No. 626,490. Patented June 6, 1899.

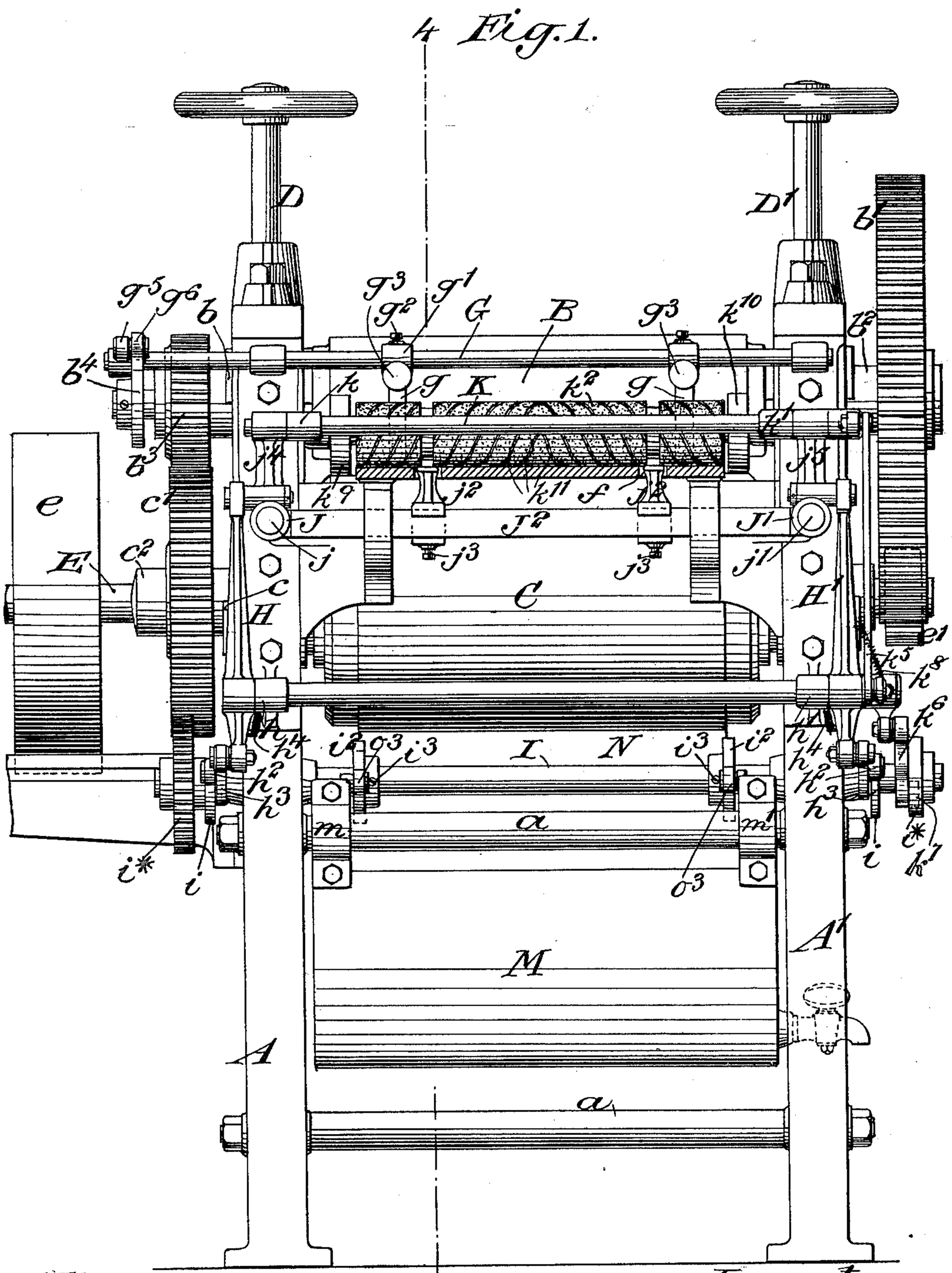
R. F. EMMERICH.

EMBOSSING MACHINE.

(Application filed Feb. 27, 1899.)

(No Model.) 5 Sheets—Sheet 1.

4 Fig. 1.



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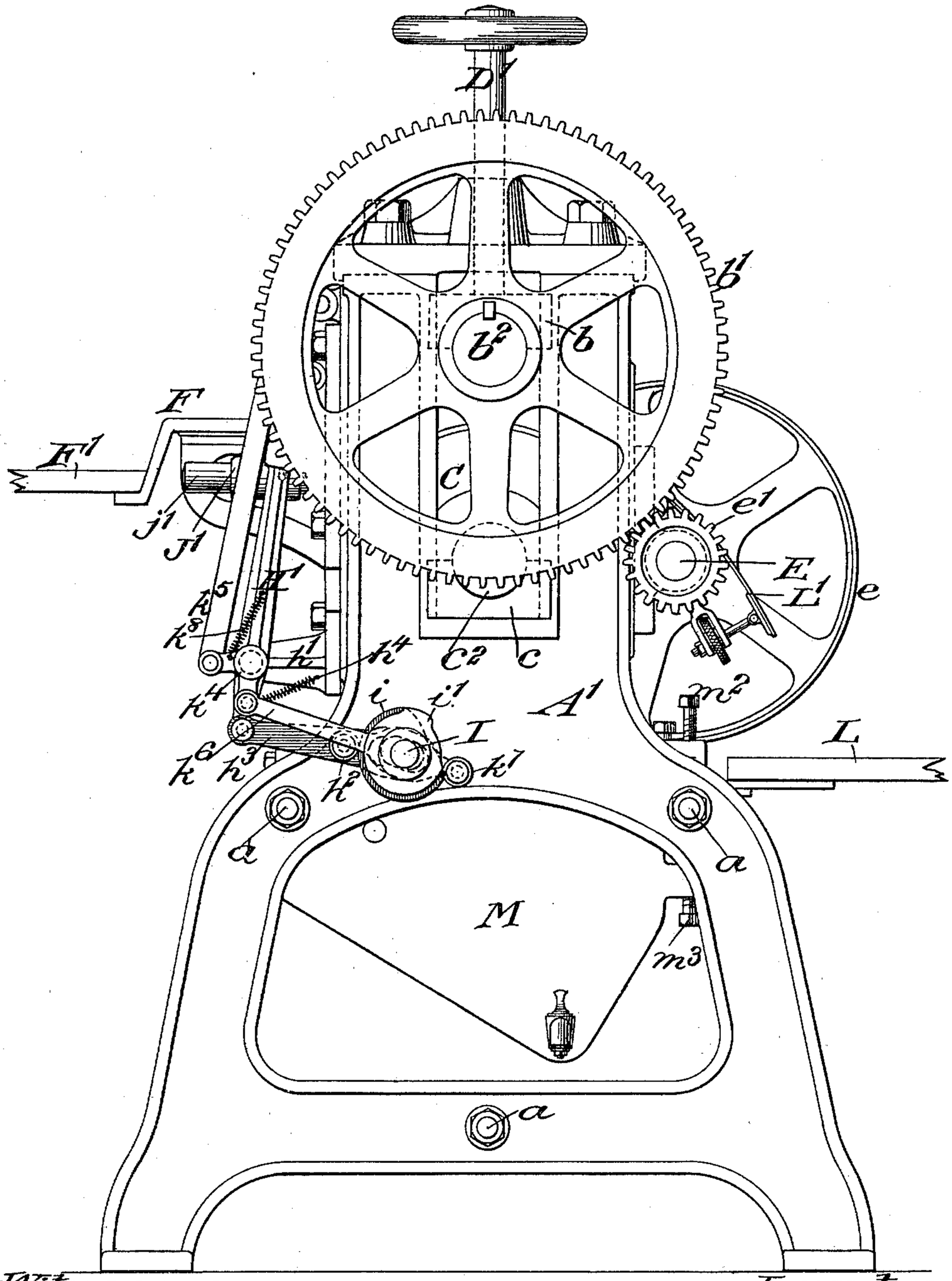
(No Model.) 5 Sheets—Sheet 2.

Fig. 2.



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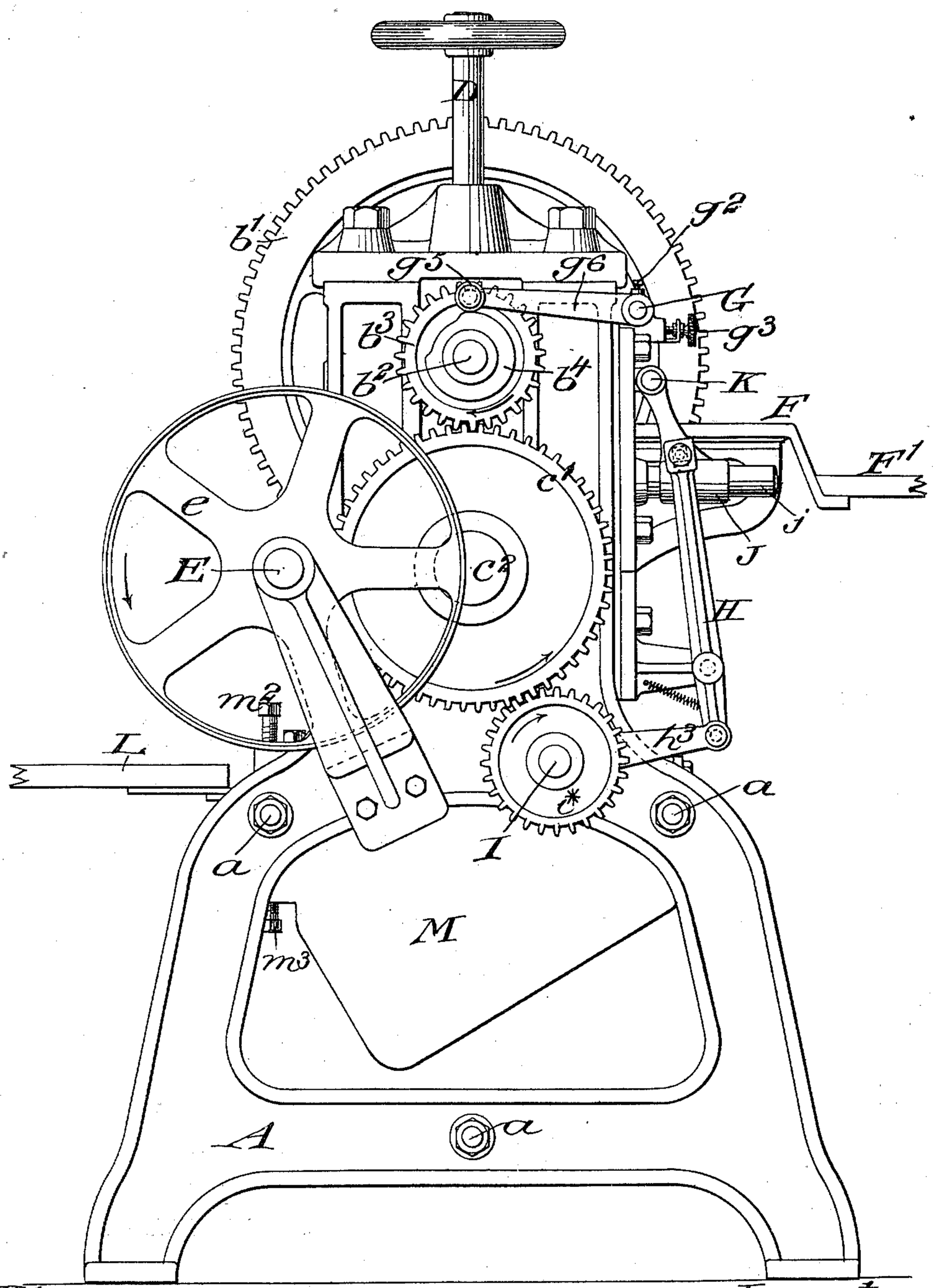
(No Model.) 5 Sheets—Sheet 3.

Fig. 3.



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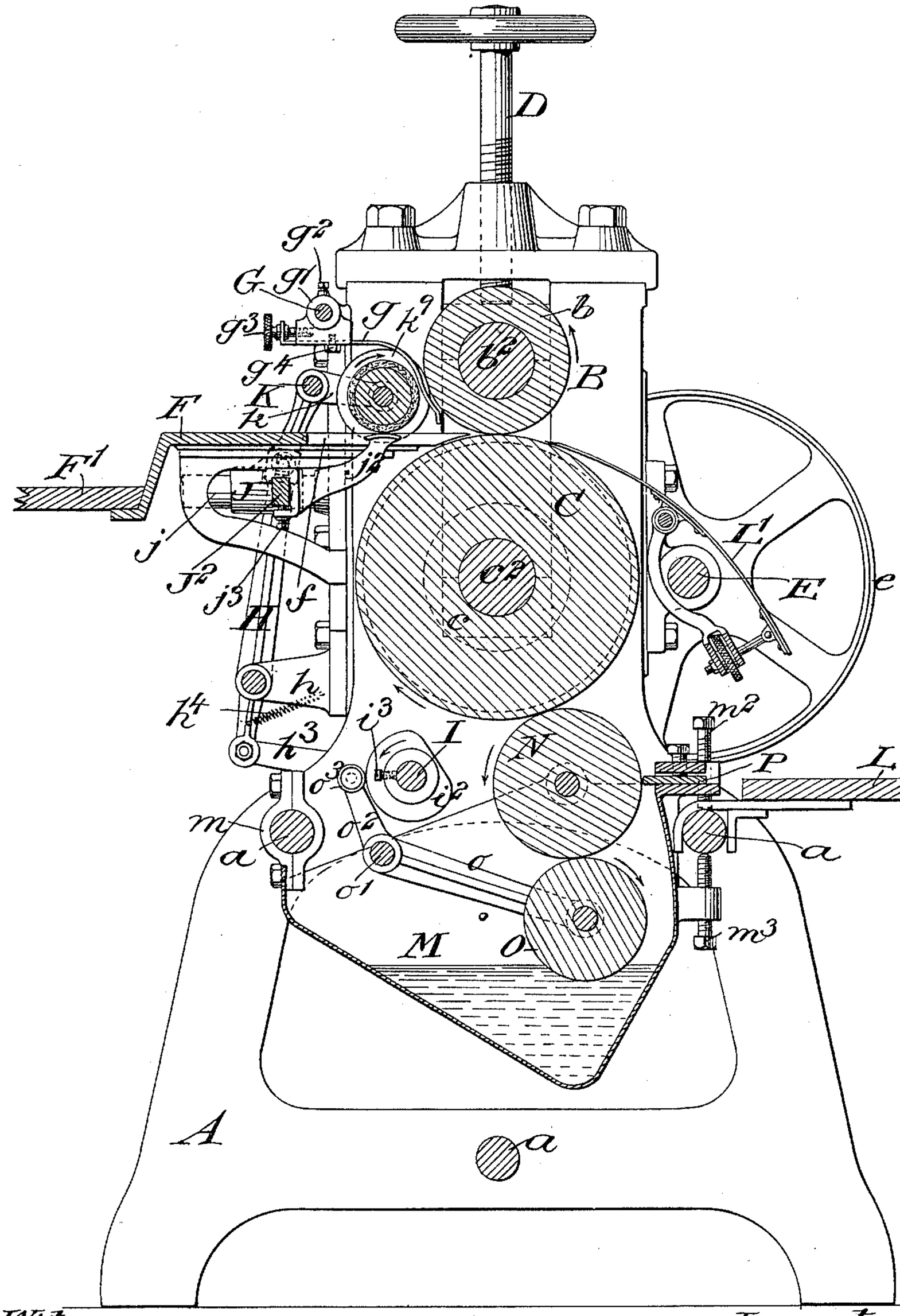
(Application filed Feb. 27, 1899.)

(No Model.) 5 Sheets—Sheet 4.

Fig. 4.



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EMBOSSING MACHINE.

(Application filed Feb. 27, 1899.)

(No Model.) 5 Sheets—Sheet 5.

Fig. 5.

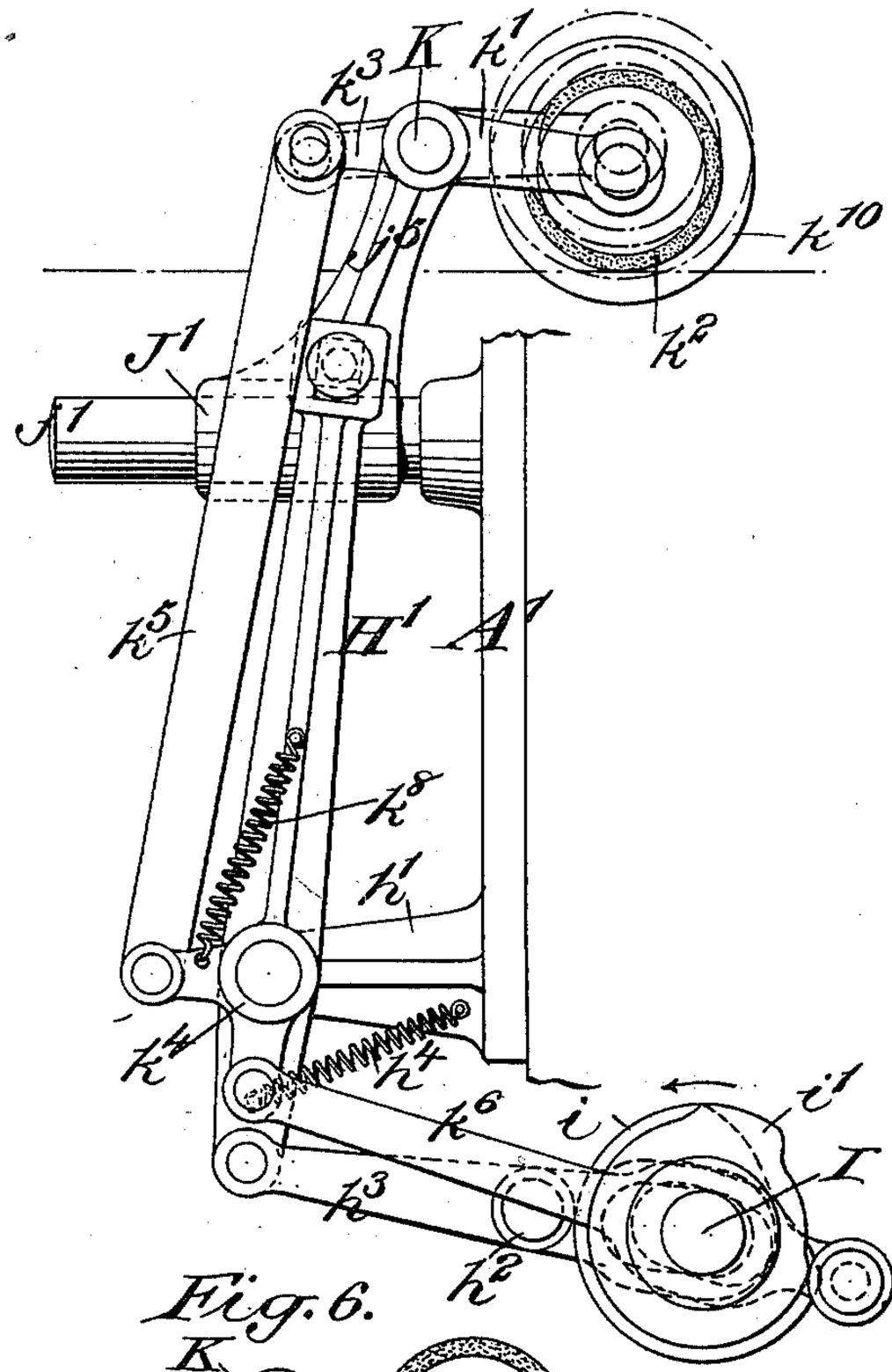
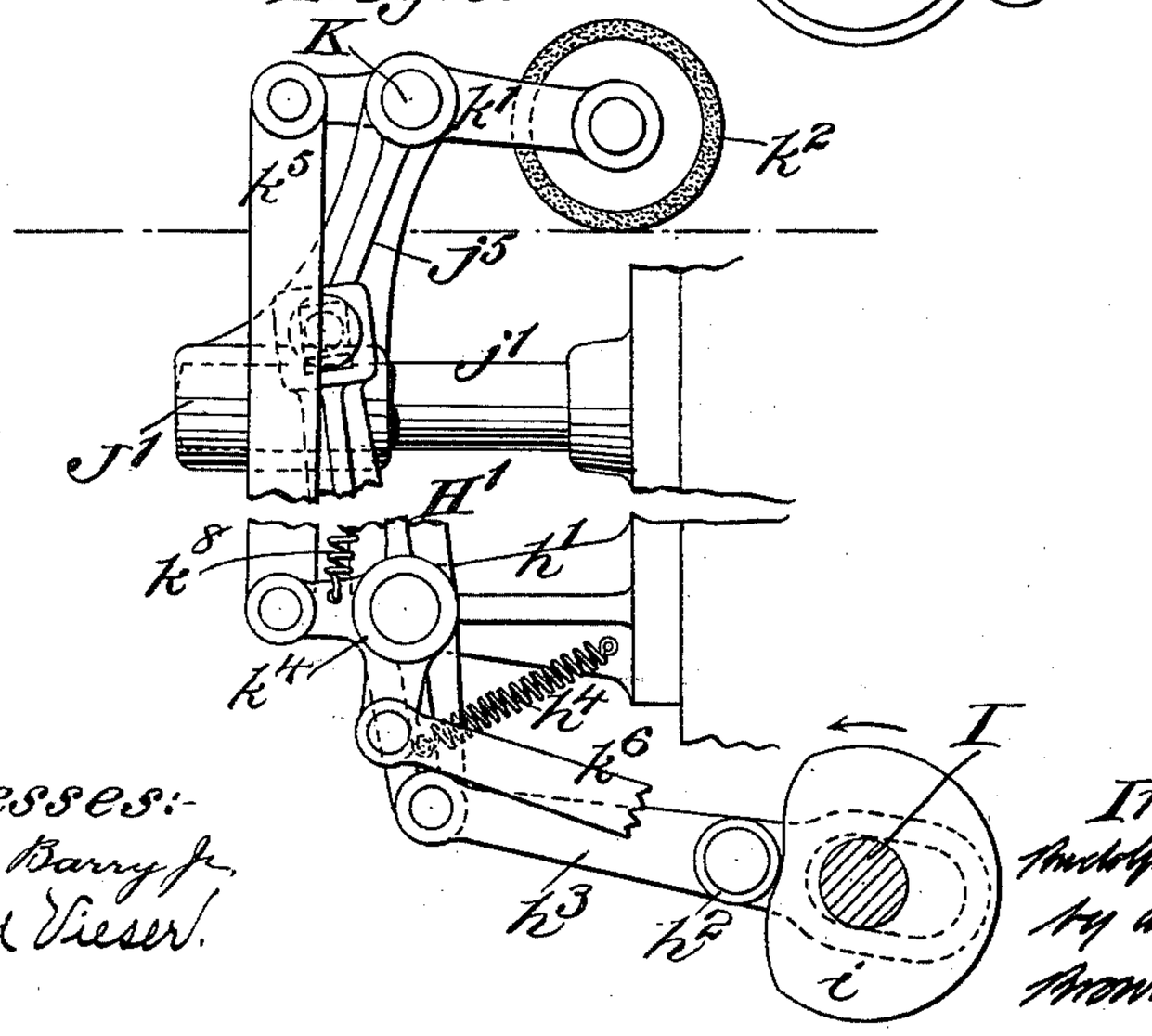


Fig. 6.



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UNITED STATES PATENT OFFICE.

RUDOLPH F. EMMERICH, OF NEW YORK, N. Y.

EMBOSSING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 626,490, dated June 6, 1899.

Application filed February 27, 1899. Serial No. 706,944. (No model.)

To all whom it may concern:

Be it known that I, RUDOLPH F. EMMERICH, a citizen of the United States, and a resident of New York, in the county and State of New York, have invented a new and useful Improvement in Embossing-Machines, of which the following is a specification.

My invention relates to an improvement in embossing-machines of that class which are adapted to emboss sheets of paper.

One object of my invention is to provide a simple and effective mechanism for feeding the sheets of paper to the embossing-rolls, which mechanism will first accurately true the forward edge of the sheet to be fed and then exert a slight retarding influence upon the sheet as it is being passed between the rolls, so as to prevent any wrinkling or twisting of the sheet.

A further object is to provide mechanism for dampening the impression-roll of the embossing-machine at desired intervals, so as to permit the die-roll to form a perfect impression upon the impression-roll.

A practical embodiment of my invention is represented in the accompanying drawings, in which—

Figure 1 is a front view of the machine. Fig. 2 is a view of the right side of the machine. Fig. 3 is a view of the left side of the machine. Fig. 4 is a vertical section from front to rear, taken in the plane of the line 4 4 of Fig. 1. Fig. 5 is an enlarged detail view of a portion of the feeding mechanism, and Fig. 6 is another detail view of the feeding mechanism with several of the parts broken away.

The main frame of the machine consists of a pair of side uprights A A′, which are rigidly spaced apart by tie-rods *a*. The embossing-rolls are denoted by B and C, in the present instance the upper roll being the die-roll and the lower larger roll the impression-roll. The impression-roll C is mounted at its opposite ends in half-bearings *c* in the side frames A A′, and the die-roll B is mounted in half-bearings *b* in the said side frames, the said half-bearings *b* being engaged by pressure-screws D D′, so that the pressure of the die-roll B upon the impression-roll C may be adjusted at pleasure.

The drive-shaft E is mounted in suitable bearings on the side frames and is provided with a drive-pulley *e*, which may be driven from any suitable source of power. (Not shown.) This drive-shaft E is provided with a gear-wheel *e′*, which at one side of the machine meshes with a gear-wheel *b′* on the shaft b^2 of the die-roll B. The shaft b^2 is provided with a gear-wheel b^3 at the other end of the machine, which meshes with a gear-wheel *c′*, carried by the shaft c^2 of the impression-roll C.

The feed-table of the machine is denoted by F, the inner edge of which is located as near as possible to the meeting faces of the two embossing-rolls. This table may be of any desired shape and size to suit different requirements. The means which I employ for lining the advance edge of the sheet before it is to be fed to the embossing-rolls is as follows: A rock-shaft G extends across the machine and is mounted in suitable bearings on the side frames A A′. This rock-shaft is located at the front of the machine a distance above the table F and is provided with a plurality of fingers *g*—in the present instance two are shown—which extend down to a position near the inner edge of the table F. These fingers are so arranged that when rocked downwardly they engage the table and form abutments for the advance edge of the sheet and when rocked upwardly their lower ends are spaced a short distance above the table, so as to permit the sheet to be fed to the embossing-rolls. Each of these fingers *g* is carried by a sleeve *g′*, which is adjustably secured to the rock-shaft G by means of a clamp-screw g^2. The finger *g* has an inner and outward adjustment by means of an adjusting-screw g^3 and set-screw g^4. The screw g^3 engages the end of the finger adjacent to the sleeve *g′* and also the said sleeve, so that when the screw g^4 is loosened the turning of the screw g^3 in one or the other direction will adjust the finger *g* outwardly or inwardly. When adjusted to the proper position, the finger is clamped there by tightening the clamp-screw g^4. By permitting the adjustment of the sleeve *g′* along the rock-shaft G the fingers *g* may be slid to any required position nearer to or farther from the sides of the machine to suit different widths of sheets.

The rock-shaft G is operated by means of

a cam b^4, carried by the die-wheel shaft b^2, which cam engages a stud or roller g^5 on the free end of an arm g^6, secured to the end of the rock-shaft G.

The means which I employ for feeding the sheet to the embossing-rolls after its forward edge has been properly alined and for frictionally engaging the sheet for preventing it from wrinkling or twisting is as follows: A pair of two-armed rocking levers H H′ are mounted in brackets h h', which project forwardly from the side frames A A′. These levers are rocked forwardly and rearwardly by cams i on a rotary shaft I, which engage studs or rollers h^2, carried by connecting-rods h^3, having their outer ends connected to the lower arms of the levers H H′. The inner ends of these connecting-rods h^3 are preferably supported by the shaft I by providing the said inner ends with loops which embrace the said shaft. The retracting-springs h^4 extend from the lower arms of the levers H H′ to their respective brackets h h', which springs tend to swing the upper arms of the said levers to the limits of their outward movement and also hold the studs or rollers h^2 snugly against the peripheries of their respective cams i.

The shaft I is mounted in suitable bearings in the side frames A A′ and is provided at the left side of the machine with a gear-wheel i^*, which meshes with the gear-wheel c', carried by the impression-roll shaft c^2. The speed of rotation of the shaft I and the die-roll shaft b^2 is the same. Sleeves J J′ are mounted to slide forwardly and rearwardly upon guides j j', which project forwardly from the side frames A A′ at points a slight distance below the feed-table F. These sleeves are reciprocated by connecting therewith the free ends of the upper arms of the rocking levers H H′. A cross-bar J^2 extends across the machine between the sleeves J J′, so as to move forwardly and rearwardly therewith, which cross-bar is provided with a plurality of upwardly-extended gripping-fingers j^2, adjustably secured to the said cross-bar by means of clamp-screws j^3. In the present instance two of these gripping-fingers are shown, and their free ends project upwardly through elongated slots f in the table F to points substantially in a plane with the top of the said table, so that the said fingers may be caused to engage the under surface of the sheet to be fed.

The sleeves J J′ are provided with upwardly-extended brackets j^4 j^5, in which is mounted a rock-shaft K, to which shaft are secured inwardly-extended arms k k'. A friction-roller k^2 is mounted in the ends of the rocking arms k k', which friction-roller may be provided with any suitable covering—as, for instance, felt—for engaging the surface of the sheet to be fed to the embossing-rolls. This roller is located directly above the fingers j^2, carried by the cross-bar J^2. This friction-roller k^2 is rocked toward and away from the gripping-fingers by the following means: A short arm k^3 projects forwardly from the rock-shaft K and is connected at its free end with one arm of an angle-lever k^4, mounted on the bracket h' by a connecting-bar k^5. The other arm of the angle-lever k^4 has attached thereto the forward end of a rod k^6, the inner end of which is provided with a stud or roller k^7, which travels along the periphery of a cam i' on the rotary shaft I. This rod k^6 is preferably provided with a looped portion, which embraces the shaft I, so that the inner end of the said rod may be supported by the shaft. The stud or roller k^7 is held in contact with the periphery of the cam i' by means of a retracting-spring k^8, which extends from the upper arm of the angle-lever k^4 to a point on the upper arm of the rocking lever H′.

The shaft of the friction-roller k^2 is provided with pulleys k^9 k^{10} at the opposite ends of the roller k^2, the pulley k^9 being removed in Figs. 5 and 6 to more clearly show the friction-roller. These pulleys k^9 k^{10} are arranged to be forced against the surface of the die-roll B when the friction-roller is at the limit of its inward movement, so that the rotary movement of the die-roll B will impart to the friction-roll k^2 a rotary movement in a direction opposite to that in which the sheet is traveling, so as to cause the friction-roll to smooth out the said sheet, and thereby prevent it from wrinkling. To still further insure that all unevenness in the sheet may be worked toward the end, so as to prevent its creasing or wrinkling, I provide the friction-roll k^2 with spiral grooves k^{11}, leading from the middle of its periphery outwardly toward its ends.

The embossing-machine may be provided with a suitable table L, and an adjustable delivery device L′ may be so arranged as to deliver sheets onto the said table as they pass from the embossing-rolls.

When it is desired to moisten the impression-roll for any purpose—as, for instance, when the pattern thereon has become broken by any foreign substance having passed between the two rolls or when the pattern has become less sharp and defined—I provide the following mechanism: A trough or reservoir M is secured between the side frames A A′, beneath the impression-roll C. The front edge of the reservoir is secured to one of the cross-braces a by means of clamps m m' and supported by one of the cross-braces a at the back of the machine. This adjustable connection consists of two sets of upper adjusting-screws m^2 and two sets of lower adjusting-screws m^3, arranged to have their ends in engagement with the top and bottom of the said back cross-brace. An intermediate dampening-roller N extends across the machine directly beneath the impression-roll C and is mounted at its ends in the sides of the reservoir M.

By means of the adjusting devices at the back of the reservoir the roller N may be caused to engage the surface of the impression-roll C with the desired pressure. A primary dampening-roller O is mounted in the

free ends of arms *o*, carried by a rock-shaft *o'*, mounted in the sides of the reservoir M. The roller O is normally swung down out of engagement with the intermediate roller N. The means which I employ for swinging the roller O up into engagement with the intermediate roller N are arms o^2, which arms are provided with studs or rollers o^3, arranged to be engaged by cams i^2, which are adjustably secured by clamping-screws i^3 on the rotary shaft I.

When the dampening mechanism is not in use, the clamp-screws i^3 are released from their engagement with the shaft I and the cams i^2 are shifted out of the way of the studs or rollers o^3, thus permitting the dampening-roller O to drop down out of engagement with the intermediate dampening-roller N. This roller O is intended at all times to be partially immersed in liquid in the reservoir M.

A wiper P may be secured to the reservoir M in position to engage the periphery of the intermediate dampening-roller N, so as to regulate the amount of water which shall be fed to the surface of the impression-roll C. It is to be understood that when the dampening mechanism is being used sheets should not be fed to the machine, although the sheet alining and feeding mechanism may go through their respective movements without interruption. When the sheets are being fed to the machine, the dampening mechanism should be thrown out of use by the shifting of the cams i^2.

The operation of my invention is as follows: The sheets to be embossed may be fed to the table F in any desired manner or may be stacked in piles upon the depressed portion F' thereof, if so desired. The several mechanisms are so timed that when the alining-fingers *g* are in their lowered position the feeding mechanism is at the limit of its outward movement away from the embossing-rolls. After the advance edge of the sheet has been slid forward by hand or other means into engagement with the alining-fingers *g* the friction-roll k^2 is lowered, so that the sheet is grasped firmly between it and the gripping-fingers j^2. The alining mechanism is then operated to raise the fingers *g* out of the way of the advance edge of the sheet, and the roller k^2 and gripping-fingers j^2 are then advanced, with the sheet between them, until the sheet is engaged by the embossing-rolls B C. As soon as the roller k^2 reaches the limit of its advance movement it is caused to rotate rapidly in the reverse direction to the movement of the sheet, and the sheet is thus smoothed and held with the proper amount of friction to insure an accurate and even impression thereon by the embossing-rolls.

The dampening mechanism may be thrown into operation at any time, as shown in the accompanying drawings, whenever required, as hereinbefore set forth.

It is evident that slight changes might be resorted to in the form and arrangement of the several parts without departing from the spirit and scope of my invention. Hence I do not wish to limit myself strictly to the structure herein set forth; but

What I claim is—

1. In an embossing-machine, embossing-rolls, means for operating them, a sheet-alining mechanism, a sheet-advancing mechanism, a friction device for engaging the surface of the sheet as it is being drawn through the rolls and means for alternately operating the alining mechanism, the advancing mechanism and the friction device, substantially as set forth.

2. In an embossing-machine, embossing-rolls and means for operating them, a sheet-advancing mechanism, means for operating it and a rotary friction device for engaging the surface of the sheet, the said rotary friction device being under the control of one of the embossing-rolls whereby it is rotated when the sheet-advancing mechanism is in its advanced position, substantially as set forth.

3. In an embossing-machine, embossing-rolls and means for operating them, a dampening mechanism and means for causing the dampening mechanism to engage one of the embossing-rolls at pleasure, substantially as set forth.

4. A sheet-advancing mechanism for embossing-machines comprising a traveling support, means for reciprocating it toward and away from the embossing-rolls, means for grasping the sheet when the support is at the limit of its outward movement comprising gripping-fingers and a friction-roll carried by the support and means for operating the friction-roll in the reverse direction to the travel of the sheet after the sheet has been advanced to the embossing-rolls for smoothing the sheet, substantially as set forth.

5. A sheet-advancing mechanism for embossing-machines comprising a traveling support, means for sliding it toward and away from the embossing-rolls, means carried by the support for gripping the sheet comprising gripping-fingers and a friction-roll and means for raising the friction-roll away from the gripping-fingers at intervals, substantially as set forth.

6. A sheet-advancing mechanism comprising a traveling support, means carried by the support for gripping the sheet, means for reciprocating the traveling support comprising a rocking lever, a rotary cam-shaft, a cam thereon, a connecting-rod secured to one end of said rocking lever and arranged to be operated by said cam, the other end of the rocking lever being connected with the traveling support, substantially as set forth.

7. A sheet-advancing mechanism comprising a traveling support, means for reciprocating the support, a rock-shaft, mounted on the support, a friction-roller mounted in arms projecting from said rock-shaft, means for rocking the shaft at intervals comprising an angle-lever, an arm projecting from the rock-

shaft, a connection between the said arm and one arm of the angle-lever, a rotary cam-shaft, a cam thereon and a rod leading from the other arm of the angle-lever arranged to be operated by the said cam, substantially as set forth.

8. A dampening mechanism for embossing-machines comprising a rotary shaft, a cam carried thereby, a rock-shaft, arms projecting therefrom, a dampening-roller mounted in said arms, another arm projecting from said shaft in position to be operated by the cam, a reservoir for the said dampening-roller and an intermediate dampening-roller engaged with the first-named dampening-roller and one of the embossing-rolls, substantially as set forth.

9. In an embossing-machine, the impression-roll, a reservoir hinged at one edge, a dampening-roll mounted in the sides of the reservoir and means for adjusting the other edge of the reservoir toward and away from the impression-roll, substantially as set forth.

10. A sheet-advancing mechanism for embossing-machines comprising a traveling support, means for sliding it toward and away from the embossing-rolls, means carried by the support for gripping the sheet comprising gripping-fingers and a friction-roll provided with spiral grooves leading from the middle of its periphery outwardly toward its ends and means for rotating the roll when in its position adjacent to the embossing-rolls, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 4th day of February, 1899.

RUDOLPH F. EMMERICH.

Witnesses:

GEORGE BARRY, Jr.,

FREDK. HAYNES.