Moreover, it would not move sufficiently off the center to clear the receiving cup, i. e., the side walls thereof.

Bearing 38, which is preferably an integral part of the press member 37, fits between bearings 36 and is operably held in position by shaft 35. The press member 37 hangs vertically from the shaft by its own weight and to a minimum extent is guided by the press mold 25. By reason of the mounting of the press member 37 it remains substantially vertical as the press axis follows the downward arc of lever 28 and as it travels through the successive reactionary points of lever 32. Likewise, in the upward arc the press member 37 remains substantially vertical until the back surface of the press member engages the bearing 26. Upon engagement with this bearing the press member reacts to the action of the couple causing the press member to rotate into a horizontal position as shown in dotted lines in Fig. 3.

Further reference may be made to the cams 34 and the arms of the lever 32, it is preferable that the grooves 34 not completely pierece the thickness of the lever. The remaining web restrains the shaft 35 of the press axis from working out and also strengthens the lever section to resist bending and shearing.

Several purposes are served by the downward deflection of the lever 32. This deflection, however, has no effect on the ratio of the lever since its length is measured from the fulcrum to the end of the hande in a straight line perpendicular to the direction of the load. The first advantage of the deflection is that pressure is more comfortably and conveniently applied when the handle is lowered and in turn greater stability is obtained; secondly, it places the handle at a greater distance from the grooved sections making the angle of the fork smaller thus offering more resistance to bending; thirdly, the angle formed by lever 32 in its two extreme positions is about 165 degrees and with the bend in the lever the arc segment described by the handle is in an advanced and a more convenient position for the user.

The press mold 25 is preferably a separate and removable piece or member which fits into the receiving cup, and the press mold may also be formed with a trough around its lower circumference to serve as a means to catch seeds and pulp and prevent the same from flowing through the apertures to the receiving cup.

The type of press disclosed in Figure 4 and the associated figures is constructed and operates upon the same theory as that described in connection with the press disclosed in Figure 1 and its associated figures.

From the foregoing it will be seen that by my invention I have provided means whereby a press mold such as element 37 may receive the reaction of a lever such as lever 32 from a point on the lever 32 where the reaction will be greatest. By the forked lever arrangement the press mold may receive a reaction from that lever at a point nearer its fulcrum than one half the diameter of the press mold by reason of the fact that the fulcrums of the arms are positioned to the sides of the press mold affording the placement of the mold therebetween.

What I claim is:

1. A press comprising the combination of a bifurcated lever having its arms fulcrumed to a support, a circular pressure member slidingly secured at its pressure axis to said lever, means operable by said lever for moving said pressure member during the effective movement of said lever to a point where its pressure axis is nearer the fulcrum of said lever than one half the diameter of said pressure member.

2. In a press the combination of a lever pivotally fulcrumed on a base, a pressure element having compression axis, means for pivotally mounting said pressure element in a manner whereby its compression axis is movable along a predetermined arc of uniform radius and which eccentrically circumscribes the axis of said fulcrum, and means slidingly connecting said pressure element to said lever in a manner whereby the lever in operation causes the pressure element to be moved along its uniform arc and simultaneously moved eccentrically with respect to the arc of said lever and whereby upon the movement of said lever at least a part of said pressure element is moved through and intersects the axis of said lever fulcrum.

3. A press comprising in combination a support, a receiving cup supported by said support and having a drainage aperture, a press mold member over which an article is adapted to be compressed removably mounted in said receiving cup and provided with drainage apertures of a predetermined size, an arm-like member hingedly attached to said support in a manner whereby its free end may pass through an arc meeting the vertical axis of the press mold, a pressure member adapted to cooperate with said press mold suspended at its diametrical axis from the free end of said arm-like member in a manner whereby the said diametrical axis of the pressure member may pass along said arc into communication with the said vertical axis of the press mold, a bifurcated lever the arms of which are fulcrumed to said support with its fulcrum axis parallel with the fulcrum axis of said arm-like member and within said arc in a manner whereby the said pressure member may pass between said arms, means for slidingly connecting the free end of said arm-like member to the arms of said bifurcated lever whereby progressively greater reactions may be transmitted from said bifurcated lever to said pressure member upon the downward movement of the bifurcated lever.

4. A press of the class described comprising the combination of a support, a bifurcated primary lever having its legs fulcrumed to said support, a secondary lever also fulcrumed to said support, a pressure element mounted in a pendulum manner on said secondary lever and carried between the legs of said primary lever, a compression member with which said pressure element is adapted to cooperate, means slidingly connecting said secondary lever to said primary

lever whereby the former is actuated by the latter to arcuately move said pressure element into and from cooperative relationship with said compression member, and means operative near the end of the back stroke of said primary lever for tilting said pressure element about its mounting to a position accessibly presenting its pressure face.

5. A press comprising in combination a support, bearing means carried by said support, a lever pivoted to and swinging about said bearing means as an axis, said support having a compression element substantially symmetrical about a central pressure axis and positioned so that the projection of said axis passes said bearing means virtually contiguous to the axis of said bearing means, said lever having cam means extending to a point virtually contiguous to said bearing axis from a point remote therefrom, cam follower means associated with said cam means, pressure means connected to said cam follower means and arranged in cooperative relation to said compression element, a cam-follower controller guiding said cam-follower along said cam means as said lever is swung, said controller guiding said cam follower in a path, during the active stroke of said pressure means, virtually in alignment with said pressure axis, said assemblage assuring maintenance of the reactionary point between said lever and cam means in virtual alignment with the pressure axis during the pressing operation concomitant with progressive movement of the cam follower to a point virtually contiguous to the bearing axis, with consequent extreme increase in the power ratio of the press, as the end of the pressing stroke is approached.

6. In a press, of the class described, a support, bearing means carried by said support, a lever pivoted to said bearing means as an axis, said lever having cam-means extending from a point relatively remote from said axis to a point virtually juxtaposed to said axis, cam follower means and a pressure member carried pendulously therefrom, and a support for said cam follower means pivoted on a fulcrum eccentric to the axis of said lever whereby the cam follower means is forced to progressively approach said lever axis as the lever is turned toward pressure-applying position and whereby the effort transmitted through said lever, cam means and cam follower is applied to said pressure member with increasing ratio.

7. A press comprising in combination a support, a lever fulcrumed by bearing means to said support, said lever having cam means extending to a point contiguous to said bearing axis from a point remote therefrom, cam follower means operatively associated with said cam means and having an axis substantially parallel with said bearing axis, a pressure element connected to said cam follower means, and means pivoted to said support for making said cam follower means move progressively along said cam means in unison with the progressively moving reactionary point on said lever, during rotary movement of said lever, from a point remote from the bearing axis of the lever to a point virtually contiguous to said bearing axis with consequent extreme increase of the power ratio of the lever to said pressure element.

8. A press comprising a lever having a fulcrum point, a pressure element having a pressure axis and movable about another fulcrum, and means slidably connecting said pressure element to said lever in a manner whereby, upon the downward movement of the lever, the pressure axis of said pressure element is progressively moved toward the fulcrum of said lever to a position contiguous with the axis of the fulcrum of said pressure element lever.

9. A press comprising the combination of a bifurcated lever having its arms fulcrumed to a support, a symmetrical pressure member of predetermined diameter adapted to pass between said arms, mounting means connecting said member to said lever intermediate the arms thereof in a manner whereby the pressure member may be moved through the bifurcated portion of said lever and whereby the reactionary forces of the lever, resulting from downward forces on the handle of the lever, are transmitted to said pressure element from points on the lever which progressively approach the lever fulcrum to a point nearer the fulcrum than one-half the diameter of said pressure member.

10. A press comprising the combination of a support, a stationary compression member mounted on said support, a movable symmetrical pressure member adapted to cooperate with said stationary member to compress an article therebetween, an arm pivotally connected at one point thereof to said support, said pressure member being pivoted to said arm at a point removed from the pivotal axis of the arm in a manner whereby the pressure member may be guided by said arm through an arc of a predetermined radius about the pivotal axis of said arm into and from cooperative relation with said stationary member, a bifurcated lever having its legs fulcrumed to said support on a line which will be intersected by at least a portion of said pressure member as it is guided into cooperative relationship with said stationary member by said arm, and cooperative cam and cam-follower means on said lever and arm respectively whereby upon the operation of the lever said arm is caused to move said movable pressure member in an arcuate path between the leg portions of said lever into and from cooperative relation with said stationary member.

11. A press comprising the combination of a primary lever fulcrumed to a support, a symmetrical pressure element fulcrumed to said support at a point eccentric to that of said lever, said pressure element having a compression axis and a diameter greater than twice the shortest distance from its compression axis to the axis of the fulcrum of the primary lever, when the press is in closed position, a stationary compression member, means slidably connecting said pressure element to said lever, for moving said pressure element into face to face contiguous juxtaposition with said compression member, and for moving the axis of said pressure element toward and away from the fulcrum of said primary lever respectively during compressing and releasing strokes of said primary lever.

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