No. 675,776. Patented June 4, 1901.

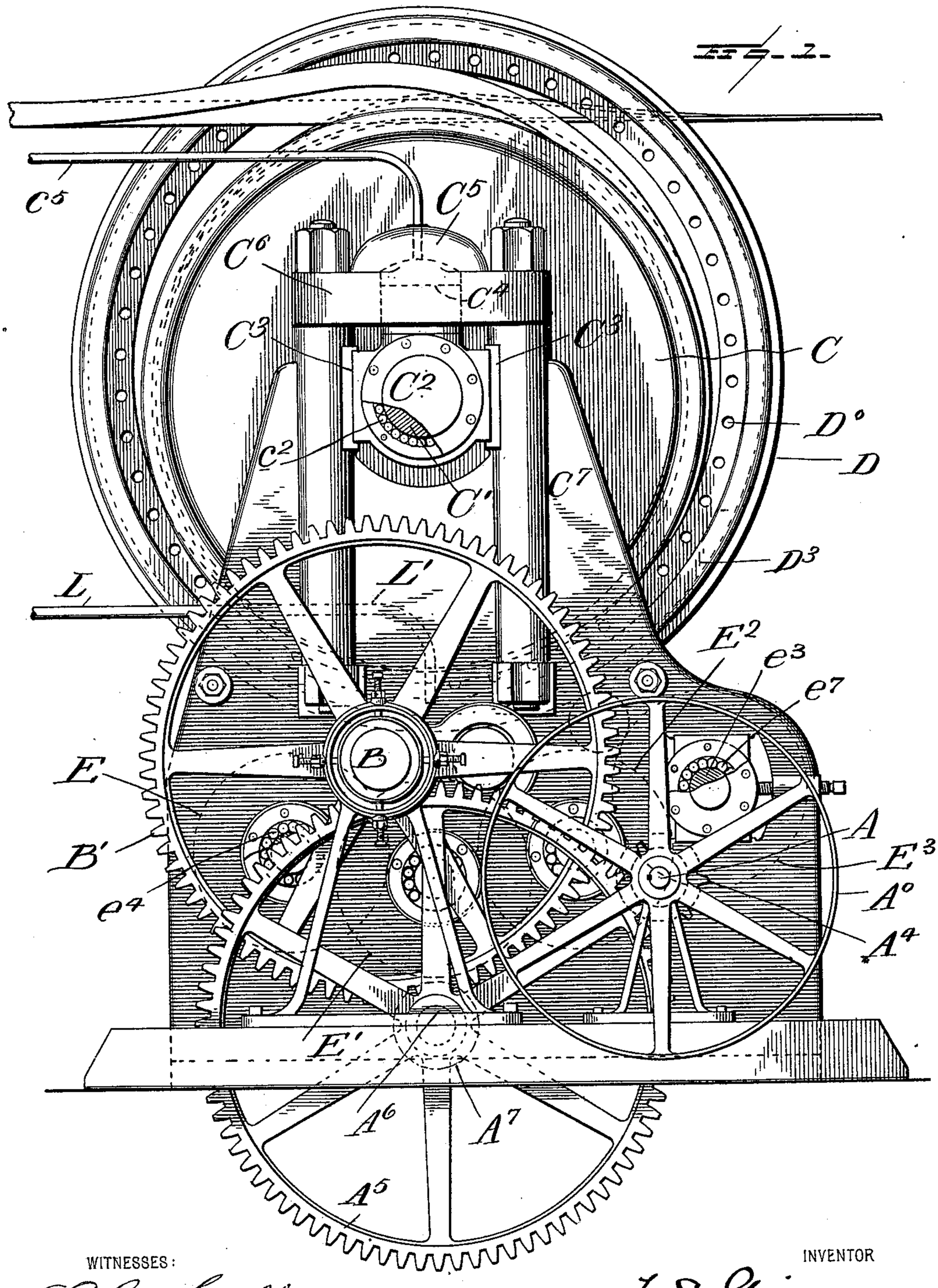
# T. S. GRIMES.

## ROTARY PRESS.

(Application filed Nov. 6, 1900.)

(No Model.) 5 Sheets—Sheet 1.

Fig. 1.

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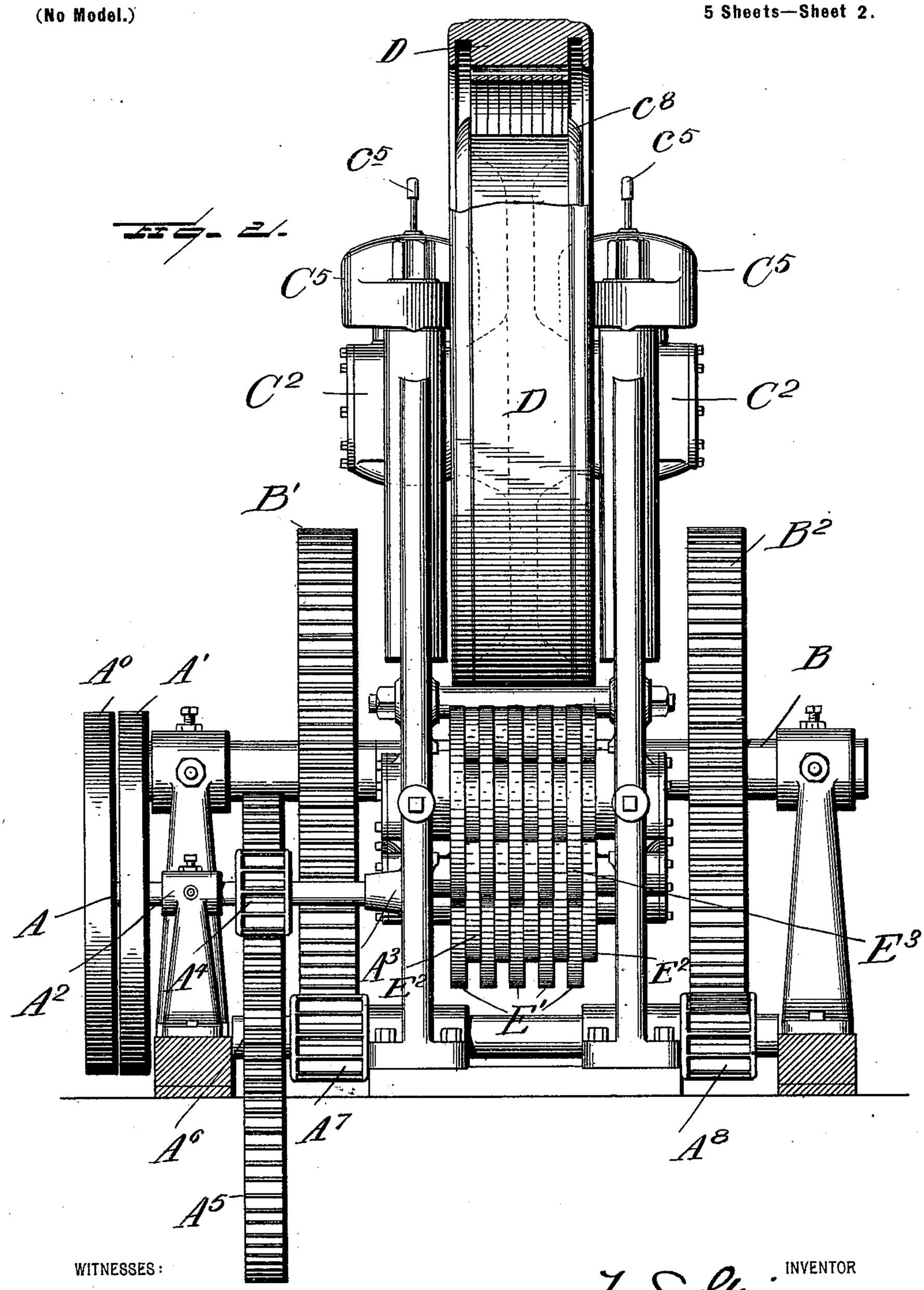
(No Model.) 5 Sheets—Sheet 2.

Fig. 2.

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# T. S. GRIMES.

## ROTARY PRESS.

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(No Model.) 5 Sheets—Sheet 3.

Fig. 3.

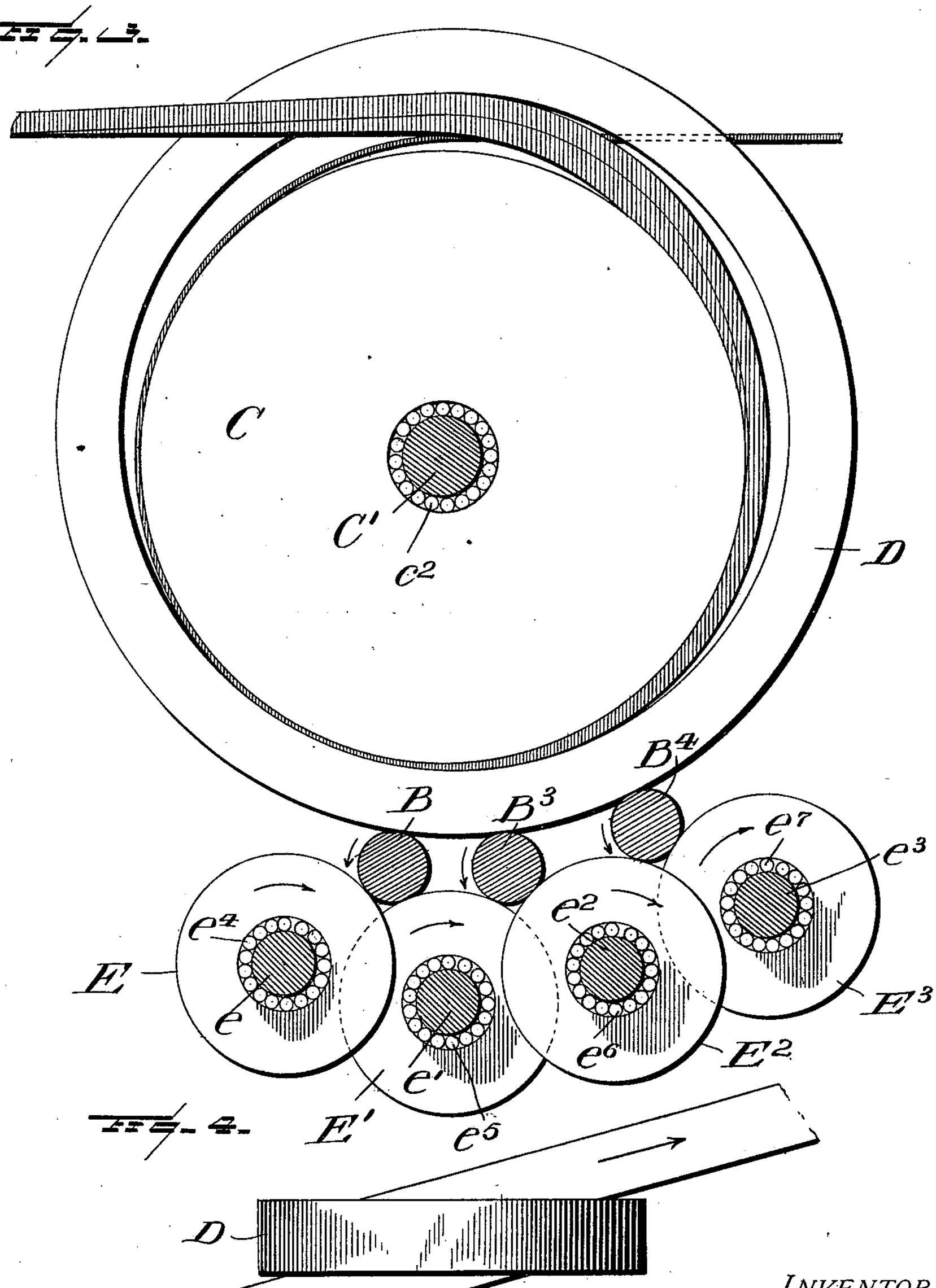


Fig. 4.

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# T. S. GRIMES.

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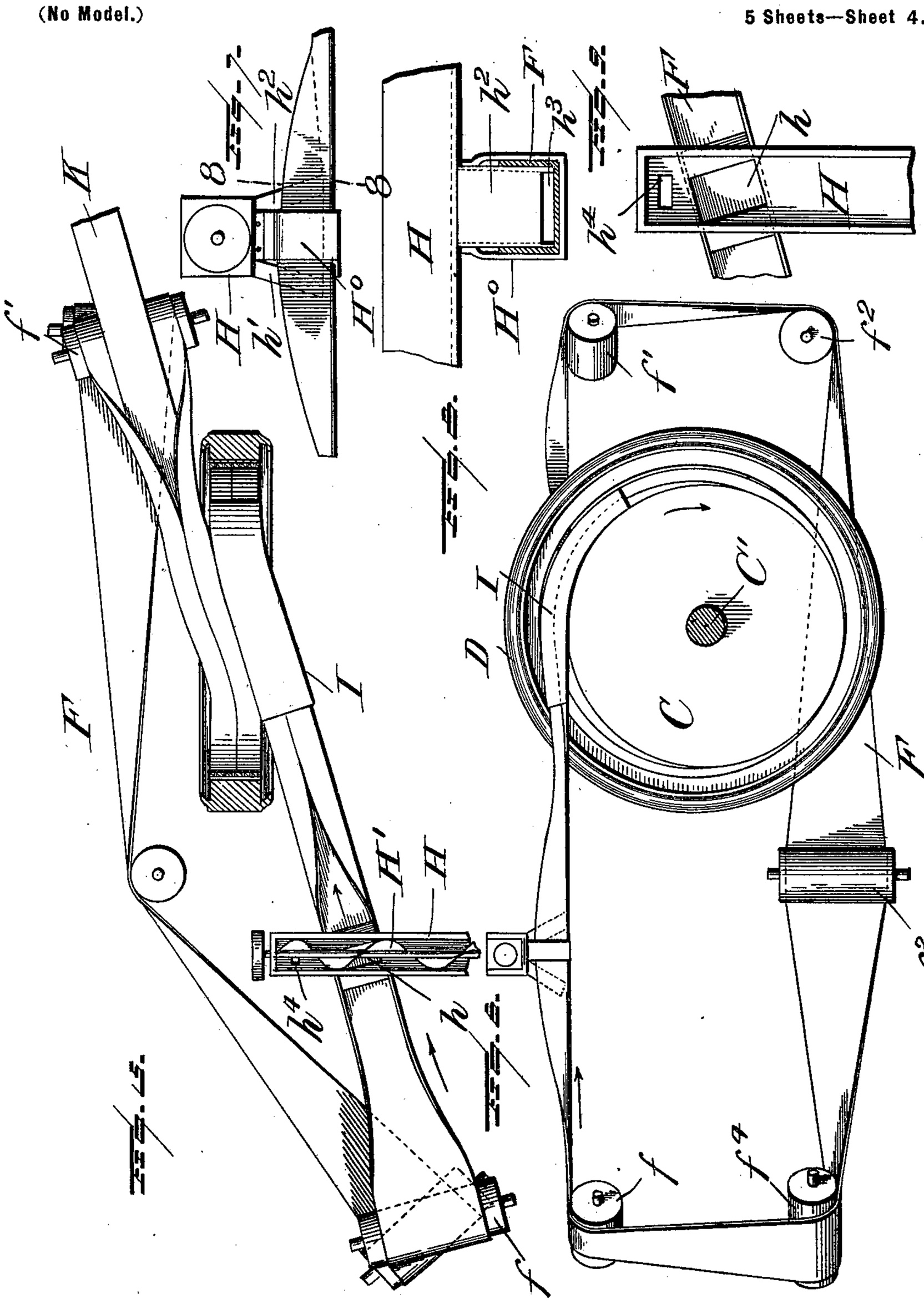


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## ROTARY PRESS.

(Application filed Nov. 6, 1900.)

(No Model.)

5 Sheets—Sheet 5.

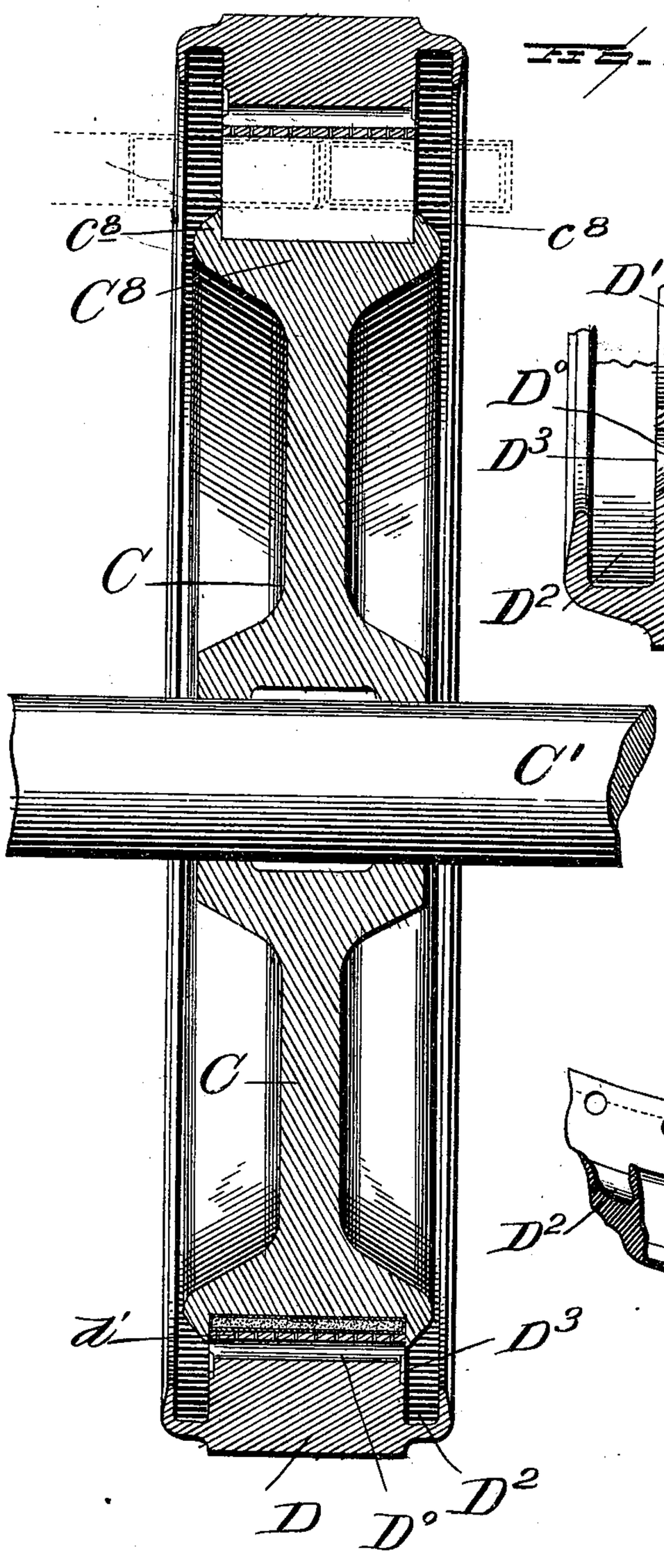



FIG. 10.

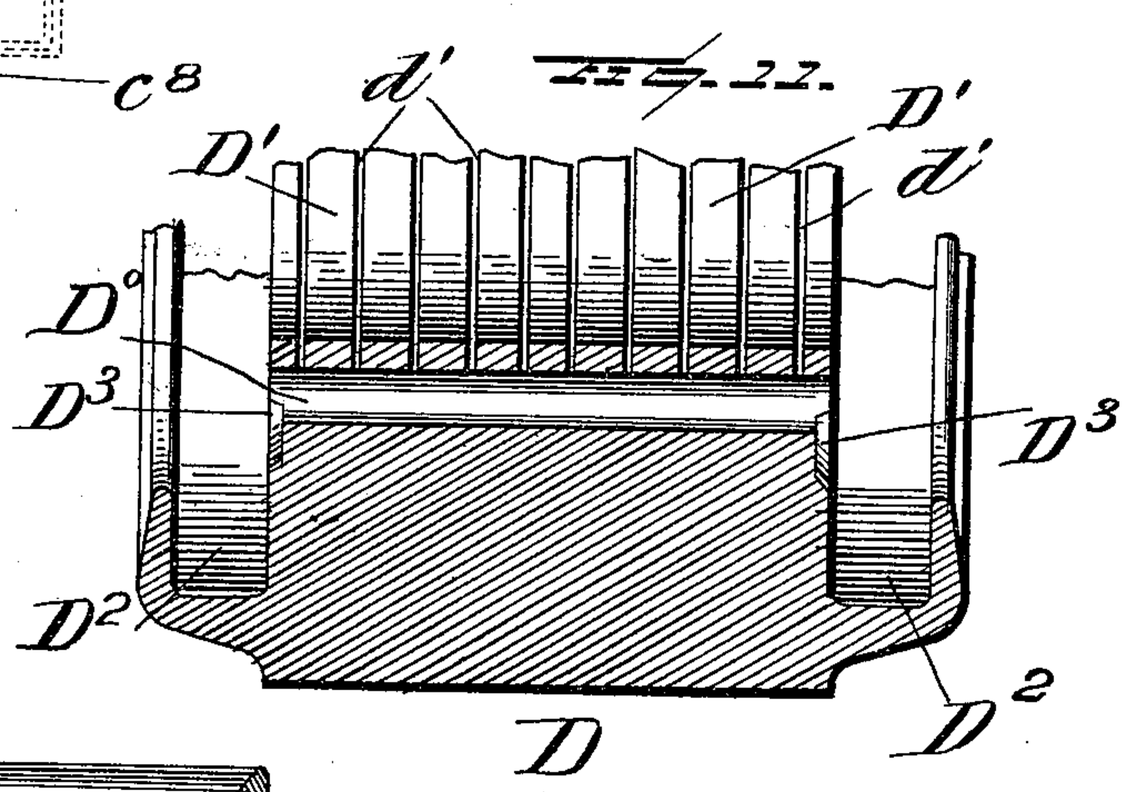
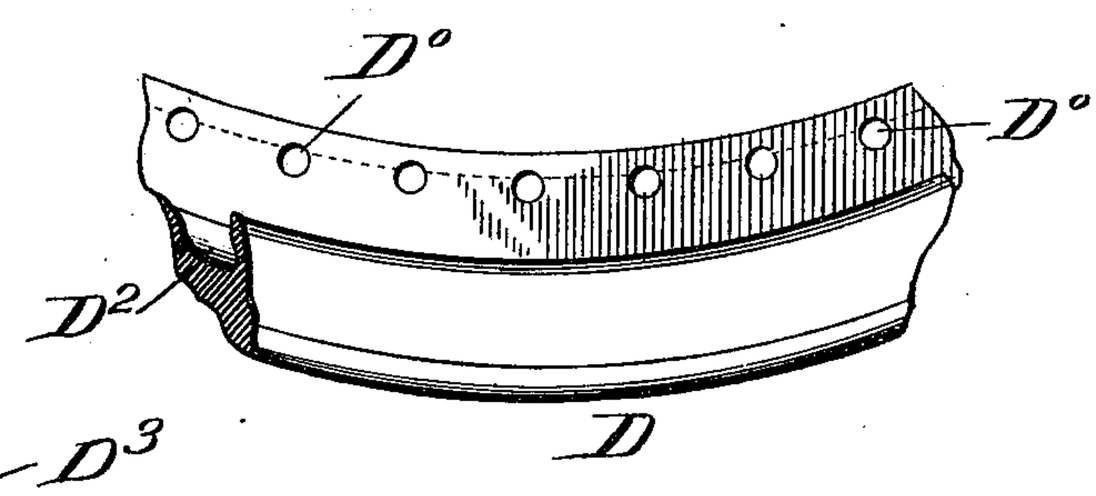



FIG. 12.

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# UNITED STATES PATENT OFFICE.

THADDEUS S. GRIMES, OF ATLANTA, GEORGIA.

## ROTARY PRESS.

SPECIFICATION forming part of Letters Patent No. 675,776, dated June 4, 1901.

Application filed November 6, 1900. Serial No. 35,653. (No model.)

*To all whom it may concern:*

Be it known that I, THADDEUS S. GRIMES, a citizen of the United States, residing at Atlanta, in the county of Fulton and State of Georgia, have invented certain new and useful Improvements in Rotary Presses; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in rotary presses particularly intended for expressing the oil from cotton-seed meal, but well adapted for use for expressing liquids from solids of various kinds.

My invention consists in the novel construction of a machine and its arrangement of parts, as hereinafter described, and it will be clearly understood by reference to the accompanying drawings, wherein the same parts are indicated by the same letters throughout the several views.

Figure 1 represents a side elevation of my rotary press. Fig. 2 represents an end view of the same as seen from the right in Fig. 1. Fig. 3 is a diagrammatic view of the pressure-wheel and eccentric ring surrounding the wheel, and said view also shows the arrangement of rollers and shafts which support and impart rotary movement to the wheel and its surrounding ring. Fig. 4 is a diagrammatic view showing the course of the cloth containing the material to be compressed as it enters and leaves the machine. Fig. 5 is a top plan view, partly in section, showing the entire course of the cloth and illustrating the manner in which the material is fed into the cloth and the cloth is folded upon the material, how the compressed material comes from the cloth, and how the cloth is spread out again. Fig. 6 is a side view of the parts shown in Fig. 5 looking toward the top of the sheet in said figure. Fig. 7 is a detail partial view of the cloth represented as passing through the filling device. Fig. 8 is a cross-sectional view as taken on the line 8 8 in Fig. 7. Fig. 9 is a top plan view of the feeding-trough and a portion of the cloth passing therethrough, the feeding-spiral shown in Fig. 5 being omitted. Fig. 10 is a vertical sectional view taken diagrammatically through the compression-wheel and its surrounding ring. Fig. 11 is an enlarged detail cross-sectional view of a portion of the eccentric compression-ring, showing the arrangement of liquid grooves and channels therein; and Fig. 12 is a fragmentary detail view, in side elevation, of a portion of the compression-ring.

The general construction of the machine is best shown in Figs. 1 and 2. In these figures, A represents the driving-shaft, upon which are mounted fast and loose pulleys A′ and $A^0$, respectively. The driving-shaft A is mounted in fixed bearings $A^2$ and $A^3$, and upon this driving-shaft is fixed a small gear or pinion $A^4$. This pinion $A^4$ meshes with a toothed gear $A^5$ on a counter shaft $A^6$, and upon this counter-shaft $A^6$ are mounted a pair of pinions $A^7$ and $A^8$, which mesh with gears B′ and $B^2$ upon heavy shafts or rollers B and $B^3$, respectively. C represents the compression-wheel, which is fast upon a shaft C′, the ends of said shaft being mounted in journal-boxes $C^2$ $C^2$, provided with antifriction roller-bearings $c^2$. The bearing-boxes $C^2$ are mounted in guides $C^3$ $C^3$, which permit vertical movement thereto, and each bearing-box has formed thereon a piston $C^4$, which extends into a hydraulic pressure-cylinder $C^5$, formed in the cross-head $C^6$. Suitable housings $C^7$ are provided for the bearings of the various shafts. The wheel C is held against upward movement by the cross-head $C^6$, and a downward pressure thereon is regulated by means of a hydraulic cylinder $C^5$, which has a fluid connection $c^5$; but the wheel is supported upwardly in the following manner: D represents a ring which loosely encircles the periphery of the wheel C and which rests at the lowest point of its periphery upon the shafts or rollers B, $B^3$, and $B^4$. The construction of the wheel C and the ring D will hereinafter be fully described; but it may be here explained that rotary motion is imparted to the wheel C through the ring D by frictional contact of the latter with the shafts or rollers B and $B^3$ and one auxiliary roller $B^4$, with which the periphery of the ring D makes contact, as seen most clearly in Fig. 3. Should it be found desirable in practice, the ring D may have teeth formed on its periphery and the shafts or rollers B and $B^3$ may be provided with pinions meshing with the said teeth, thus turning the ring D positively.

Referring now to Fig. 3, in connection with Figs. 1 and 2, E, E′, $E^2$, and $E^3$ represent a series of rollers or disks mounted upon shafts $e$, $e'$, $e^2$, and $e^3$. Each of these rollers is preferably in the form of a series of disks, and these are so arranged that the disks on adjacent rollers intermesh with each other. When these rollers are built up of a series of disks, as shown, a much more solid bearing-surface is provided for the rollers B, $B^3$, and $B^4$ than would otherwise be possible. The shafts $e$, $e'$, $e^2$, and $e^3$ of the several rollers referred to are supported by antifriction-bearings $e^4$, $e^5$, $e^6$, and $e^7$. The rollers B and $B^3$, which are positively rotated by the driving power of the machine, rotate in contact with the peripheries of rollers E, E′, and $E^2$, the parts moving in the direction indicated by the arrows in Fig. 3. The roller $B^4$ rotates in contact with the peripheries of the rollers $E^2$ and $E^3$ in the direction indicated by the arrows. The rotary motion of the roller $B^3$ is transmitted through the roller $E^2$ to the roller $B^4$, and the ring D is caused to rotate by the frictional contact of the rollers B, $B^3$, and $B^4$ when the latter rotates. The roller E and the roller $E^3$ are merely idle rollers, which serve to assist in supporting rollers B and $B^4$. The journal-bearings of the shaft $e^3$ of the roller $E^3$ are preferably made adjustable, as shown in Fig. 1, in order to take up any lost motion.

The centers of the ring and wheel are so located with relation to each other and to the centers of the rollers B, $B^3$, and $B^4$ that the upward pressure is many times greater than the forward pressure produced by the rotation of the rollers upon which the ring rests.

The construction of the compression wheel and ring is partially shown in Figs. 1 and 2, but is best shown in Figs. 10, 11, and 12. Referring to these figures, the wheel C is provided with a grooved rim $C^8$, bounded by flanges $c^8$ $c^8$, the grooves or spaces between the flanges $c^8$ $c^8$ representing the pressure-surface of the wheel. The interior surface D′ of the ring D constitutes the pressure-surface thereof, and this pressure-surface is provided with a series of circumferential slots $d'$, which extend a short distance into the body of the ring D and communicate with a succession of transverse openings or passages $D^0$, arranged at intervals about the ring. These openings or passages $D^0$ pass entirely through the body of the ring and open at opposite sides thereof. The openings $D^0$ are for the escape of the oil or other liquid which enters the said openings through the grooves $d'$, which communicate with the compression-surface D′ of the ring D. The ring D is provided along its opposite sides with continuous annular grooves or troughs $D^2$ for the reception of the oil or other liquid which escapes from the opening $D^0$. The flanges $c^8$ $c^8$ on the rim of the wheel C inclose the side edges of the compression-surface D′ of the ring D, as seen at the bottom of Fig. 10, and in this manner the ring D is guided by the wheel C as the two rotate. In order to allow the free escape of the liquid from the opening $D^0$ in the ring to the troughs $D^2$ therein when the flanges $c^8$ extend partially over the ends of the openings $D^0$, grooves $D^3$ are provided, and these grooves allow free escape always to the liquid from the openings $D^0$ into the troughs $D^2$. It will be seen from the foregoing that the ring D, though mounted loosely about the wheel C, is held to its position during the operation of the machine by the flanges $c^8$ $c^8$ on the wheel, at the same time that it is supported by the rollers B, $B^3$, and $B^4$, which also impart to the ring and wheel the necessary rotation.

Referring now to Figs. 5 and 6, wherein is shown the manner in which the material is fed to the cloth and the cloth fed between the compression ring and wheel, F represents the endless cloth, which receives the material to be compressed and conveys it through the machine. The course of this cloth is as follows: Considering the point where the cloth passes over roller $f$ as the starting-point and the direction of travel of the cloth to be indicated by arrows, the cloth first travels through the feeder, where it receives the continuous deposit of the material to be compressed. The feeder comprises a trough H, in which is mounted a rotary spiral H′, driven by any suitable source of power, and in the bottom of the trough H is a discharge-opening $h$, through which the material is fed by means of the spiral H′. Beneath the trough H is mounted a guide-frame $H^0$, and at opposite sides of the discharge-opening $h$ at the bottom of the trough are provided two partitions $h'$ and $h^2$. These partitions are arranged with their lower ends in a divergent direction, so that there will be no accumulation of the material upon the inner faces thereof. The partition $h'$, beneath which the cloth first passes, allows merely sufficient space for the free passage of the cloth beneath its lower end, while the partition $h^2$ has a passage $h^3$ cut away at its bottom end to allow the desired quantity of material to be carried along upon the cloth F, as seen most clearly in Fig. 8. The cloth as it approaches the guide-frame $H^0$ of the feeder is folded up at its edges in the form of a trough, in which position it receives the material and passes on toward the compression devices. There will be a uniform quantity of material carried along by the cloth F, because no more will be carried away from the feeder than the opening $h^3$ in the partition $h^2$ will allow. It may occur that the material is fed into the opening $h$ of the trough H faster than it is carried off, and in order to avoid clogging of the machine or other trouble an opening $h^4$ is provided near the end of the trough H, through which the surplus material may escape and fall to the ground. As the portion of the cloth containing the material approaches the compression wheel and ring it enters a hollow guide I, which causes the edges of the cloth

to be folded over upon the material and to slightly overlap each other, as seen in Fig. 5. The guide I is so arranged that as the folded cloth containing the material is fed directly into the groove of the compression-wheel C, passing into this groove near the upper side of the periphery of the wheel, the folded cloth is caused to pass by the rotation of the wheel and ring downwardly in the direction of the arrow in Fig. 6, and as the cloth nears the bottom of the wheel and ring the compression begins. The compression is greatest at a point in the region of the lowest portion of the periphery of the wheel C. After passing through this point of greater compression the cloth passes upwardly upon the opposite side of the wheel C through a space of increasing width and finally passes out from between the wheel C and ring D on the opposite side from which it entered. At an appropriate location a roller $f'$ is arranged for the cloth F to pass over, and in passing over said roller the cloth is opened and spread out flat, and the compressed material passes out of the cloth as it is unfolded in the form of a flat strip or cake, as seen at K in Fig. 5. The cloth then passes over a suitably-arranged set of rollers in its flattened opened condition back to the roller $f'$, heretofore referred to as the "starting-point," from which point it again passes through the feeder and compression devices. The arrangement of the rollers for guiding the cloth back to the starting-point may be of any suitable arrangement; but that shown in Figs. 5 and 6 of the drawings is a convenient arrangement. In these figures, $f^2$ represents a horizontal roller, upon which the cloth passes after leaving the roller $f'$. $f^3$ represents a vertical roller, about which the cloth next passes with a quarter-turn, and $f^4$ represents a third roller, about which the cloth passes before reaching the roller $f'$.

I do not wish to limit myself to any particular arrangement of the guide-rollers for the cloth, nor do I wish to limit myself to the particular manner in which the cloth is fed for the compression ring and wheel, as it will be perfectly obvious that such arrangement may vary according to conditions or for other reasons without materially affecting the intent and purpose of the invention.

Reverting now to Figs. 10 and 11, in connection with Figs. 5 and 6, above referred to, the folded cloth containing the material to be compressed fits snugly within the peripheral groove of the compression-wheel C, and the compression takes place between the opposite surfaces of the ring and wheel. The grooves $d'$ in the compression-surfaces of the ring allow the oil or other liquid to escape into the passage $D^0$ and thence into the troughs or channels $D^2$ along the side edges of the ring D. These troughs $D^2$ being continuous, the oil may move around therein. In order to carry off the oil, however, I provide a pipe or tube L, which has a depending end L', (shown in dotted lines in Fig. 1,) which is suitably supported in a fixed position, but extends into the trough $D^2$ and is connected to any suitable suction device by means of which the oil as it accumulates in the trough $D^2$ may be drawn off. There would be two of these oil-suction pipes, although but one is seen in the drawings, it being understood that the other occupies a similar position upon the other side of the machine.

The degree of pressure upon the material may be varied within certain limits by means of the hydraulic cylinder $C^5$ and the piston $C^4$, working therein, inasmuch as the pressure within such cylinder may be reduced or increased at will by well-known means which form no part of my present invention, and therefore need not be herein specifically referred to.

By the arrangement of the wheel and ring eccentric to each other I produce two solid surfaces which always maintain the same converging compression-surfaces, and by this means the greatest degree of compression may be obtained.

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

1. In a rotary press, the combination with a wheel having central bearings and a grooved peripheral bearing-surface; of a ring encircling said wheel eccentrically, the inner face of said ring being adapted to enter said groove, means for conveying material between the wheel and ring, and means for rotating said wheel and ring, substantially as described.

2. In a rotary press, the combination with a wheel having central bearings and a grooved peripheral bearing-surface; of a ring encircling said wheel eccentrically, the inner surface of said ring forming a bearing-surface, means for forcing said bearing-surface of said ring against the bearing-surface of said wheel, and means for conveying material between the wheel and ring, substantially as described.

3. In a rotary press, the combination with a wheel having a grooved peripheral pressure-surface; of a ring encircling said wheel eccentrically the inner face of said ring entering said groove and having a pressure-surface upon its interior circumference and provided with fluid-passages communicating with said pressure-surface, substantially as described.

4. In a rotary press, the combination with a flanged wheel having a grooved peripheral pressure-surface; of a ring encircling said wheel eccentrically the inner face of said ring entering said groove and having a pressure-surface upon its interior circumference and provided with fluid-passages communicating with the said pressure-surface, substantially as described.

5. In a rotary press, the combination with a wheel having a peripheral pressure-surface;

of a ring encircling said wheel eccentrically and having a pressure-surface upon its interior circumference and having fluid-passages communicating with said pressure-surface, and provided with an annular fluid-channel for the reception of the fluid from the said passages, substantially as described.

6. In a rotary press, the combination with a wheel having a peripheral pressure-surface; of a ring surrounding said wheel eccentrically, having a pressure-surface upon its interior circumference and having fluid-passages communicating with said pressure-surfaces and provided with an annular channel for the reception of the fluid from said passage; and a suction-pipe depending into said annular channel for drawing off the fluid therefrom, substantially as described.

7. In a rotary press, the combination with a wheel having central bearings and a grooved peripheral pressure-surface; of a compression-ring encircling said wheel eccentrically the inner face of said ring entering said groove; a plurality of rollers supporting the said ring; frictional gearing between said rollers; and means for positively rotating two of said rollers, substantially as described.

8. In a rotary press, the combination with a grooved wheel having central bearings; of a ring encircling said wheel eccentrically; an endless cloth for conveying the material into said groove between the wheel and ring; means for folding and unfolding the cloth as it enters and leaves respectively the space between the compression-ring and the said wheel; and means for rotating said wheel and ring, substantially as described.

9. In a rotary press, the combination with a grooved wheel having a peripheral pressure-surface; of a ring encircling said wheel eccentrically and having an interior pressure-surface; an endless cloth for conveying the material into said groove between the wheel and ring; a guide for the passage of said cloth while receiving the material; a guide for folding said cloth after receiving the material and rollers over which the cloth passes after the compression of the material, and by which the unfolding of the cloth is effected; and means for rotating said ring and wheel, substantially as described.

10. In a rotary press, the combination with a grooved wheel and ring; of a cloth for containing the material as it passes between said wheel and ring; means for guiding the cloth, into said groove, means for carrying said cloth out of said groove and means for rotating the wheel and ring, substantially as described.

11. In a rotary press, the combination with a wheel having a grooved peripheral pressure-surface; of a ring encircling said wheel eccentrically resting in said groove and having a pressure-surface upon its interior circumference; movable bearings for said wheel; and means for increasing the pressure between said ring and wheel, substantially as described.

12. In a rotary press, the combination with a wheel mounted in bearings having a grooved peripheral pressure-surface; of a ring having circumferential grooves upon its inner face, said ring encircling said wheel, an endless cloth, means for feeding material upon said cloth, means for folding said cloth and guiding the same into said groove between said wheel and ring, and means for imparting pressure upon said ring, substantially as described.

13. In a rotary press, the combination with a wheel centrally mounted in bearings, having a grooved peripheral pressure-surface; of an encircling ring having circumferential grooves upon its inner face, passages communicating with said grooves, an endless cloth, means for feeding material upon said cloth, means for folding said cloth and guiding the same into said groove between said wheel and ring, means for removing said cloth from said groove, means for opening said cloth and removing the material therefrom, and means for imparting pressure to said ring, substantially as described.

14. In a rotary press, the combination with a wheel centrally mounted in bearings, having a grooved peripheral pressure-surface; of an encircling ring having circumferential grooves upon its inner face, passages in communication with said grooves, and annular channels upon said ring connecting with said passages, an endless cloth, means for feeding material upon said cloth, means for folding said cloth and guiding it into said groove, means for removing said cloth from said groove, and means for imparting a rotary motion and a changeable pressure to said ring, substantially as described.

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

THADDEUS S. GRIMES.

Witnesses:
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