

A. TURNER.
FELT HAT PLANKING MACHINE.
APPLICATION FILED MAR. 30, 1909.

969,999.

Patented Sept. 13, 1910.

4 SHEETS—SHEET 1.

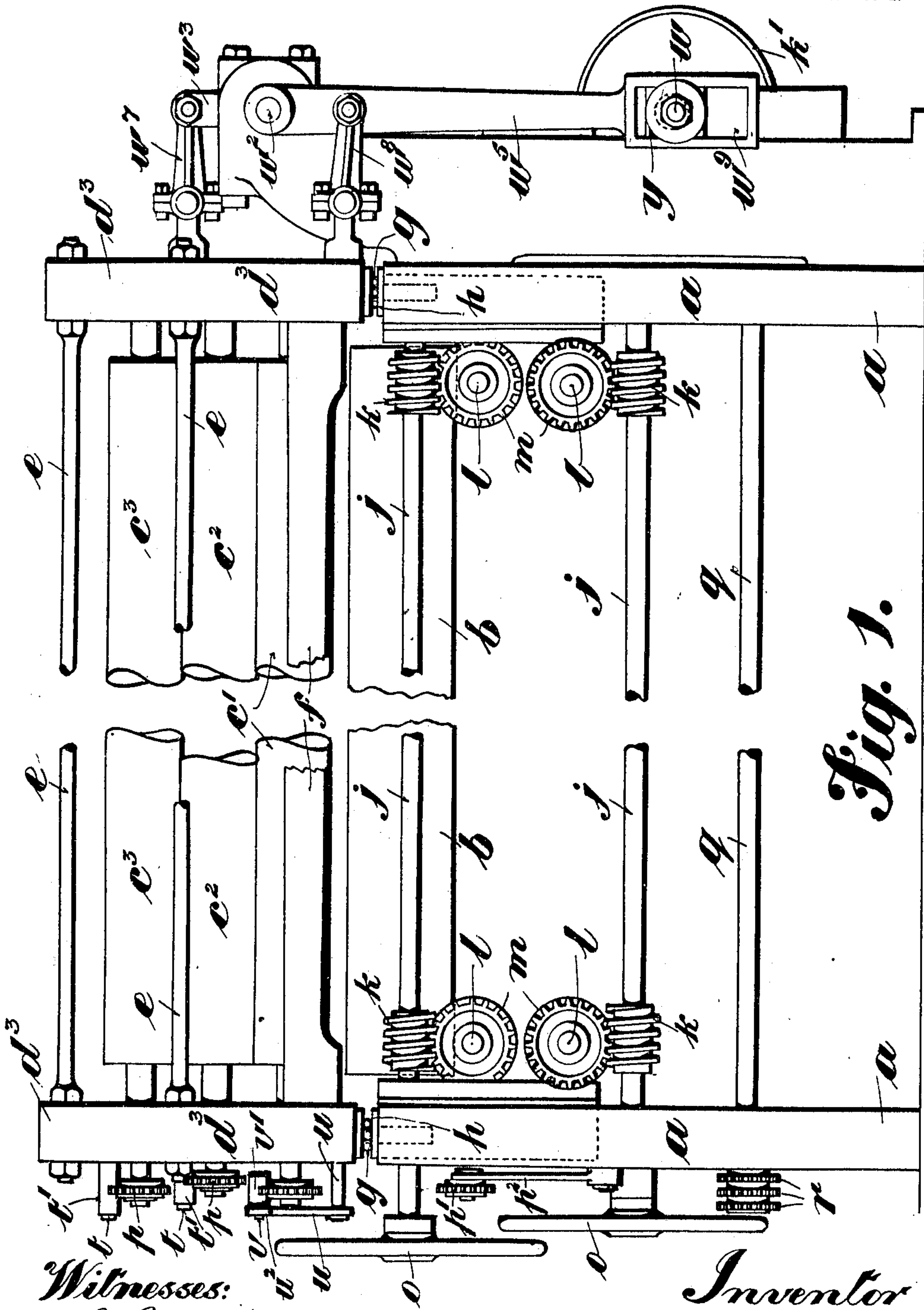


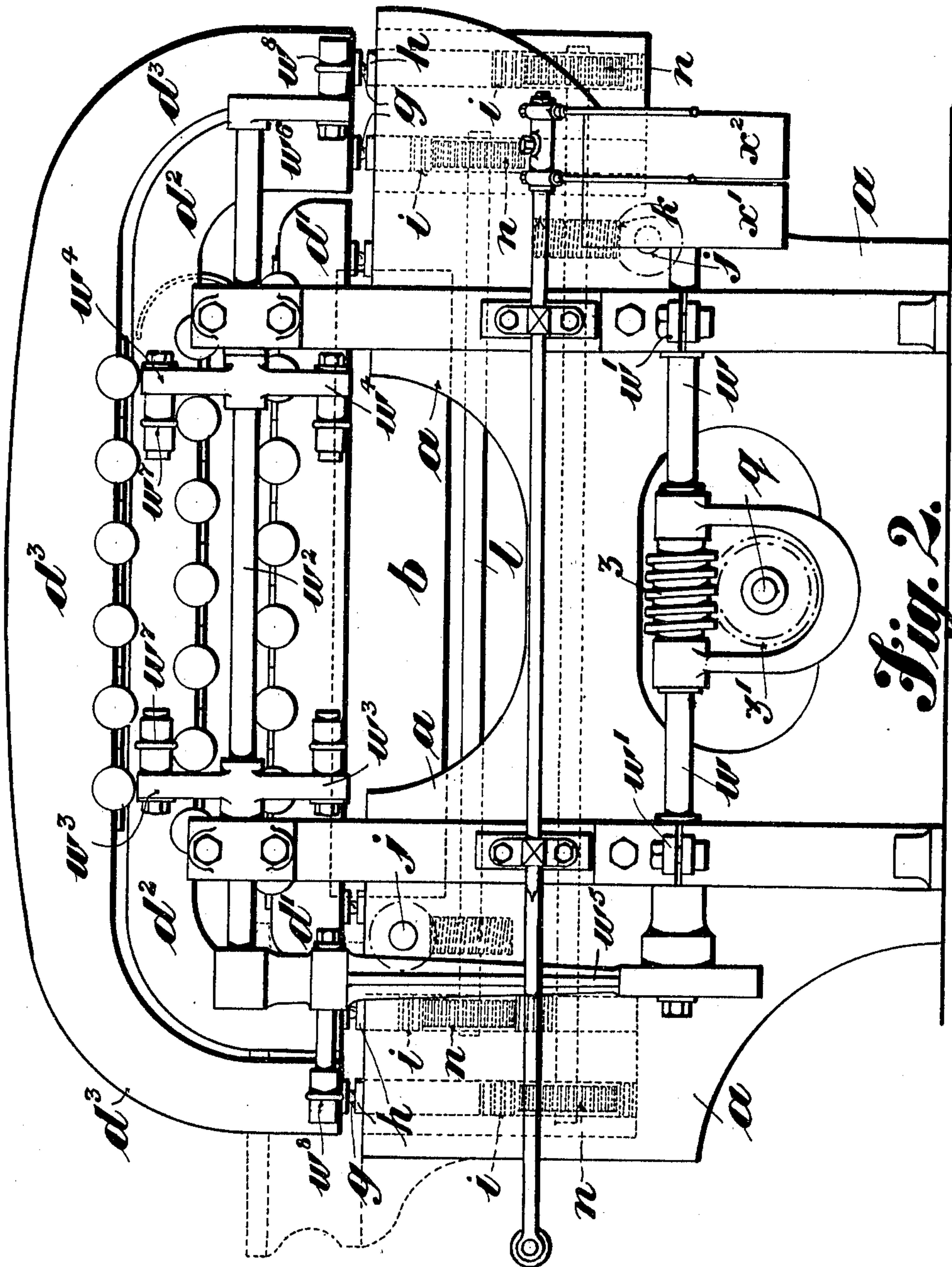
Fig. 1.

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4 SHEETS—SHEET 2.



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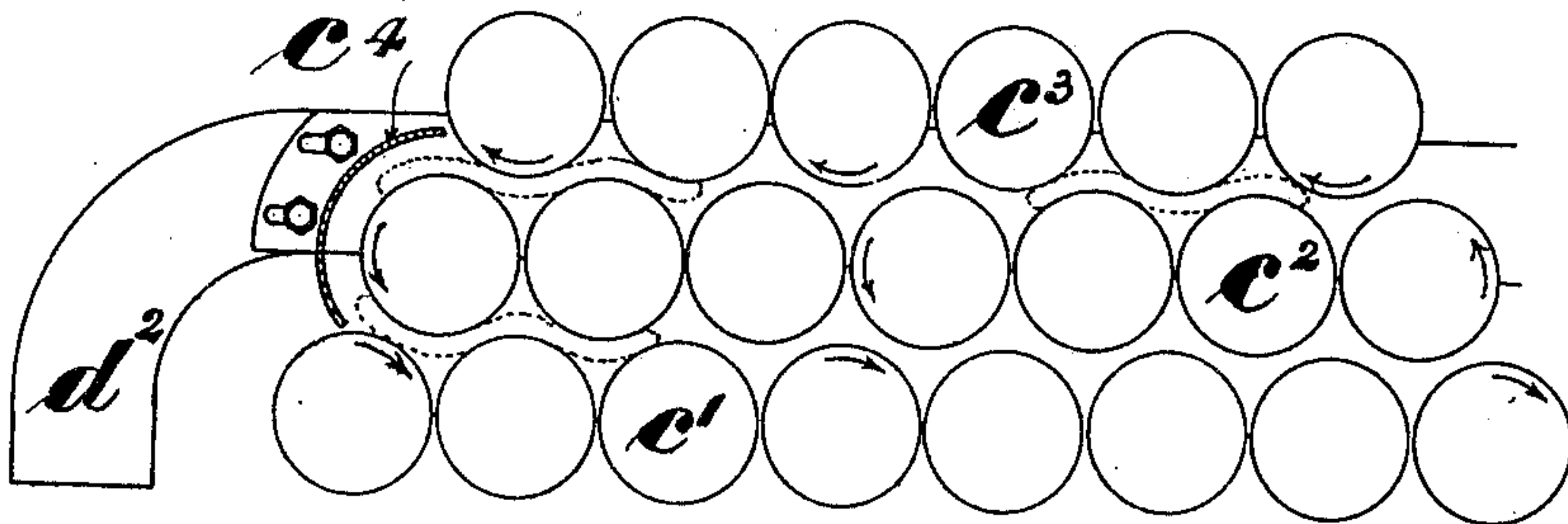


Fig. 4.

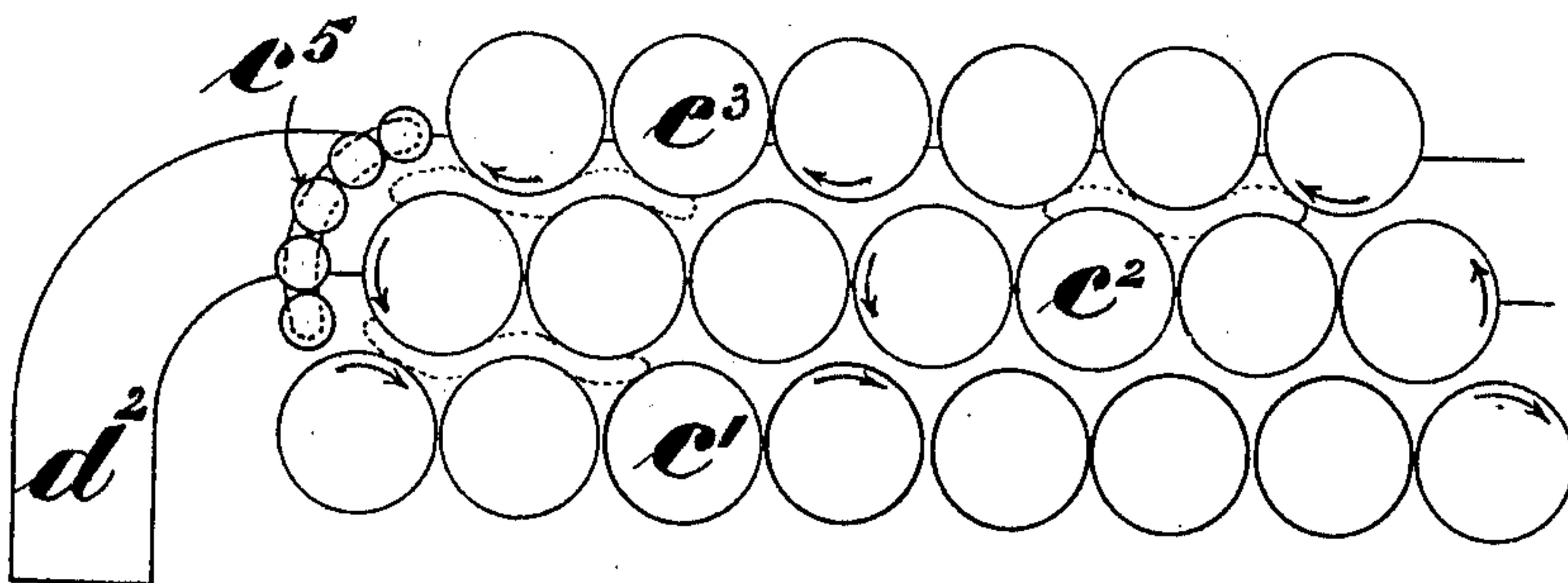


Fig. 5.

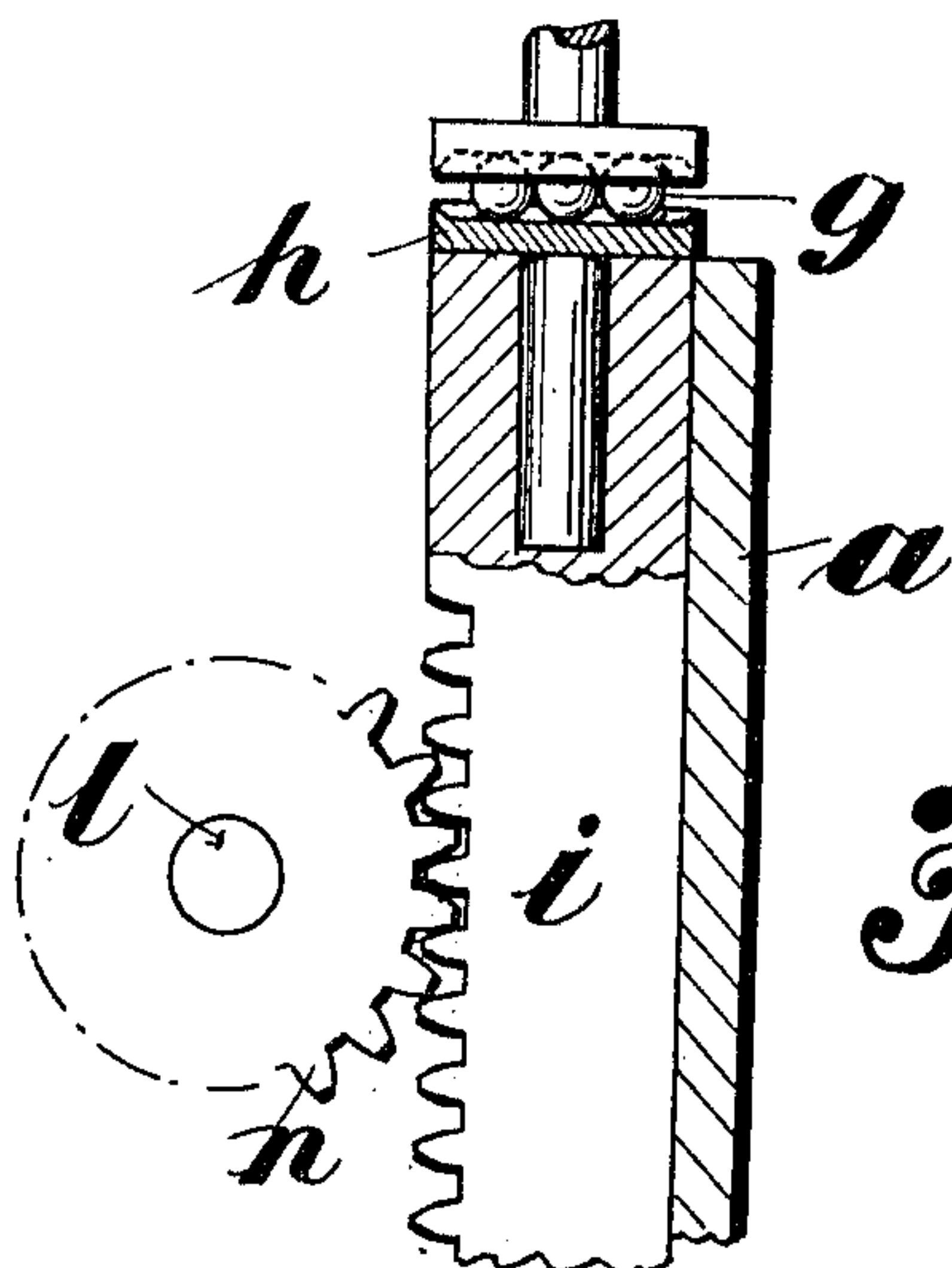


Fig. 6.

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UNITED STATES PATENT OFFICE.

ALBERT TURNER, OF DENTON, MANCHESTER, ENGLAND.

FELT-HAT-PLANKING MACHINE.

969,999.

Specification of Letters Patent. Patented Sept. 13, 1910.

Application filed March 30, 1909. Serial No. 486,651.

To all whom it may concern:

Be it known that I, ALBERT TURNER, a subject of the King of Great Britain and Ireland, and resident of Denton, Manchester, England, have invented certain new and useful Improvements in Felt-Hat-Planking Machines, of which the following is a specification.

This invention refers to machines as used for planking felt hat bodies and relates to that type of such machines in which two sets of revolving planking rollers are used, arranged one over the other and one set moved longitudinally in one direction while the other set is moved longitudinally in the opposite direction, the felt hat bodies to be planked being fed between the two sets of rollers and being thereby subjected to a combination of pressure and friction. In such machines as at present made the planking rollers are driven by worm wheels, one for each roller, and two long worms, the wheels of one set of rollers meshing with one worm and those of the other set meshing with the other worm. The rollers are also mounted in carriers which work on ball ended studs, and the sets of rollers and carriers have a bodily to and fro movement in the arc of a circle. The mechanism for moving the rollers and carriers to and fro consists of an arrangement of rock shaft, lever arms and links operated by eccentrics. In the working of such machines it has been previously necessary, when requiring to subject the hat bodies to further planking, to pass them through the machine a second or third time, the hat bodies having to be brought from the back to the front of the machine and each time they require to pass through the machine. For the purpose of returning the hat bodies it has been usual to employ two persons, one to feed the hat bodies into the machine, and the other to return them. To avoid the expense of two persons working the machine, or to render the employment of two persons equal to the work done by two machines, it has been proposed to increase the size of the machine by adding almost double the number of rollers. Or, in the alternative, it has been proposed to place one machine in front of another and convey the hat bodies from one to the other by an endless lattice. Both such expedients are unsatisfactory to the hat manufacturer, first, because of the cost, and secondly, be-

cause of the large amount of room taken up by the machine or machines.

One of the principal objects of this invention is to provide a machine which will do the work of the said large single machine, or that of two machines, while only occupying the same floor space and costing very little more than the ordinary machine.

Further objects of the invention are to simplify the driving mechanism of the machine, and to so mount the roller carriers that they and the rollers will move longitudinally in a horizontal, instead of a curved path, and with a minimum of friction.

According to these improvements, the aforesaid worm gearing is done away with and in its place an arrangement of endless chain and chain wheels is provided, the chain wheels being arranged one on each roller spindle and the chain being caused to encircle and gear with all the chain wheels, and also with further sprocket wheels mounted on the shaft from which the rollers receive their rotary motion. Further, the carriers are mounted on anti-friction bearings and move in a horizontal path instead of in the path of the arc of a circle, thereby insuring of a uniform action of the rollers on the hat bodies at all points. For the purpose of avoiding the returning of the hat bodies by hand, and also for the larger purpose of enabling the work of two machines to be done in one, thereby saving in power, materials and space, a third set of planking rollers is provided, which are mounted to move to and fro endwise and are rotated in like manner to those of the other sets. At that side of the machine, usually termed the outlet or delivery side, is a device by which the hat bodies, after passing between and being planked say by the upper and the middle sets of rollers, are caught and directed between the middle and lower sets of rollers, by which they are further planked and carried back to the inlet side of the machine.

Upon the accompanying drawings, Figure 1 illustrates a front elevation (partly broken away), Fig. 2 a right hand end elevation, and Fig. 3 a left hand end elevation of a felt hat body planking machine embodying all the features of the invention. Fig. 4 illustrates the arrangement of three sets of planking rollers and hat-returning device more or less in diagram. Fig. 5 illustrates

a similar view but showing another form of hat-returning device. Fig. 6 illustrates a detail part hereinafter described.

In all the views, where shown, a, a are the end frames of the machine, which are held together, as usual, by stout rods (not shown) and to the floor by suitable holding down bolts and nuts (also not shown).

b is the usual tank which is fastened to and supported by the end frames of the machine and which thereby also helps to hold the frames in position.

c', c^2 are the usual sets of felting or planking rollers and c^3 is the further set forming one of the features of this invention.

d', d^2 are the usual carriers by which the sets of rollers c', c^2 are carried.

d^3 are the extra carriers which carry the extra set of rollers c^3 . The carriers of each set of rollers are held together by cross-rods such as e and bars such as f . Each carrier at its forward and rearward end is mounted on hardened steel balls g , see Figs. 1 and 6, whereby the rollers and carriers, when moved endwise, move with a minimum of friction, and whereby they also move in a straight horizontal line, instead of in the arc of a circle as heretofore. The said ball bearings of the carriers d^2, d^3 are adjustable vertically in order to allow of the sets of rollers c^2, c^3 being adjusted relatively to each other. That is to say, the bearings each comprise steel "shoes" h , one fitted to the carrier and the other to the top end of a vertically adjustable rack i slidably mounted in a recess in the frame end. By means of cross shafts j, j , see Fig. 1, worms k on such shafts, further shafts l, l extending from front to back of the machine, worm wheels m, m and spur wheels n, n on such further shafts,—which latter mesh respectively with one of the racks i ,—and hand wheels o, o on the shaft j, j respectively, both carriers d^2, d^3 of each set of rollers c^2, c^3 may be readily elevated or lowered equally at each end, the spur wheels n on being rotated raising or lowering the racks i and therefore the carriers. By such mechanism the parts are also securely held after adjustment, there being no liability of the racks to move downward under the pressure of the weight of the rollers.

Upon the spindle of each felting or planking roller at one end is a small chain sprocket wheel p , see Fig. 3, and upon a shaft q , running longitudinally below the tank b from one end of the machine to the other, are three further sprocket wheels r . Engaging all of such wheels is an endless sprocket chain s , shown on the drawing in the form of a chain line. As will be seen from the drawing the chain is so wound around the several sets of wheels p that it meshes with a portion of each wheel and in

such manner as to drive the sets of wheels in the directions indicated by the arrows.

Upon the carriers d^2 and d^3 at the left hand end of the machine and at points above the spaces between the wheels p are small studs t and upon each of such studs is a loose sleeve t' against which the outer face of the chain abuts and by which the chain is held to the wheels p .

Secured to the carrier d' at the same end of the machine by studs u and arms u' is a bar u^2 and by such bar is supported a further series of studs v , each carrying a loose sleeve v' . These serve to hold the chain in mesh with the wheels p of the lower set of rollers c' .

For the purpose of taking up any slack in the chain a jockey or tensioning sprocket wheel p' is provided carried at the extremity of a pivoted bell-crank lever p^2 , and adapted to press against the chain, see Fig. 3. The three wheels r on the shaft q allow for a long chain being used and for each set of rollers being driven practically direct from the shaft q . They also allow of the chain engaging the wheels p on the right side and rotating them in the right direction. With the chain passing from one of the wheels r before engaging the next set of wheels p , it allows of the lateral movements of the carriers. The long length of chain in connection with the wheel p' also allows in the event of a hat body getting jammed between the sets of rollers of the one or other of the sets yielding.

The mechanism for moving the roller carriers to and fro, which is arranged on the right hand end of the machine, see Figs. 1 and 2, consists of a shaft w mounted in bearings w' and fitted with fast and loose belt pulleys w^1, w^2 at one end and with an eccentrically mounted block y at the other end. It also consists of a further shaft w^2 whereon is mounted two double-armed levers w^3, w^4 and two single armed levers w^5, w^6 . The arms of the levers w^3, w^4 are respectively connected by links w^7 to the roller carriers d', d^2 . The single armed levers w^5, w^6 are connected by links w^8 to the roller carrier d^3 . The lever arm w^5 also extends downward and at its free end is formed with a slot w^9 in which slidably fits the block y on the shaft w . It will now be seen that with the shaft w in motion the lever arm w^5 will be caused to swing to and fro and the shaft w will be caused to rock, and thereby move the several carriers to and fro, the carriers d', d^3 moving in one direction while the carrier d^2 moves in the opposite direction.

Upon the shaft w is a worm z and upon the shaft q is a worm wheel z' which meshing with the worm receives motion therefrom and transmits it to the shaft q and, through the chain gearing, to the felting rollers. The sets of rollers being thus ro-

tated and moved endwise as aforesaid it will be seen that a very simple and effective construction of multi-roller planking machine is provided.

5 In using the machine, the hat bodies to be planked are fed between the lower and middle sets of rollers, see Figs. 4 or 5. They are then carried forward by the rollers, and while saturated with a hot planking solution, subjected to a combination of pressure and friction until they reach the outlet side of the machine. They are then caught by a curved guide c^4 , see Fig. 4, made say of wood, or by a series of small wood rollers c^5 collectively forming a curved guide, see Fig. 5, and by such guide the hat bodies are directed downward and between the middle and lower sets of rollers. They are then traveled forward by the rollers and again subjected to a combination of pressure and friction until they again reach the inlet side of the machine, when they are delivered on to a table or into a box placed to receive them. Instead of being fed between the middle and upper sets of rollers the hat bodies may be fed between the middle and lower sets of rollers. Instead also of the carrier operating mechanism being on the right hand end of the machine it may be on the left hand end, and the chain drive be on the right hand end instead of on the left hand end.

As aforesaid, by this invention the advantages of the said larger machine, or those of the two ordinary machines, are obtained in a single machine of ordinary size and practically at very little more expense both in making and working as the ordinary machine. Moreover, the hat bodies are planked in less time.

A further advantage is that owing to the anti-friction bearings the machine takes very little power to drive. And with the chain firmly held in mesh with the wheels there is very little loss of movement in the rollers, while, owing to the flexibility of the chain, should a felt hat body get jammed between the sets of rollers the latter are free to yield and prevent damage being done to the hat bodies or to the machine.

What I claim is:—

1. In felt hat body planking machines, the combination of three sets of planking rollers and spindles therefor arranged one above another and in planes parallel with each other, a curved guide at one side of the machine and opposite the spaces between the sets of rollers, a pair of carriers for supporting each set of rollers, one pair also supporting the said guide, bearings for supporting the several carriers which allow the carriers to have a slight lateral to and fro motion, end frames for supporting the bearings, means for imparting to and fro movements to the carriers and rollers and in such

way that the uppermost and lowermost sets of rollers and their carriers move in one direction while the middle set of rollers and their carriers move in the opposite direction, and means for rotating the rollers of the uppermost and lowermost sets in one direction and those of the middle set in the opposite direction, substantially as herein set forth.

2. In felt hat body planking machines, the combination of planking rollers and spindles therefor arranged in sets and in planes parallel with each other, a pair of carriers for each set of rollers, bearings for the said carriers which allow the carriers to have a slight lateral to and fro motion, end frames for supporting the bearings, a chain wheel on the spindle of each roller, a rotary shaft and bearings therefor supported by the end frames, chain wheels on said shaft, means for driving the shaft, an endless chain engaging the wheels on the said shaft and all the wheels on the several roller spindles and in such manner as to cause the rollers of each set to revolve in the same direction and those of one set to revolve in an opposite direction to those of the next adjoining set, and means for taking up the slack of the chain, substantially as herein set forth.

3. In felt hat body planking machines, the combination of planking rollers and spindles therefor arranged in sets and in parallel planes one above another, a pair of carriers for each set of rollers, anti-friction bearings for supporting the pairs of carriers and allowing them to have a slight lateral to and fro motion, racks for supporting the bearings of the carriers of the upper sets of rollers, means for adjusting the racks in sets of four vertically and simultaneously, and end frames for supporting the racks and their adjusting means and also supporting the bearings of the lower set of rollers, substantially as herein set forth.

4. In felt hat body planking machines, the combination of three sets of planking rollers, the several sets being arranged in parallel planes one above another, a curved guide arranged at one side of the machine opposite the spaces between the sets of rollers, a pair of carriers for each set of rollers, one pair also supporting the said guide, bearings for the carriers, means for adjusting the bearings of the carriers of the upper and middle sets of rollers, end frames for supporting the carrier bearings and their adjusting means, a rotary shaft and bearings therefor passing longitudinally below the machine, chain wheels keyed to such shaft at one end, a chain wheel on each planking roller spindle, an endless chain engaging the chain wheels on the said shaft and all the chain wheels on the several roller spindles, a rock shaft and bearings therefor,

two armed levers on such shaft and links
connecting the lever arms to the carriers of
the lower and middle sets of rollers, two
single armed levers also on said shaft and
5 links connecting the arms of such levers to
one of the carriers of the uppermost set of
rollers, and one of said single lever arms
longer than the other, a further rotary shaft
and bearings therefor, fast and loose pul-
10 leys thereon, and a block eccentrically
mounted on the shaft and engaging the end
of the longer single arm, substantially as
herein set forth.

5. In felt hat body planking machines,
15 the combination of three sets of planking
rollers arranged in parallel planes one over
another, a curved guide on one side of the
machine and opposite the spaces between the
sets of rollers, a pair of carriers for sup-
20 porting each set of rollers, one pair of which
support the said guide, bearings for the car-
riers, which allow the carriers to have a
slight lateral to and fro motion, means for
adjusting the bearings of the carriers of the

middle and upper sets of rollers, end frames 25
for supporting the carrier bearings and
their adjusting means, means for imparting
rotary motion to the several sets of rollers,
a rock shaft and bearings therefor, two two-
armed levers on such shaft and links connect- 30
ing the lever arms to the carriers of the
lower and middle sets of rollers, two single-
armed levers also on said shaft and links
connecting the arms of such levers to one of
the carriers of the uppermost set of rollers, 35
and one of said single lever arms longer
than the other, a further rotary shaft and
bearings therefor, fast and loose pulleys
thereon, and a block eccentrically mounted
on the shaft and engaging the end of the 40
longer single arm, substantially as herein
set forth.

In witness whereof I have hereunto set
my hand in the presence of two witnesses.

ALBERT TURNER.

Witnesses:

F. C. PENNINGTON,
P. D. BAILEY.