

No. 631,285.

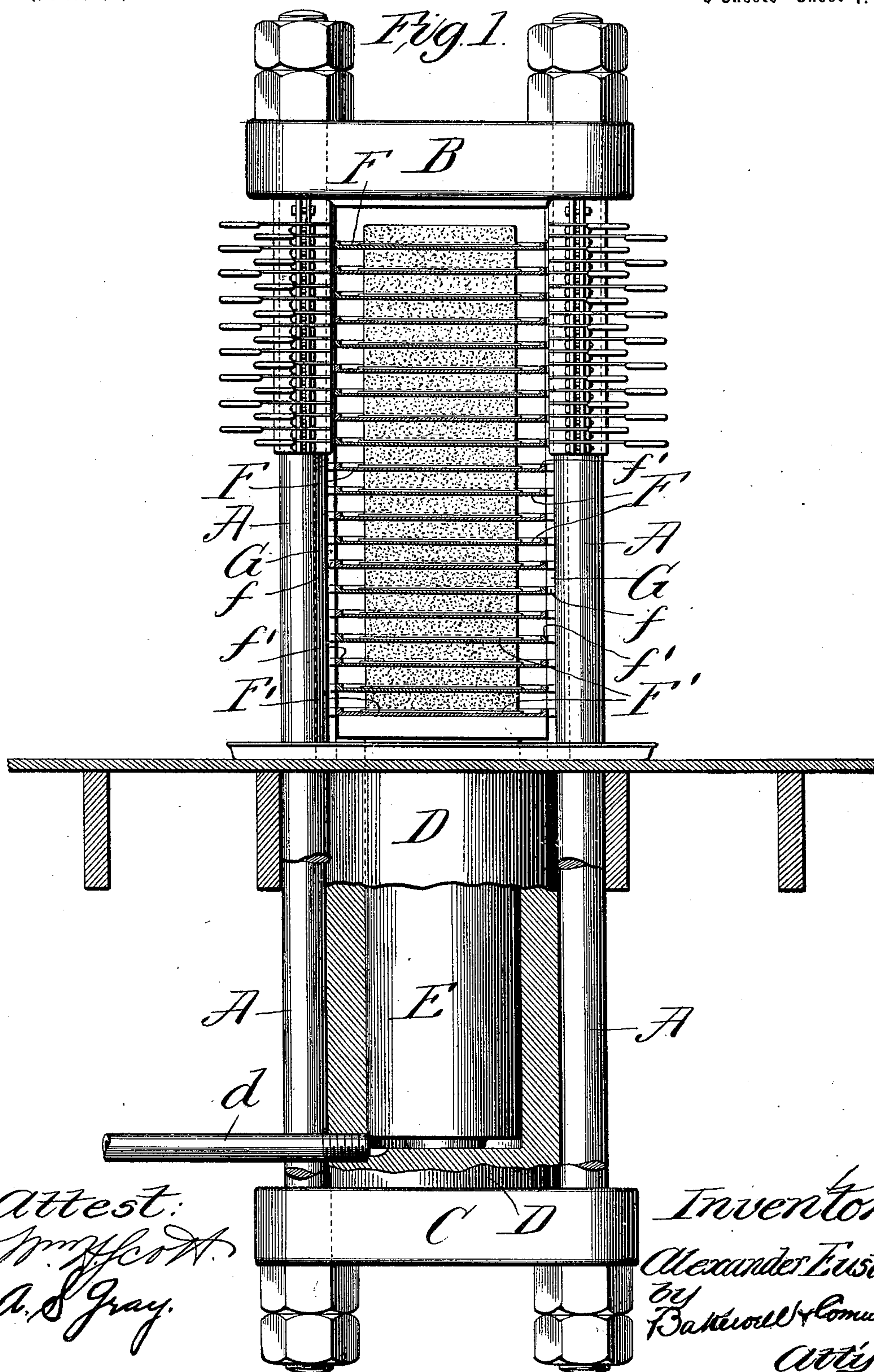
Patented Aug. 22, 1899.

A. EUSTON.
HYDRAULIC PRESS.

(Application filed Apr. 3, 1899.)

(No Model.)

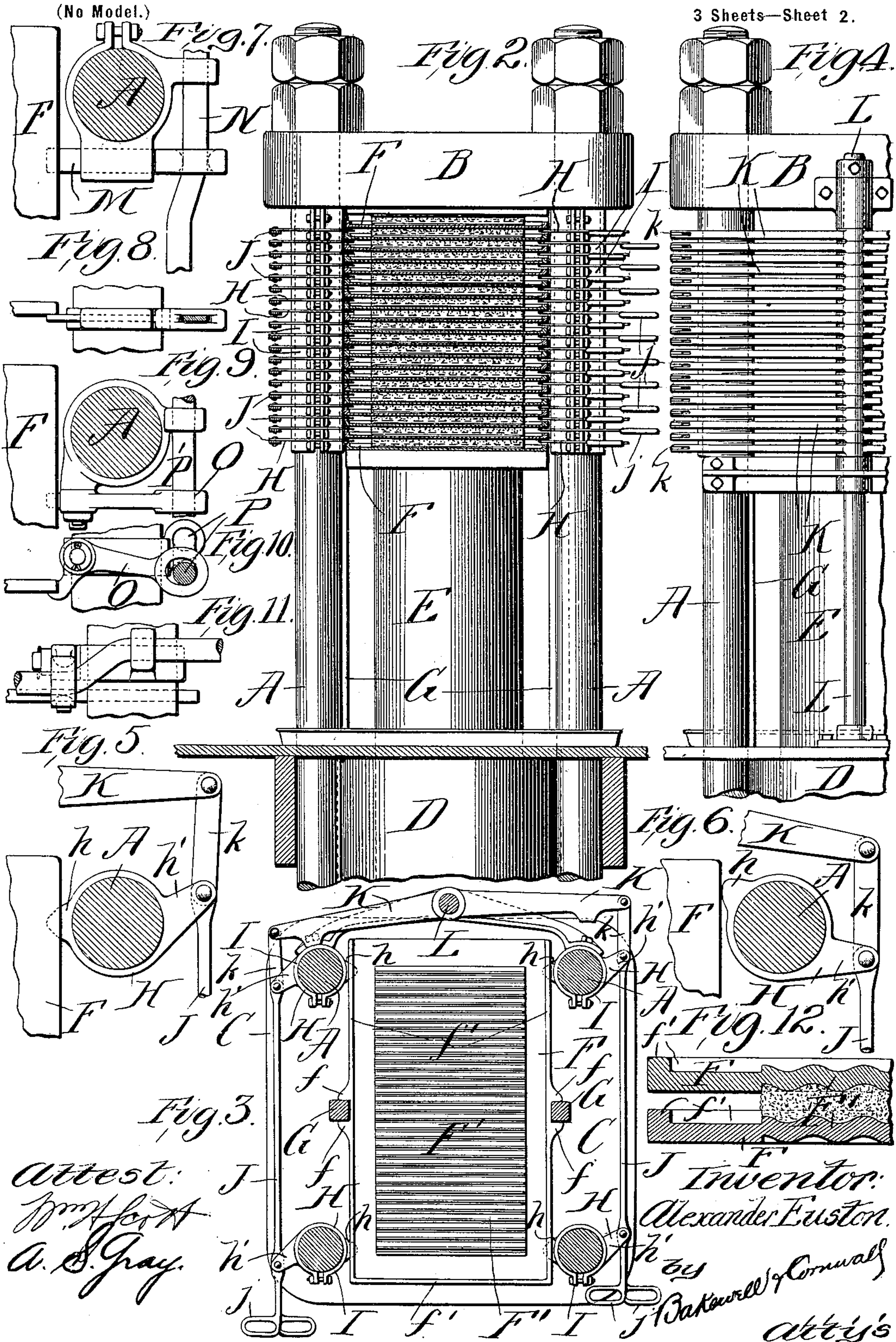
3 Sheets—Sheet 1.



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Attest: J
A. S. Gray.

Inventor:
Alexander Euston.
J. Bakewell & Cornwall
attys

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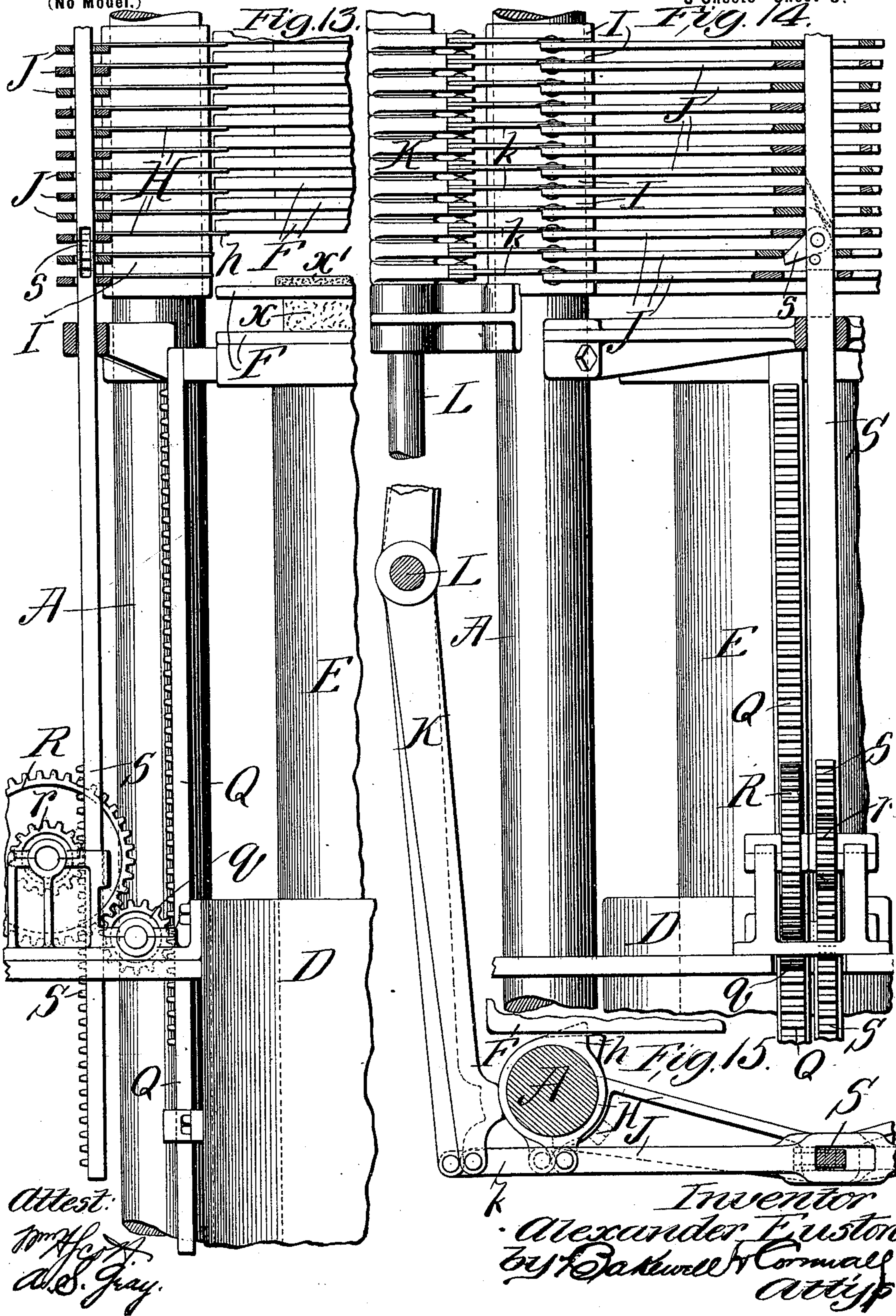
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UNITED STATES PATENT OFFICE.

ALEXANDER EUSTON, OF ST. LOUIS, MISSOURI.

HYDRAULIC PRESS.

SPECIFICATION forming part of Letters Patent No. 631,285, dated August 22, 1899.

Application filed April 3, 1899. Serial No. 711,468. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER EUSTON, a citizen of the United States, residing at the city of St. Louis, State of Missouri, have invented a certain new and useful Improvement in Hydraulic Presses, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a front elevational view, partly in section, of my improved hydraulic press. Fig. 2 is a similar view of the upper portion of said press. Fig. 3 is a horizontal sectional view. Fig. 4 is a partial rear elevational view. Fig. 5 is a detail view illustrating the manner of supporting the plates in position. Fig. 6 is a similar view illustrating the manner of releasing the plates. Fig. 7 is a detail view of a slightly-modified form of the mechanism for supporting and releasing the plates. Fig. 8 is a side elevational view of the construction shown in Fig. 7. Fig. 9 is a top plan view, showing one of the columns in section, of a modified form of mechanism for supporting the plates. Fig. 10 is a front elevational view of the construction shown in Fig. 9. Fig. 11 is a side elevational view of the construction shown in Fig. 9. Fig. 12 is a detail view in section through a portion of two plates, showing the compressed cake between. Fig. 13 is a front elevational view in modified form, illustrating the mechanism for automatically releasing the plates. Fig. 14 is a side elevational view of the same, and Fig. 15 is a top plan view of part of said mechanism.

This invention relates to a new and useful improvement in hydraulic presses designed particularly for use in extracting oil from oleaginous seeds, such as linseed.

The object of my present invention is to simplify the construction of the supporting mechanism for the plates in presses of the character described to increase the capacity of said presses.

In the presses now in use for extracting oil from oleaginous seeds there are two well-known methods employed for supporting the plates on which the green cakes are placed preparatory to being subjected to pressure.

One method involves the use of links attached to pins or bolts inserted in the edges of the plates, and each plate is thus connected to the next adjacent by such links. By this construction the green cakes are inserted between each plate, a sufficient clearance being provided for each cake. Usually there are fifteen plates in presses answering this description. When the ram ascends, it necessarily comes in contact with the bottom plate, raises it until its carried green cake comes in contact with the plate next above, and so on, the initial movement of the ram being depended upon to overcome the clearance between the plates and each cake, or say about fifteen to twenty inches in a press having from fifteen to twenty plates. The links of course move over their pins or bolts when the ram thus rises, and after all clearance has been overcome by the movement of the ram the cakes are subjected to pressure. When the ram descends, the total number—fifteen to twenty plates—are suspended at equal distances governed by the length of the links between. The pressed cakes are then removed and green cakes inserted in their places, and the same cycle of operations is repeated. Another method is to place a metal rack or frame on either side of the press, which rack or frame is formed with a series of steps at unequal distances apart. The plates in the press are provided with suitable projections located at varying distances apart to cooperate respectively with proper steps, so that as the ram descends the plate having the projections closest together will be supported on the top steps, the second plate on the second steps, and so on until the ram has reached its lowest position, when all of the plates will be supported by their proper steps. In this construction from fifteen to twenty plates are employed, and it is necessary to have a clearance between each plate for the introduction and proper manipulation of the green cake, which clearance has to be overcome by the ram in its initial upward movement and provided for by the ram in its final descending movement. My invention contemplates a construction which dispenses with this clearance, thereby adding from twenty-five to fifty per cent. to the capacity of each press without increasing the size of the press, and, further—

more, the descent of each plate according to my invention is under immediate control of the operator instead of following the ram as it descends.

5 My invention consists in the provision of a number of supports suitably mounted on the press for coöperating with the individual plates for supporting said plates or for releasing each individual plate.

10 Another feature of my invention resides in the novel construction of the plates themselves, wherein I dispense with the use of hair or other forms of mats attached to the plates above and below the cakes; and, finally, the
15 invention consists in the construction, arrangement, and combination of the several parts, all as will hereinafter be described and afterward pointed out in the claims.

In the drawings, A indicates a column, of
20 which there are usually four, passing at each end through a head-piece B and a base-plate C. On the base-plate C is arranged a cylinder D, carrying a piston or plunger E, which latter is raised or lowered, according to the
25 will of the operator, by the introduction of hydraulic pressure thereunder through a pipe *d*.

The above parts are common to most hydraulic presses now in use for the purpose of
30 extracting oil from oleaginous seeds.

F indicates the plates preferably used, which plates are arranged in the press between the columns and guided in their vertical movement by rods G, said plates having
35 lugs *f* on each side thereof embracing said guide-rods. The two side and front edges of my improved plate are provided with ribs *f'* on their upper faces, the rear side being left
40 open to conduct off the oil as it exudes from the pressed cake, the press as an entirety being slightly tilted to conduct off the oil at this point. A panel *F'* is provided in each plate, which panel is formed by transversely-
45 arranged corrugations, said corrugations being so positioned that they match each other in their respective plates, so that the thickness of the cake is substantially equal throughout its length. By providing these panels in
50 the plates, such panels being an integral part of the plates, I dispense with the use of hair mats and all the labor of securing separate panels or mats in position on the upper and lower faces of each plate. Furthermore, by
55 having fixed corrugations above and below the cakes to be pressed I prevent said cake from spreading, and by having an equal thickness throughout the cake all parts of the cake are pressed evenly, so that said cake will test
60 out more uniformly with respect to the percentage of oil remaining therein after pressure than with other systems.

Mounted on the columns A (although I do not wish to confine myself to these main columns as supports for the supporting mechanism, as other supports may be provided, if
65 desired) are rotatable plate-supports H, properly spaced apart by rings or collars I, clamped

in position on the columns A. These plate-supports H, which I will term "supporting-rings," are radially increased in diameter at
70 *h*, as shown more clearly in Figs. 3, 5, and 6, and by rotating said rings the projections *h* may be turned under or removed from the respective plates. A lug or projection *h'* extends from each ring outside of the column,
75 to which lug is connected a rod J, having a suitable handle *j* at its forward end, by which the same may be reciprocated to rotate said supporting-rings. By this construction it will be noticed that four rings being substantially
80 on a horizontal plane can be moved so that their projections *h* will pass under a plate, the plate being in the proper position, for the purpose of supporting said plate. However, it is desirable to so connect these four rings
85 that they will be moved in unison either to place their projections *h* under the plate to be supported or remove their projections *h* from under said plate and permit the same to drop. I therefore connect the rear ends
90 of rods J with a lever K through the instrumentality of links *k*, said lever K being pivoted on a rod L, mounted in suitable brackets in the rear of the press.

In Fig. 5 the four supporting-rings are
95 shown in position to support a plate; but it will be obvious that upon pulling rod J outwardly at the right-hand side of the press said rod will operate its two connected supporting-rings, so as to cause the same to as-
100 sume the position shown in Fig. 6—that is, be moved from under the plate—and through the instrumentality of lever K the two rings at the left side of the press will be simultaneously operated to throw their projections out
105 of the path of the same plate. The projections *h*, as shown in Figs. 5 and 6, are preferably formed with flat sides, so that the supporting-rings can be stamped from a single die or cast from a single pattern and be used
110 either as rights or lefts, the square portion of the projection releasing the plate positively instead of supporting it on a fine point just before releasing, as would be the case if said projection were rounded. There are a num-
115 ber of these supporting-rings arranged on the four columns of the press in such position as to engage all of the plates when the ram is at its highest position and the pressing action of the cakes is completed.
120

Assuming, for the purpose of description, that the ram is at its highest point, as shown in Fig. 2, in which position all the oil has been extracted from the cakes and the press is now ready to be recharged with green cakes,
125 while the ram is still at its highest point all of the supporting-rings are rotated, so as to place their carried projections *h* under the respective plates, so that each and every plate will be supported by said rings. The ram is
130 now permitted to drop—say three or four inches—and the pressed cake is removed from the head thereof and a green cake inserted in its place. By proper manipulation of one

of the rods J the supports are removed from the lowest plate and the ram permitted to descend sufficiently to enable the operator to remove the pressed cake and insert a green cake on said plate in its stead. The next plate above is dropped in the same way, its pressed cake being removed and a green cake inserted, this operation of loading the ram step by step and dropping the plates individually for the purpose of removing the pressed cakes and introducing the green cakes being continued until the ram occupies its lowest position, when all of the supporting-rings will be moved out of the path of their respective plates and the green cakes in position to be pressed when the ram next ascends. By this construction it will be noticed that the only clearance necessary when the press is charged to its full capacity is the clearance for the last cake introduced on the top plate. The operator may instead of starting and stopping the ram at each removal of the dry cake and introduction of the green cake on the release of plates start the ram slowly in its descending movement, drop a plate, remove the dry cake, and insert a green one, and so on, accommodating the removal and insertion of cakes according to the speed of the descent of the ram without further control thereof.

I do not wish to be understood as confining myself to the exact mechanism above described for releasing the plates, as there are other devices which can be employed with equal facility. In Figs. 7 and 8 I have shown another form, in which a slide M is arranged in a suitable bearing clamped to the column, said slide being operated by a jog or bend in a rod N acting as a cam in a slot in the outer end of said slide. By this construction when rod N is moved in one direction the slide will be forced inwardly and when the rod is moved in the other direction said slide will be moved outwardly. In Figs. 9, 10, and 11 I have shown another form in which a bell-crank lever is pivotally supported on a collar clamped to the column, the inner member of said lever being adapted to engage the plate, while the outer end of said lever (marked O in the drawings) is operated by a sliding rod P, provided with an inclined portion, or said rod P may be rotated as a crank to throw the bell-crank lever, in which latter construction the slot in the outer end of the bell-crank lever would have to be elongated.

It is likewise obvious that instead of manually manipulating the plate-supports mechanism can be provided for automatically releasing the plates as the ram descends, so that the operator can remove and insert cakes according to the speed of said descent and release of the plates, the plate-supports being held out of operative position until the ram has again risen and completed its pressing operation, when it would again automatically release the plates upon its descent.

In Figs. 13, 14, and 15 I have illustrated a

construction for accomplishing the above in which a rack Q is attached to the ram for operating a pinion *q*, in mesh with a gear R, to which is conjoined a pinion *r*, driving a rack S. This rack carries on its upper end a dog *s*, operating as a cam against the rods J, which are slotted for the passage of the rack S. It will be noted from the above construction that when the ram is descending it will cause the rod S to ascend, and the plates being so much closer together the speed of the ram is reduced to accommodate the cam *s* to the nest of rods J. As rods J are about an inch apart and as it is desired to drop a plate at every three inches movement of the ram, the gearing is made three to one. The dog *s* operates on the first or lowest rod J to move the same rearwardly, and by so doing release the lowest plate, which plate drops on the ram-head, the pressed cake is removed, and a green cake, as indicated at *x*, placed in position. The ram now descends a further distance—say three inches—when the cam-dog *s* forces the next rod J above to the rear, releasing the second lowest plate, as shown in Fig. 13, so that the pressed cake (marked *x'*) can be removed and a green cake inserted. It will be noticed that as each plate drops it falls on the soft green cake and little or no damage is done to the plate or cake upon which it falls. After the rod S has reached its highest point and dropped all the plates, at which time we will assume the press is charged, the ram now ascends, and in so doing the rod S descends, its cam-dog *s* folding up, so as not to operate any of the rods J in its descent.

I am aware that many minor changes in the arrangement, construction, and combination of several parts of my device may be made and substituted for those herein shown and described without in the least departing from the nature and principle of my invention.

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

1. In a press, the combination with a plurality of plates of a plurality of individually-operable supports for each plate, and independently-operable means for throwing said supports into and out of position with respect to said plates; substantially as described.

2. In a press, the combination with a plurality of plates, of a plurality of supports for each of said plates, and independently-operable mechanism for operating all the supports for a single plate in unison, so as to throw said supports into or out of the path of the movement of said plate; substantially as described.

3. In a press, the combination of a plurality of plates, of guide-rods for the same, a plurality of supports for each of said plates, and independently-operable connections between all the supports for an individual plate, whereby said supports may be operated in unison to engage with or be disengaged from their respective plates; substantially as described.

4. In a press, the combination of a plurality of independently-movable plates, of supports adapted to cooperate with said plates in approximately their pressing position, and independently-operable means for actuating said supports to throw the same into and out of engagement with their respective plates; substantially as described.

5. In a press, the combination with the columns and the plates, of a plurality of supporting-rings mounted on said columns for each plate, projections *h* on said rings for engagement with the plates, and means for rotating a number of said rings so that their projections will be thrown in unison into or out of engagement with a plate; substantially as described.

6. In a press, the combination with a plurality of columns and a plate, of rings mounted on the columns in the same horizontal plane, projections extending from the rings, and rods connected to said rings for rotating the same in unison and throwing the projections into and out of the path of the plate; substantially as described.

7. In a press, the combination with the columns and a plate, of rings *H* mounted on said columns and having projections *h* for engaging said plate, and rods *J* connected to projections extending from said rings, and a lever *K* connecting one end of said rods *J*; substantially as described.

8. In a press, the combination with the columns of a plurality of plates, of guide-rods cooperating therewith, a plurality of supporting-rings for each plate, said rings being mounted on the columns and means for operating all of the supporting-rings cooperating with a single plate, said means comprising rods *J*, connected to said rings, said rods being provided with suitable handles at one end, a lever *K*, and links *k*, connecting said lever with the rear end of said rods *J*; substantially as described.

9. In a press, the combination with the plates, of means for supporting each individual plate, a ram, and means connected to, and operated by the ram for automatically operating said plate-supporting means to successively release the plates; substantially as described.

10. In a press, the combination with the ram and the plates, of means for supporting said plates, and means for automatically releasing said plates as the ram descends; substantially as described.

11. In a press, the combination with the ram and plates, of plate-supports cooperating with said plates, for holding the same in approximately their pressing position, and mechanism connected to and operated by the ram for automatically operating said plate-supports to release the plates in succession; substantially as described.

12. In a press, the combination with the ram, and a plurality of plates, of supporting mechanism for cooperating with said plates and holding the same approximately in their pressing position, and a connection between said ram and said plate-supporting mechanism for operating the latter to release the plates; substantially as described.

13. In a press, the combination with the ram and the plates, of plate-supports for different plates, all of the supports for a single plate being connected together, a rod carrying means for operating said plate-supports, and means connected to, and operated by the ram, for actuating said rod; substantially as described.

In testimony whereof I hereunto affix my signature, in the presence of two witnesses, this 31st day of March, 1899.

ALEXANDER EUSTON.

Witnesses:

F. R. CORNWALL,
A. S. GRAY.