

No. 606,651.

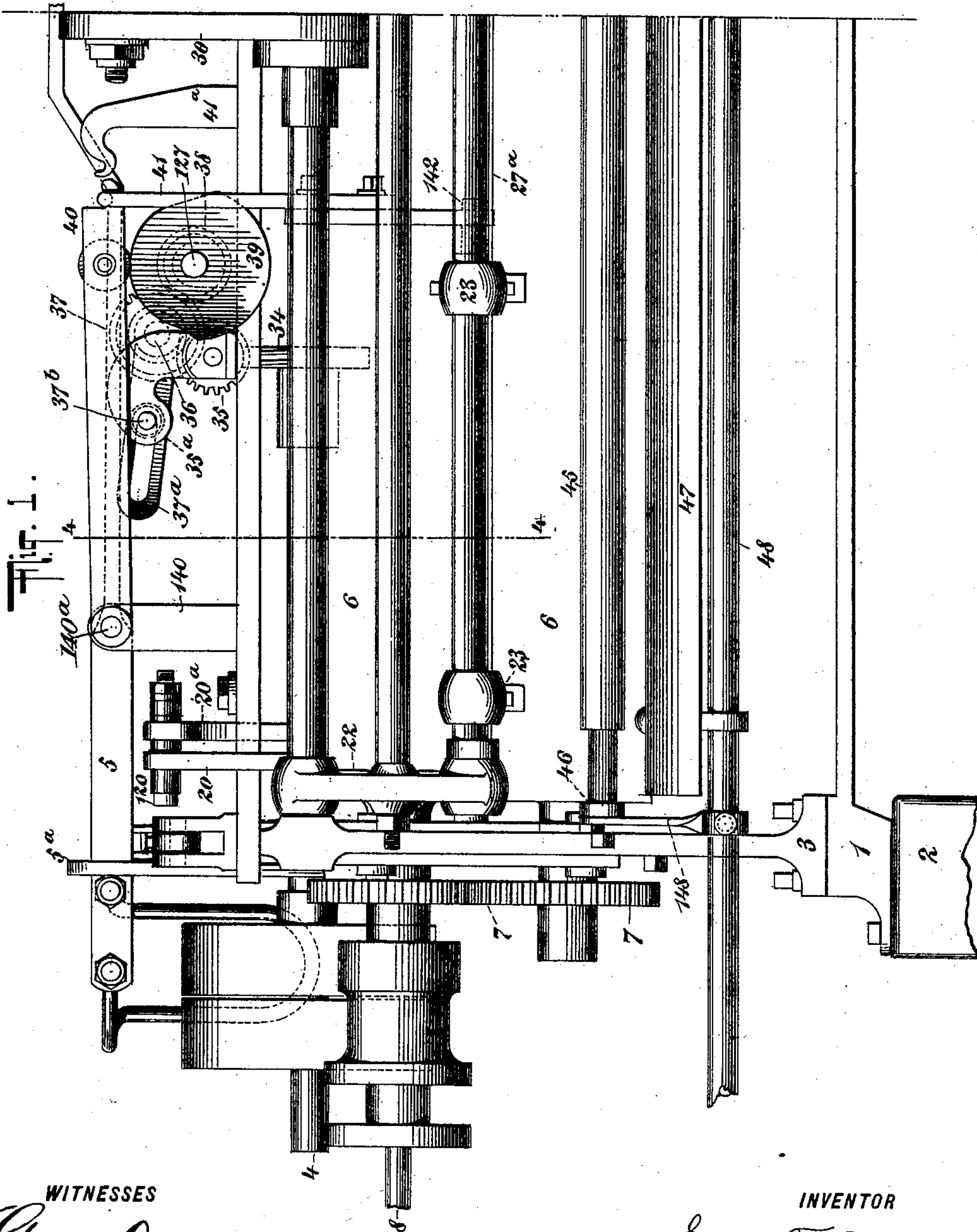
Patented July 5, 1898.

E. F. DONNE.  
PLAITING MACHINE.

(Application filed Feb. 2, 1897.)

(No Model.)

4 Sheets—Sheet 1.



WITNESSES

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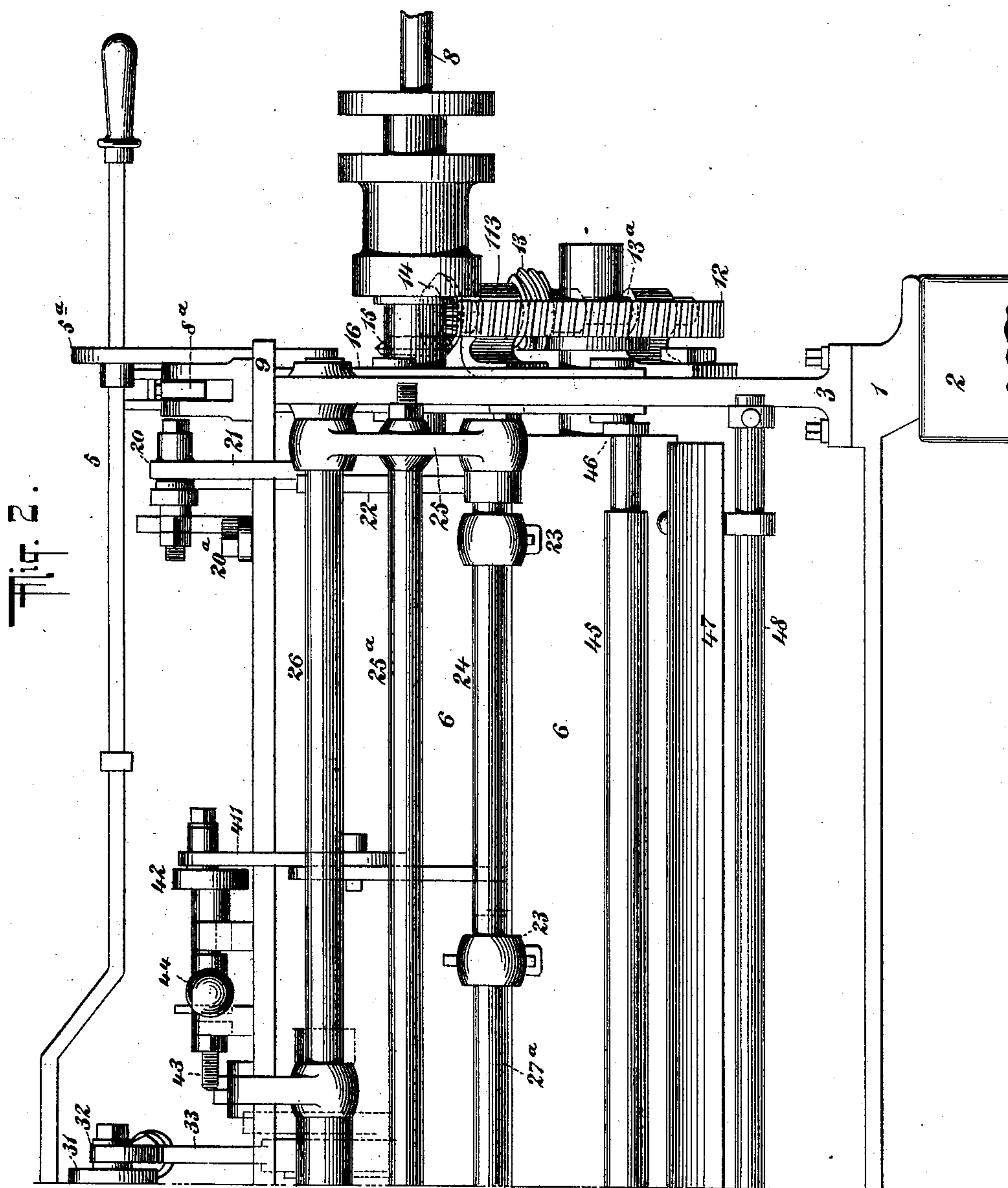
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Fig. 4.

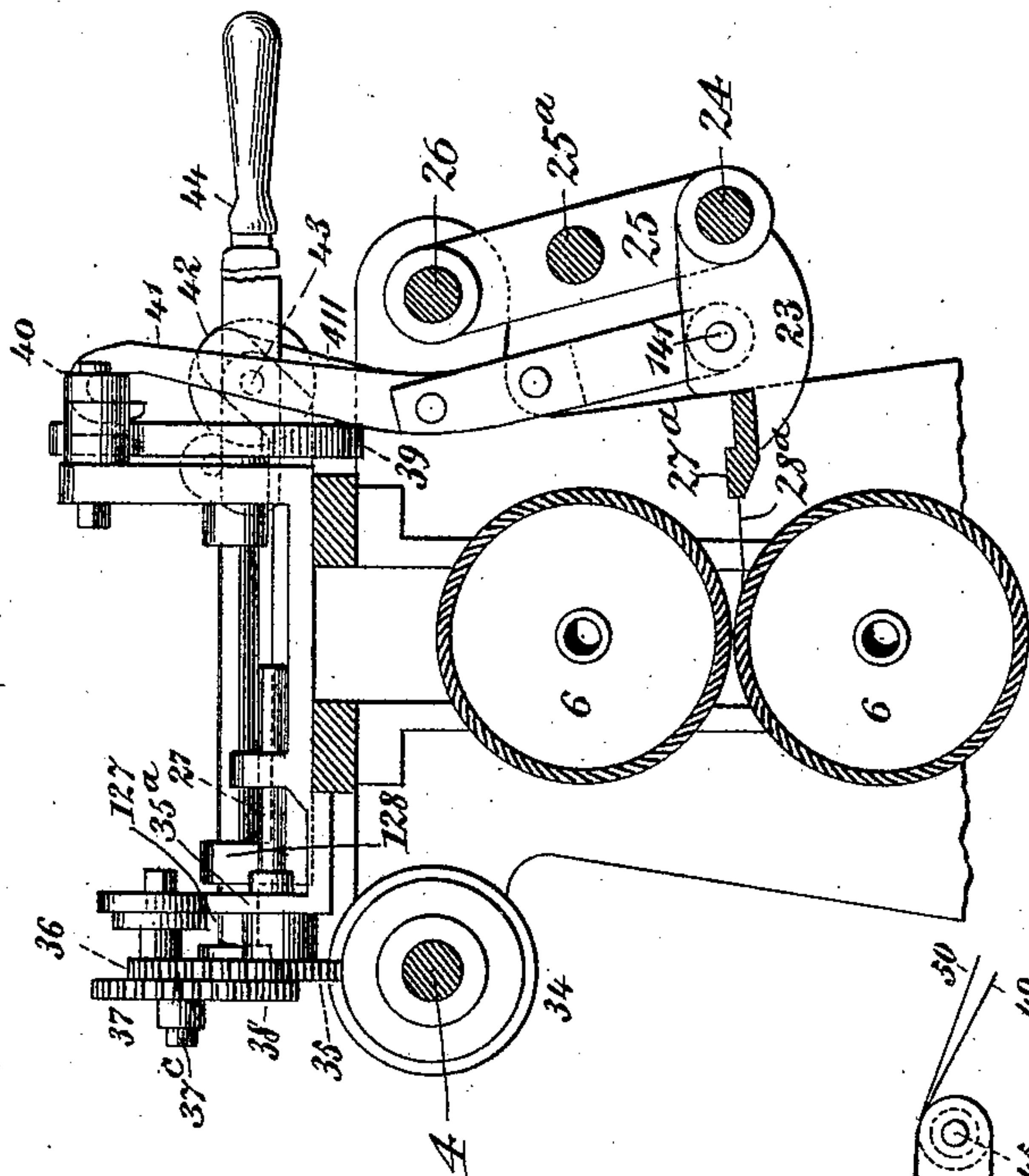


Fig. 5.

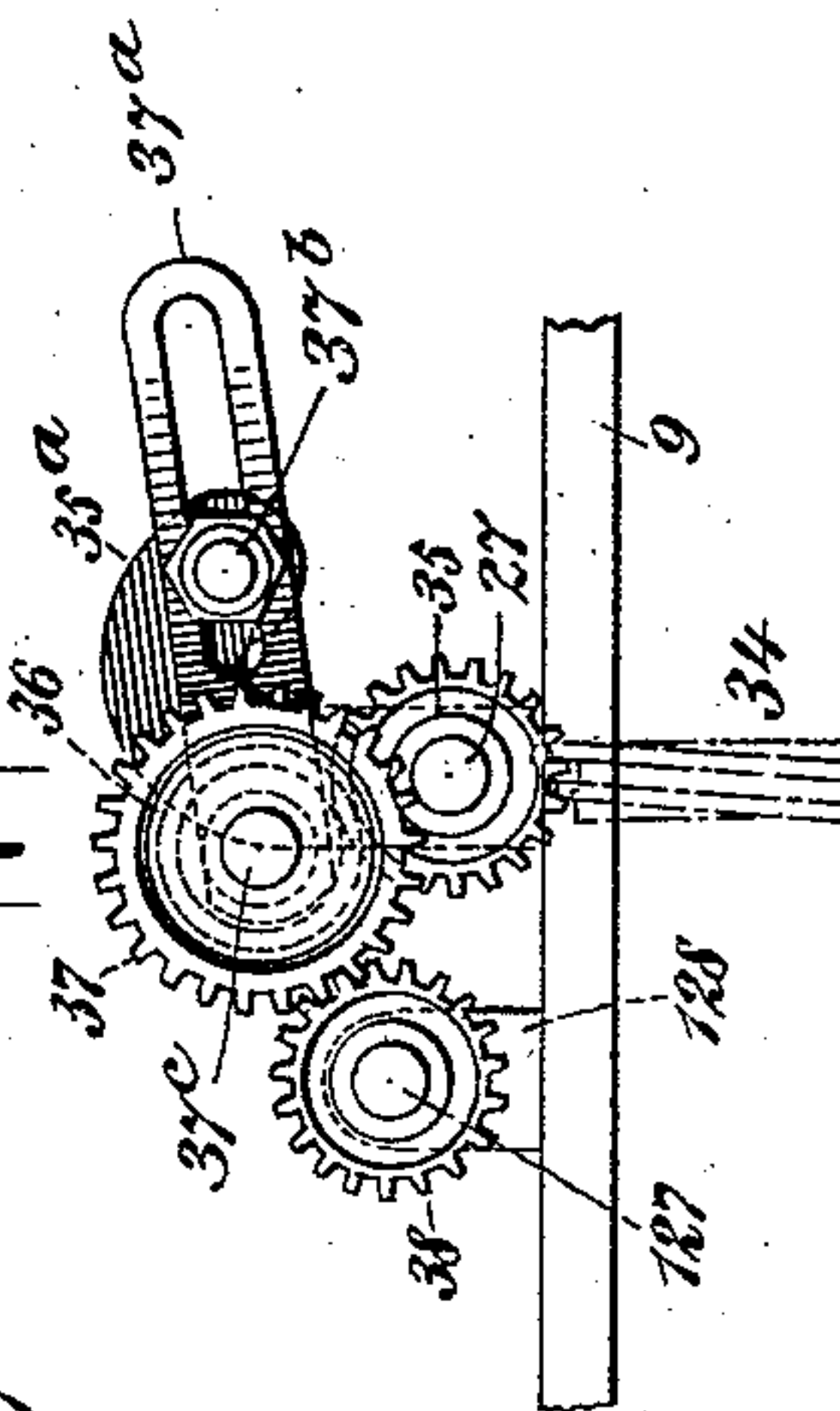
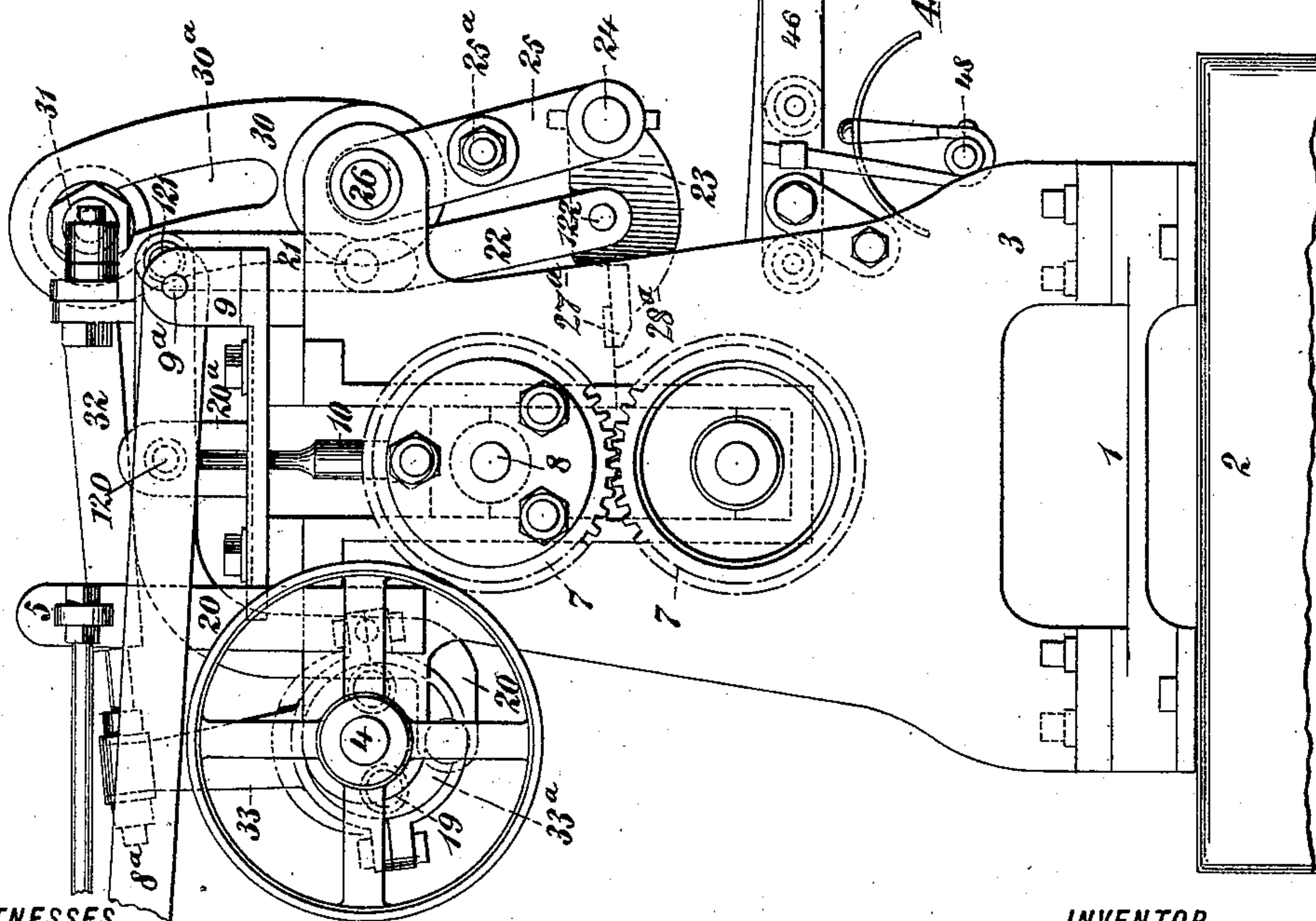


Fig. 3.



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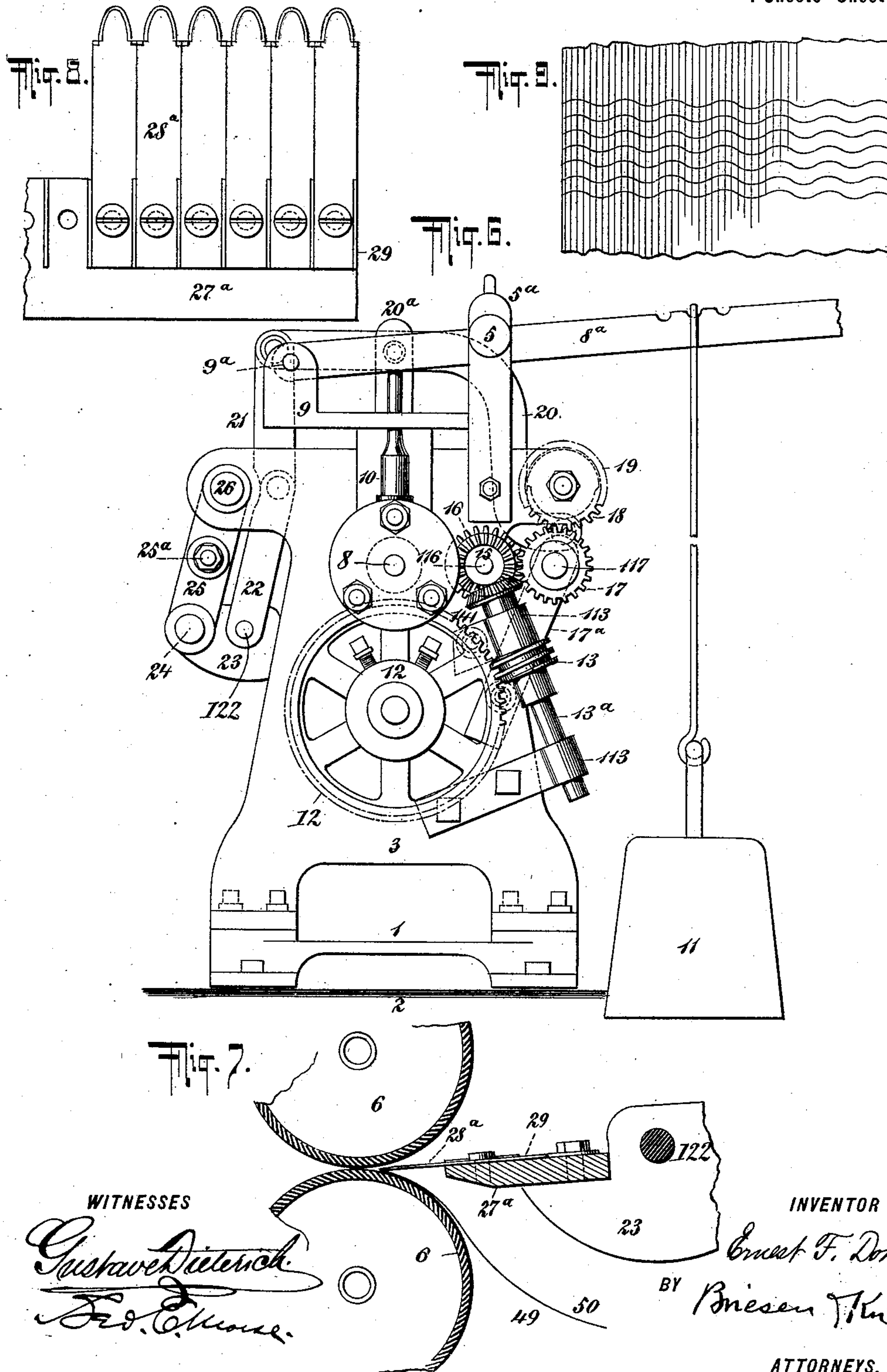
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# UNITED STATES PATENT OFFICE.

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## PLAITING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 606,651, dated July 5, 1898.

Application filed February 2, 1897. Serial No. 621,649. (No model.) Patented in England July 6, 1895, No. 9,890.

*To all whom it may concern:*

Be it known that I, ERNEST FRANK DONNE, residing at the city of London, England, have invented certain new and useful Improve-  
5 ments in Plaiting-Machines, of which the following is a specification, and for which I have obtained a patent in England, No. 9,890, dated July 6, 1895.

My invention relates to plaiting-machines; and it consists in the special matters hereinafter claimed.

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

15 Figures 1 and 2 are front views of the left and right hand halves of a plaiting-machine embodying my invention; Fig. 3, an end view of the left half of the machine; Fig. 4, a sectional elevation of part of the machine, the  
20 section being taken on line 4 4 of Fig. 1. Fig. 5 is a detached view of a worm-wheel and toothed change-wheels, hereinafter referred to. Fig. 6 is an end elevation of the right half of the machine. Fig. 7 is a vertical sectional view, on an enlarged scale, of the sup-  
25 porting-bar and plaiting-blade, looking from the left end of the machine. Fig. 8 shows the blade in detail plan view, and Fig. 9 shows a portion of fabric as plaited.

30 The corresponding parts in each view are indicated by the same figures where necessary.

The special object of my invention is to improve that class of fabric-plaiting machines  
35 employing a moving plaiting blade or blades or plaiting edge or edges and plait-permanentizing mechanism for permanentizing the plaits imparted to a fabric by the plaiting blade or edge.

40 The improvements are mainly directed to mechanical organs for carrying out the operations described, it being understood that the invention is not limited to the details set forth.

45 The machine herein shown comprises pressing-rollers for permanentizing the plaits, a plaiting edge which has a compound motion and coöperates with the rollers, and various means for rendering the edge effective or in-

effective. These last-named means are preferably automatic means for moving the edge  
50 into a position where it will be inoperative to plait the fabric.

The form of plaiting-machine shown consists of the following parts: A bed-plate 1 is  
55 supported by blocks 2. End standards 3 are bolted to the bed-plate and form bearings for a cam-shaft 4 at the back of the machine. The left end of the shaft 4 is provided with a loose pulley and a fast driving-pulley around  
60 which a belt is passed from a main shaft. The belt may be shifted by a bar 5, provided with a handle at the right end and sliding in brackets 5<sup>a</sup>, secured to the standards. The  
65 standards are slotted vertically at the center and provided with bearings for two pressing-rollers 6 or plait-permanentizing means, which are revolved simultaneously, being geared together by toothed wheels 7, secured on the  
70 left end of the roller-axes. The lower roller drives the upper roller. Both rollers are hollow, the upper or driven roller being heated by steam admitted through a supply-pipe 8 at either end and escaping at the other end. When thick fabrics are to be plaited, the  
75 lower roller may be supplied with steam in like manner if requisite.

The upper roller is pressed onto the lower one by a lever 8<sup>a</sup> at each end, (see Fig. 6,) each lever 8<sup>a</sup> being journaled on a pin 9<sup>a</sup> in  
80 a fork projecting from the ends of a tie-bar 9, secured to the top of each standard. Each lever rests on a vertical pin 10, projecting from the top of the roller-bearing, the back end of each lever being notched on its upper  
85 edge to receive the upper end of a hooked rod provided at its lower end with a weight 11. (Shown only in Fig. 6.)

The revolution of the lower or driving roller is continuous and is effected by toothed gear-  
90 ing (shown at the right end of Fig. 2 and at Fig. 6) actuated as follows: The axle of the said lower roller 6 at the right end is provided with a toothed wheel 12, driven by a worm-wheel 13, secured on a shaft 13<sup>a</sup>, revolving in bear-  
95 ings 113, secured to the right end standard 3. The upper end of the shaft 13<sup>a</sup> carries a miter gear-wheel 14, gearing into a similar wheel



15, (see Figs. 2 and 6,) secured to the boss of a toothed wheel 16, both of said wheels 15 and 16 revolving on an axle 116, projecting from the standard 3. The wheel 16 engages with a toothed wheel 17, revolving on an axle 117, carried by an arm 17<sup>a</sup>, secured to the standard. The wheel 17 engages with a wheel 18, secured on the right end of the cam-shaft 4.

10 The plaiting-blade 27<sup>a</sup> coöperates with the rollers 6 6 to bring the fabric up to the meeting faces of the rollers in a folded or plaited condition, which folds or plaits are permanentized by the rollers. This blade is usually given a reciprocating motion and a rising-and-falling motion. The rising-and-falling motions may be imparted as follows: The cam-shaft 4 carries two cams 19 between the end standards. (Shown by dotted lines in Figs. 3 and 6.) Each cam operates a truck-bearing lever 20, one at each end of the machine, rocking on an axle 120, (see Fig. 1,) projecting from a bracket 20<sup>a</sup>, secured to the tie-bar connecting the standards. The front end of the lever 20 carries an axle-pin 121, (see Fig. 3,) on which a link 21 rocks, its lower end being hinged to a link 22, rocking on an axle 122, projecting from a bracket-bearing 23, secured to and rocking with a shaft 24, carried at each end by the lower end of a bearing-arm 25, secured to a tie-rod 25<sup>a</sup>. The upper end of the bearing-arm 25 is rigidly secured to a shaft 26, rocking in bearings in the end standards. The bracket-bearings 23 are pivoted to the arms 25 and carry a plaiting-blade 27<sup>a</sup> the length of the pressing-rollers. The arms 25 and bracket-bearings 23 constitute a connection intervening between the rocking or oscillating shaft 26 and the plaiting-blade. This blade 27<sup>a</sup> is provided with stop-bits 29, between and against which narrow bevel-pointed blades 28<sup>a</sup> are secured. (Partly shown in plan at Fig. 8 and in edge view at Fig. 7.) The undulated edge constituted by the adjacent blades 28<sup>a</sup> constitutes an undulated plaiting edge. The rocking of the bracket-bearings 23 causes the plaiting edge to be alternately lifted clear of the fabric to be plaited and then pressed onto it. It will be observed that the plaiting-blade does not in this instance itself reach contact with the fabric, although the plaiting edge carried by the said blade does reach contact therewith. I would have it understood, however, that whenever I use the term "plaiting-blade" I mean to thereby include any moving device by which plaits are formed, whether the said device be itself provided with a plaiting edge or merely carry a plaiting edge, as in the present case.

As before mentioned, in addition to the above-described movements, the blade and plaiting edge are advanced toward and retracted from the pressing-rollers, which may be accomplished by the following means: At

the center of the machine the shaft 26 has an arm 30 secured on it provided with a curved slot 30<sup>a</sup>, in which an axle 31 may be adjusted vertically and secured in its adjusted position in said slot. The axle engages with a link 32, (see Fig. 3,) screw-threaded at its back end and provided with lock-nuts to adjust it in the arm 33, operated by the eccentric 33<sup>a</sup> on the shaft 4.

Fabrics are sometimes required to be plaited across their width for portions only of their length, the plaited portions alternating with plain or unplaited portions. For this purpose I provide automatic means for moving the blade at predetermined times into a position where it will be ineffective to plait the fabric. The apparatus which I preferably employ consists of a worm-wheel 34, secured on the cam-shaft 4 and gearing into a toothed wheel 35, (shown in Figs. 1, 4, and 5,) secured on a short shaft 27, revolving in a bearing-bracket 35<sup>a</sup>, secured to the top of the tie-bar 9. The wheel 35 gears into and drives a toothed wheel 36, secured to the front side of a third toothed wheel 37, engaging with a wheel 38, secured on the back end of a shaft 127, revolving in bearings 128, projecting from the tie-bar and provided at its front end with a cam 39, which operates a truck-bearing lever 40, (see Fig. 1,) rocking at its left end on a stud 140<sup>a</sup>, projecting from an arm 140, secured to the tie-bar. The right end of the lever 40 is formed with a hook to receive the upper end of a link 41, the lower end of the said link loosely surrounding an axle 142, projecting from the intermediate bracket-bearing 23, secured to and rocking with the shaft 24.

The cam 39 has one half its circumference of greater diameter than the other half. While the lowest half of the cam is under the truck the plaiting-blade is lowered to reach contact with the fabric, and the rising-and-falling motion is given by the apparatus provided for that purpose. When the highest half of the cam is under the truck, the blade or blades are held up above the fabric and pass into the space between the pressing-rollers 6 without plaiting the fabric.

When the fabric is required to be plaited its whole length, the link 41 is unhooked from the lever 40 and hooked onto an arm 41<sup>a</sup>, projecting from the tie-bar 9, so that the cam 39 can vibrate the lever 40 without affecting the link 41, the other motions of the plaiting-blade being effected as usual.

It will be understood that when the blade has been lifted by the higher portion of the cam 39 the links 21 and 22 will be ineffective to raise and lower the plaiting-blade under these circumstances, the motion of the link 21 merely causing the link 22 to swing on its pivot 122, the links being suitably pivoted together for this purpose.

While the fabric to be plaited is being



placed in the machine the blade or blades may be lifted by another link 411, (see Fig. 2,) whose lower end loosely surrounds and rocks on the axle 141, projecting from the intermediate bracket-bearing 23. The upper end of the link rocks on an axle projecting from a disk 42, secured on a shaft 43, carried by bearings secured to the tie-bar and provided with a handle 44 for use of the attendant.

When longer and deeper waved plaiting is required, the blades 28<sup>a</sup> are removed and broader bevel-pointed blades are substituted, and when the width of the plain or waved plaits is required to be greater than those shown at Fig. 9 the axle 31 in the slotted arm 30 is adjusted nearer to the shaft 26.

While the cam 39 revolves once the worm-wheel 34 and cam-shaft revolve eighteen times, making nine plaits on one half the cam and not plaiting on the other half of the cam.

When a greater or less number of plaits are required in a given length of fabric, the operation is effected as follows: The wheels 36 and 37 revolve on an axle 37<sup>c</sup>, projecting from a slotted arm 37<sup>a</sup>, adjustable on a stud 37<sup>b</sup>, projecting from the upper end of the bearing-bracket 35<sup>a</sup>. (See Fig. 1.) The change-wheels 36 and 37 are changed for wheels of a smaller diameter for a greater number of plaits or for wheels of a larger diameter for a less number of plaits. By means of this interchangeable wheel-gear the period and frequency of the rotation of the cam 39 may be governed, the said gearing constituting an adjustable means intervening between the main driving-shaft 4 and the cam 39 to regulate the motion of the cam.

Beneath the bracket-bearings are rollers 45, carried by arms 46, secured to the end standards, the front roller being covered by carding or other suitable rough material. Beneath the central roller is a curved sheet of iron 47, supported by arms secured to a gas or gas and air supply pipe 48, perforated for jets in the usual way, the pipe 48 being carried by two hooked brackets secured to the arms 46. The plaiting may be effected as follows: A piece of calico or linen 49 is dipped in water and passed between the rollers of a mangle. One end of it is placed under the plaiting-blade and between the pressing-rollers 6, the fabric 50 to be plaited being placed upon it. The calico and fabric as they are drawn to the pressing-rollers pass over the rollers 45 above the gas-heated curved plate 47, the heat from which partly dries the calico. The steam arising from the calico 49 damps the fabric 50, both being folded as the plaiting-blade 27<sup>a</sup>, carrying the blades 28<sup>a</sup>, is moved inward, as shown at Fig. 8, until the pressing-rollers 6 draw the plaited fabrics clear of the blades as they are moved outward, the blades being raised during the outward movement and then lowered onto

the fabric ready for the inward movement to make the next plait.

The drying of the fabrics is effected as they pass through the pressing-rollers, whereby the plaits imparted by the plaiting-blade are permanentized.

After the fabric has been plaited the dried calico is stripped therefrom and again wetted and passed between the mangle-rollers to be ready for damping the next length of fabric to be plaited. The calico may, however, be dispensed with and the fabric dampened by other means.

What I claim, and desire to secure by Letters Patent, is—

1. In a plaiting-machine, the combination of continuously-rotating pressing-rollers, a plaiting-blade, means for reciprocating the same, comprising an oscillating shaft 26, a connection intervening between the shaft and the plaiting-blade to which the plaiting-blade is pivoted, a slotted arm rigidly mounted upon the shaft 26, a cam-operated link adjustably connected to the slotted arm to oscillate the shaft, and a positively-acting means for positively raising and lowering the plaiting-blade, substantially as described and for the purposes set forth.

2. A plaiting-blade for plaiting-machines comprising a plaiting-blade 27<sup>a</sup>, provided with stop-bits 29 at an angle to the length of the blade, and a plurality of bevel-edged blades 28<sup>a</sup> secured to the blade 27<sup>a</sup> with which blades the stop-bits cooperate to lock the said blades from swinging on their fastenings.

3. In a plaiting-machine, the combination of a plaiting-blade, a link 41 for lifting the same into an inoperative position, actuating mechanism for raising the said link, and a support 41<sup>a</sup>, the said link being readily disengageable from its actuating mechanism and capable of engagement with the support 41<sup>a</sup> so as to hold the blade permanently in an inoperative position when desired.

4. In a plaiting-machine, the combination of plait-permanentizing means, a plaiting-blade, means for oscillating the same, a positively-acting means for raising and lowering the said plaiting-blade positively, and means for moving the plaiting-blade into a position where it will not be operative to plait the fabric, comprising in its structure a cam 39, a gearing driven from the main shaft for driving the said cam, a support 35<sup>a</sup>, an arm 37<sup>a</sup> adjustably carried by the said support and carrying one of the gears 37 of the gearing for driving the cam, whereby the said arm 37<sup>a</sup> may be adjusted in its support so as to adjust the gearing 37 with respect to the other gears, substantially as described.

5. In a plaiting-machine, the combination of plait-permanentizing means, a plaiting-blade cooperating therewith to plait a fabric, and means for oscillating the said blade, comprising in its structure a shaft 26 having arms



25 rigidly secured thereto from which the blade is pivotally suspended, means for swinging the said shaft whereby the blade is reciprocated and means for intermittently swinging the blade on its pivot comprising a cam operating to raise and lower the blade and adjustable means intervening between the driving-shaft of the machine and the cam to regulate the motion of the cam.

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