

No. 630,596.

Patented Aug. 8, 1899.

W. G. COWELL.
PAPER BOX MACHINE.

(Application filed July 15, 1898.)

(No Model.)

4 Sheets—Sheet 1.

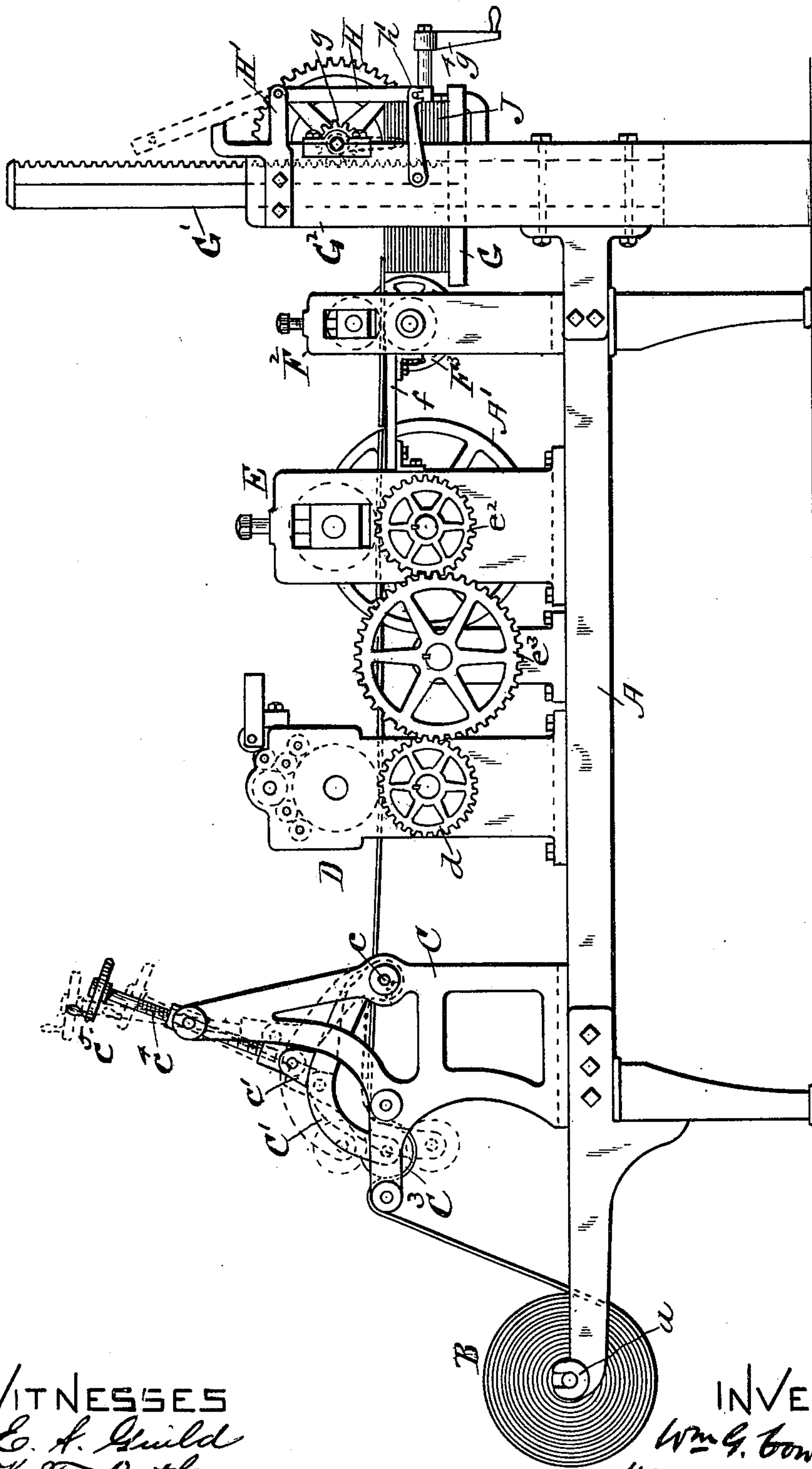


Fig. 1.

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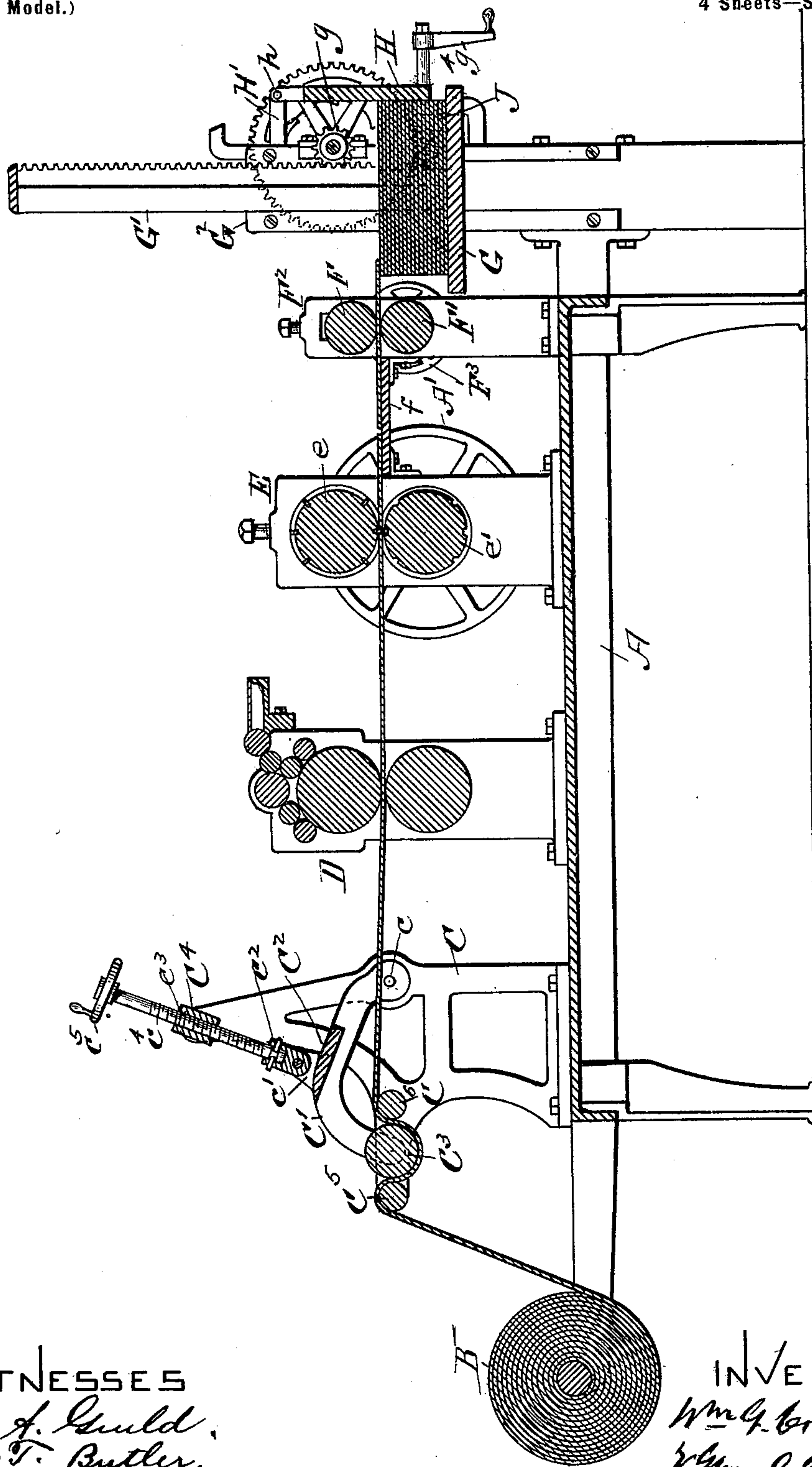


Fig. 2.

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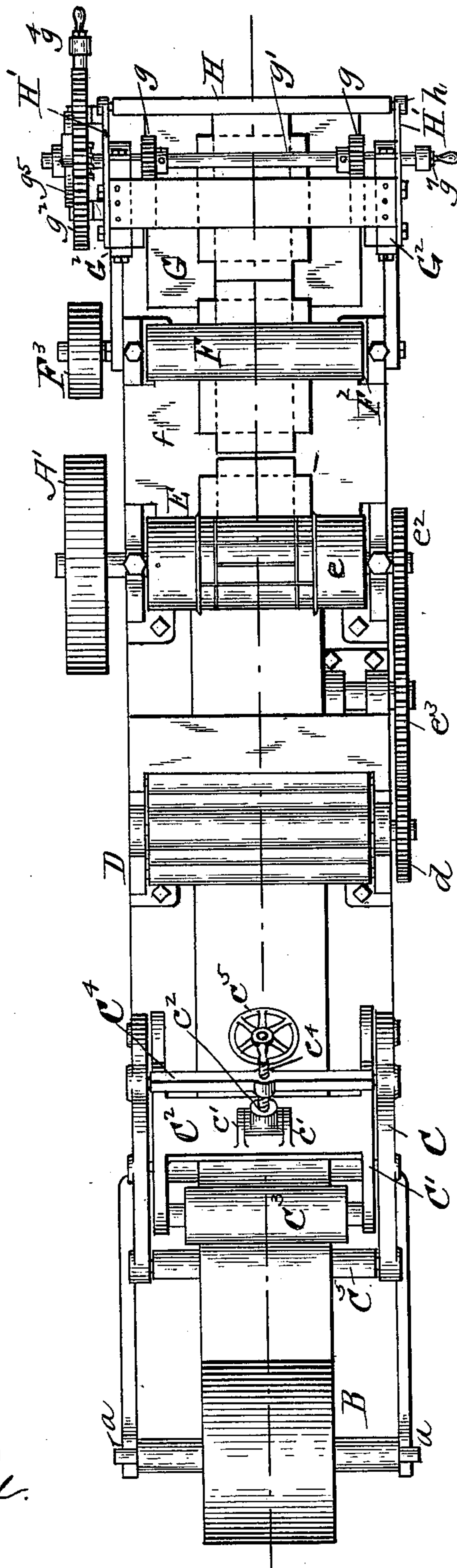


FIG. 3.

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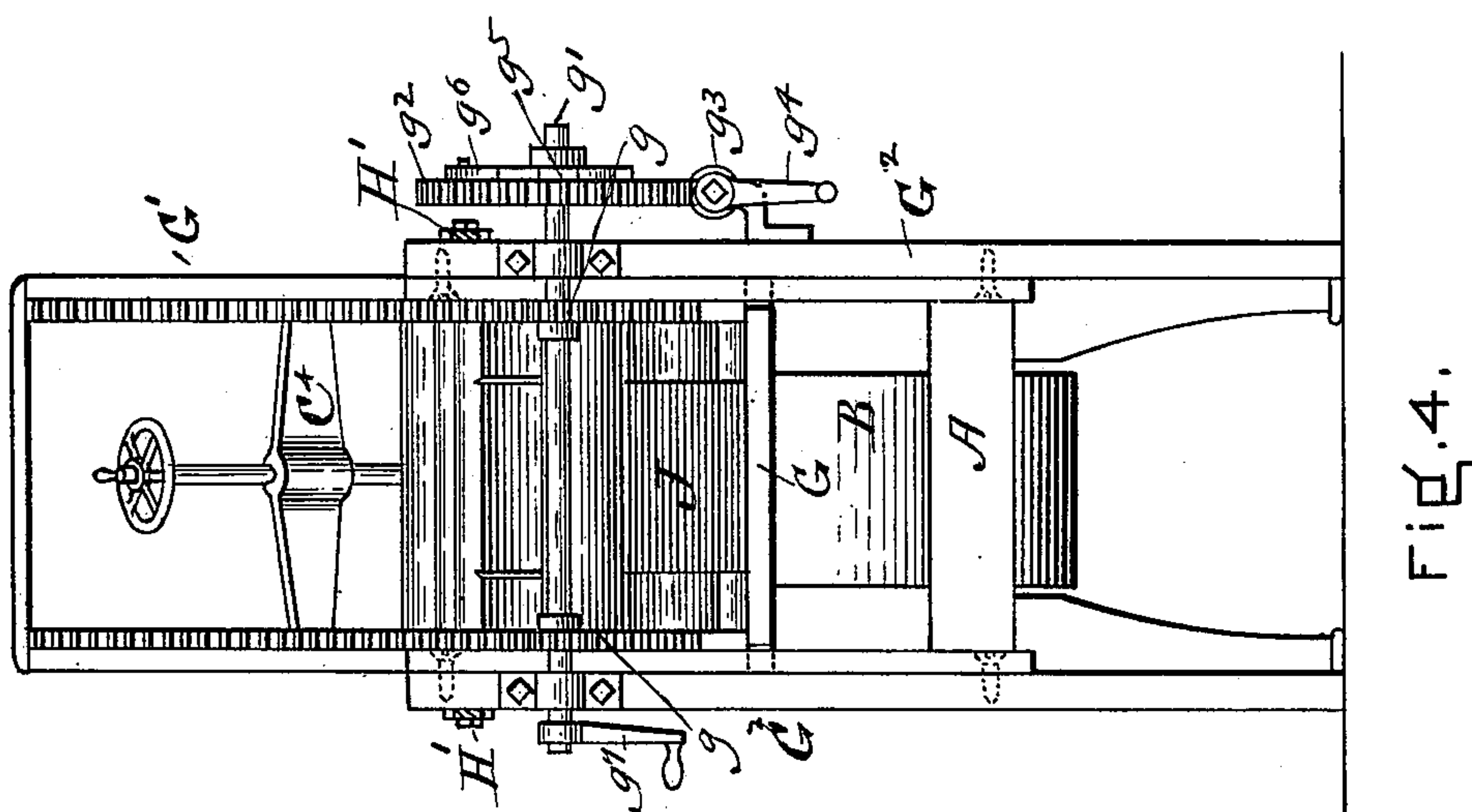
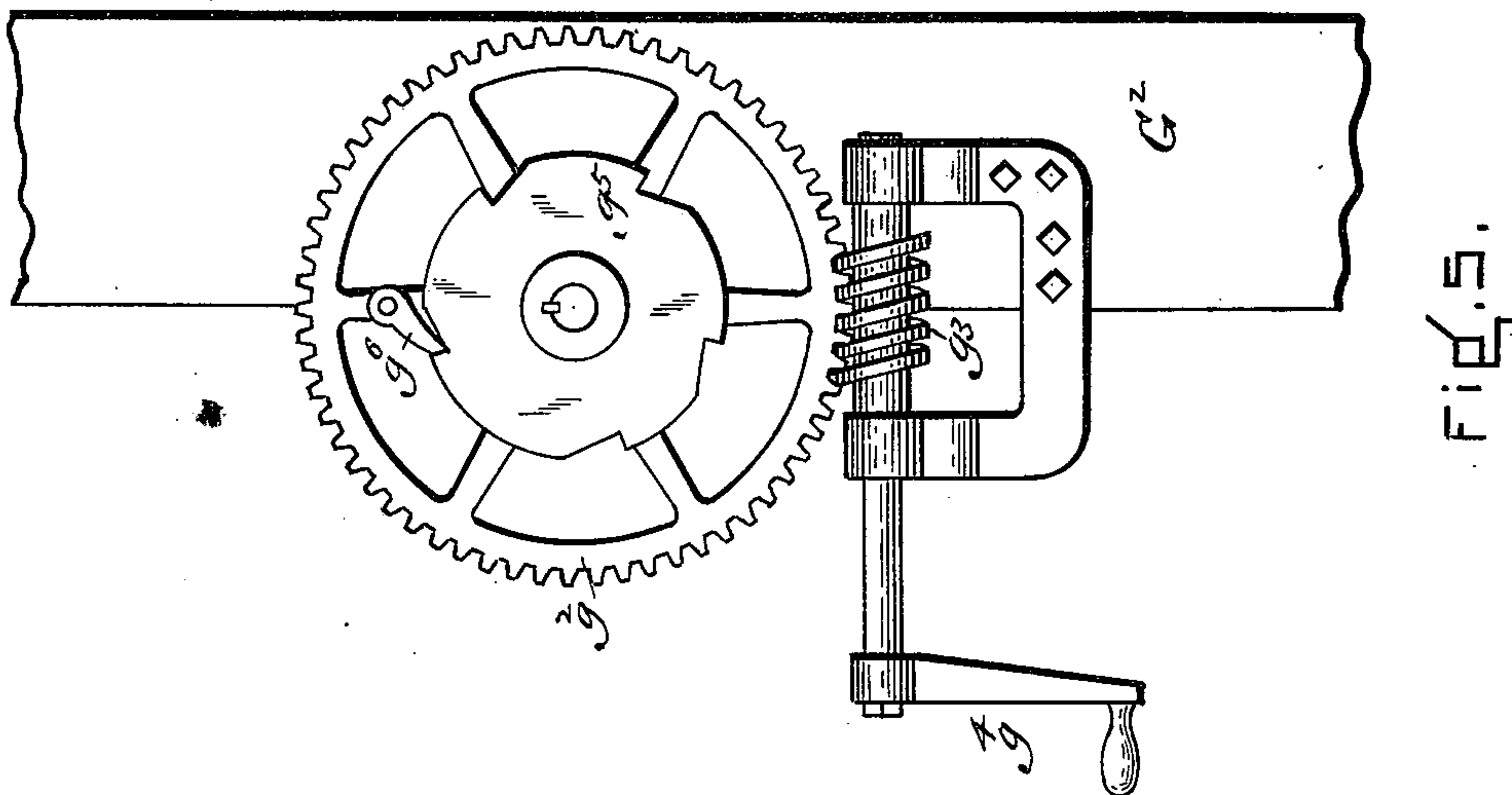
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4 Sheets—Sheet 4.



WITNESSES

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H. T. Butler

INVENTOR

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UNITED STATES PATENT OFFICE.

WILLIAM G. COWELL, OF NEW HAVEN, CONNECTICUT.

PAPER-BOX MACHINE.

SPECIFICATION forming part of Letters Patent No. 630,596, dated August 8, 1899.

Application filed July 15, 1898. Serial No. 686,080. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM G. COWELL, of New Haven, in the county of New Haven and State of Connecticut, have invented a new and useful Improvement in Paper-Box-Making Machines, of which the following is a specification.

In the making of paper boxes from paper or cardboard which has been rolled it is desirable to flatten the strip as it comes from the roll and before it runs through the machine. My invention relates to means for this purpose and to means for receiving and piling the blank.

My invention will be understood by reference to the drawings, in which—

Figure 1 is a side elevation, Fig. 2 a longitudinal section, and Fig. 3 a plan, of a machine embodying my invention, Fig. 4 being an end elevation and Fig. 5 a detail enlarged, showing the operation of the blank-receiving table.

In the drawings, A is the bed, which has at one end a pair of bearings *a* to receive the spindle which carries the paper-roll B.

The flattening mechanism or mechanism for taking the curl out of the paper, as shown, is constructed as follows: C C are two side frames mounted upon the bed A, near one end thereof. In this frame is pivotally mounted at *c* a pair of arms C'. These arms are connected by a cross-brace C² and at their outer ends carry the guiding-roll C³. The cross-brace C² carries two uprights or ears *c'*, in which is pivotally mounted a socket-piece *c*². C⁴ is a second cross-bar which is pivotally mounted in the upper part of the frames C and carries a threaded opening *c*³, through which passes a screw *c*⁴, the lower end of which sets into the opening in the socket-piece *c*² and is confined therein, so as to raise and lower the arms C' and roll C³. The upper end of this screw carries a hand-wheel *c*⁵. By turning the hand-wheel the position of the guiding-roll C³ will be adjusted. The frames C also carry two rolls C⁵ C⁶, which are a sufficient distance apart to allow the roll C³ to pass freely between them and carry the two thicknesses of paper with it. These rolls are intended to give a curve to the paper the reverse of that which it has in the roll B. The operation of this part of my mech-

anism is as follows: Where the roll B is placed upon the machine in the manner shown in the drawings, (see Fig. 2,) so that the paper rolls off from the under side of the roll, the paper is passed up and over the roll C⁵, then down under the roll C³, and up over the roll C⁶ and through the machine, as shown. The paper which comes from nearer the interior of the roll is of course curled to a greater extent than that which comes off from its outside, and hence requires to be given a more of a reverse curl to flatten it. The position of the roll C³ is therefore made adjustable, and as the center of the roll B is approached the screw *c*⁴ is turned to lower the roll C³ between the axes of the rolls C⁵ C⁶, so as to drag the paper over more and more of the surface of these rolls. Thus the paper may be given as much of a reverse curl as may be necessary to overcome the curl which is given it in the roll B.

In case the position of the roll B is reversed, so that the paper comes off from the top of the roll instead of the under side, the strip of paper is passed under the roll C⁵, over the roll C³, and under the roll C⁶, and in order that the machine may be effective for this purpose I prefer to have the screw *c*⁴ of considerable length, so as to give a considerable range of movement to the roll C³.

The paper-roll should be located apart from the flattening-surfaces and in such relation thereto that the paper on leaving the roll may be drawn over these surfaces in a direction the reverse of that in which it is rolled.

In the machine shown in the drawings the next step in the preparation of the boxes is the printing, and this may be accomplished by means of a printing-press of any desired kind. I have shown in the drawings at D the diagrammatic representation of such a press to indicate its general relations to the other parts of the machine; but any form of press may be used for the purpose.

d is the gear mounted on the lower roll of the press, by which power is applied thereto.

At E, I have shown a frame carrying a pair of rolls *e e'*, provided with knives for cutting and scoring the blank. The upper roll is adjustable to the thickness of the paper. Such rolls and their use are well known in the art and need no further description. They also

provide the feed for the strip. Upon the axis which carries the lower roll e' is mounted a pulley A' , by means of which power is applied to the roll e' and through it and the gears e^2 and e^3 to the gear d and printing-press. It is well known that the knives of such rolls as are shown at e e' may not always cut entirely through the paper and do leave points or tacks of attachment, and hence unless means are provided to finish the cutting a strip of partially-detached blanks will be formed instead of a pile of entirely-detached blanks. In order to insure the detachment of the blank, I provide a detaching mechanism which consists of a pair of rollers F F' , mounted in a frame F^2 . The upper roll F is mounted in adjustable bearings, so that its height and the pressure with which it bears upon the paper which runs between it and the lower roll may be adjusted. The shaft of the lower roll F' is provided with a pulley F^3 , and power is applied to this pulley to speed it more rapidly than the normal feed of the paper. This may be done by belting pulley F^3 to pulley A' or in any other desired way. Thus the rolls F F' when they grip the paper will tear it at its weakest spot—namely, where it has been scored or partially cut by the cutting and scoring mechanism E . Between the cutting mechanism and this detaching mechanism there is a table f , supported by the frame E F^2 in order to properly guide the advancing sheet between the rolls F F' . I also show a stacking mechanism to secure the blanks from the detaching-rolls.

The stacking-table G is carried by two slides G' G' , sliding in grooves in the two side frames G^2 G^2 . Each slide has a rack in which works the pinions g g , mounted upon a shaft g' , journaled in bearings on the side frames G^2 G^2 and carrying a worm-gear g^2 , loose thereon, which engages with the worm g^3 . g^5 is a ratchet fast on the shaft g' , and g^6 is a pawl on the gear g^2 . The rotation of the shaft g' in the direction to allow the table G to descend will rotate the ratchet, and hence, by means of the pawl g^5 , the worm-gear g^2 and worm g^3 . Power is applied to this worm g^3 to restrain any tendency of the table G to drop too rapidly and to control its movement. I have indicated a handle g^4 for this purpose. When the table has reached the end of its movement, any further movement on the part of the worm and gear will be ineffective to move the shaft g' . A handle g^7 is used to turn the shaft g' to raise the table G . By timing the movement of the worm the table G may be allowed to descend exactly in proportion to the speed with which the blanks are fed out by the detaching mechanism.

In order that the blanks J may lie in an even stack, I prefer to provide a stop H , pivoted at h to arms H' , which extend out from the uprights G^2 . This stop is preferably latched in place by means of a hook h' . The blanks then being fed forward by the detach-

ing-rolls will strike the stop H and, the table having been previously lowered just the proper distance, will settle down and rest upon the stack of blanks below it. The table G may then descend slightly in time to properly receive the next blank in turn.

In practice I prefer to apply power to the machine by means of the pulley A' on the axis of the roll e' . From this pulley power is transmitted through roll e and gears e^2 e^3 to the gear d' , which is part of the printing mechanism, and by means of a belt (not shown) to pulley F^3 , which is mounted on one of the detaching-rolls. By this means the feed of the machine is controlled, the difference of diameters between A' and F^3 giving the detaching-rolls an increased speed over the normal feed, and thus insuring their detaching action.

I have described in detail so much of the mechanism shown in the drawings as is new to me; but it is evident that these details may be altered without taking from the machine those characteristics which are new with me.

The mechanism for flattening the paper is of course applicable elsewhere than in machines for making paper boxes, and its efficiency is due to the drawing of the paper over one or more flattening-surfaces in such a direction as to give the paper a curl the reverse of that which it had in the roll B . Of course the amount of this reverse curl given the paper is controlled by the location of what I have called the "guiding-roll," and it is evident that the means whereby the guiding-roll is adjusted between the flattening-surfaces (whether they be rolls or not) may be changed somewhat without departing from the spirit of my invention, its supporting-frame, however, being the simplest manner of suspending it now known to me.

To insure the proper action of the detaching-rolls, they should be located near to the cutting-rolls, so that as soon as a blank is entirely free from the cutting-rolls it will be gripped by the detaching-rolls.

I have described the paper-board-lowering mechanism as a worm and worm-gear and have shown a handle connected to said worm; but it is evident that this is merely diagrammatic, as power may be applied in any desired manner to control the movement of the worm. Moreover, while I believe the mechanism controlling the descending table to receive the stack of blanks is best constructed in the manner shown it will be evident to any mechanic that its details may be varied to suit any given circumstances, the novelty of the device being, so far as I am aware, the use of a table which may be caused to descend at a rate corresponding to the rate at which the height of the stack of blanks increases, so that the detaching mechanism may feed each blank on a level into the position which it is to occupy.

I have referred to the blank-cutting mechanism as providing the feed for the strip; but

it is evident that other means may be provided for this purpose if thought best.

What I claim as my invention is—

1. In a paper-flattening mechanism, in combination with a pair of flattening-surfaces, the guiding-roll lying between said surfaces and mounted in a pair of pivoted arms C' carried in a suitable frame C, said arms also being pivotally connected to an adjusting-screw c⁴ also mounted in said frame C, whereby the location of said roll C³ may be adjusted, as and for the purposes set forth.

2. In a paper-box machine, in combination with a blank-receiving table mounted between suitable guides and mechanism whereby its descent may be controlled, a stop hung upon said guides in line with the desired front edge of the pile of blanks and adapted to be lifted for removal of said blanks, and means whereby said stop may be held in place in its

lowest position, as and for the purposes set forth.

3. In a paper-box machine, in combination with a detaching mechanism whereby the blanks are detached and are fed forward, a table located to receive said blanks as they come from said detaching-rolls, said table being mounted in suitable slides and provided with a stop located in line with the desired front edge of the pile of blanks, said stop being adapted to be lifted in order to withdraw the blanks and to be locked in its lowest position, as and for the purposes set forth.

In testimony whereof I have hereunto set my name this 5th day of July, 1898.

WILLIAM G. COWELL.

Witnesses:

OLIVER S. WHITE,
HENRY D. WHITE.