

No. 644,498.

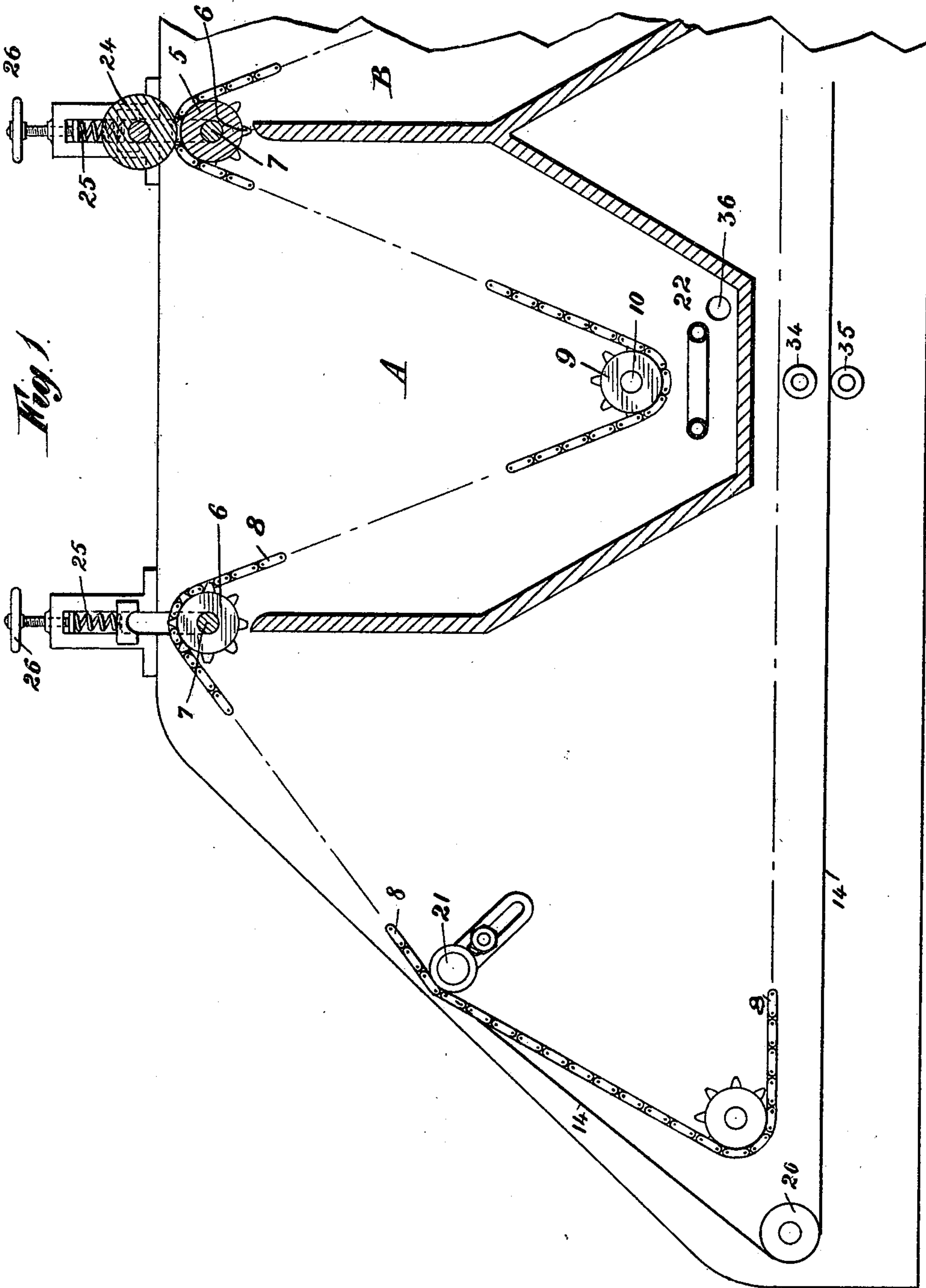
Patented Feb. 27, 1900.

E. S. COOK.
WASHING MACHINE.

(No Model.)

(Application filed May 22, 1899.)

8 Sheets—Sheet 1.



Witnesses
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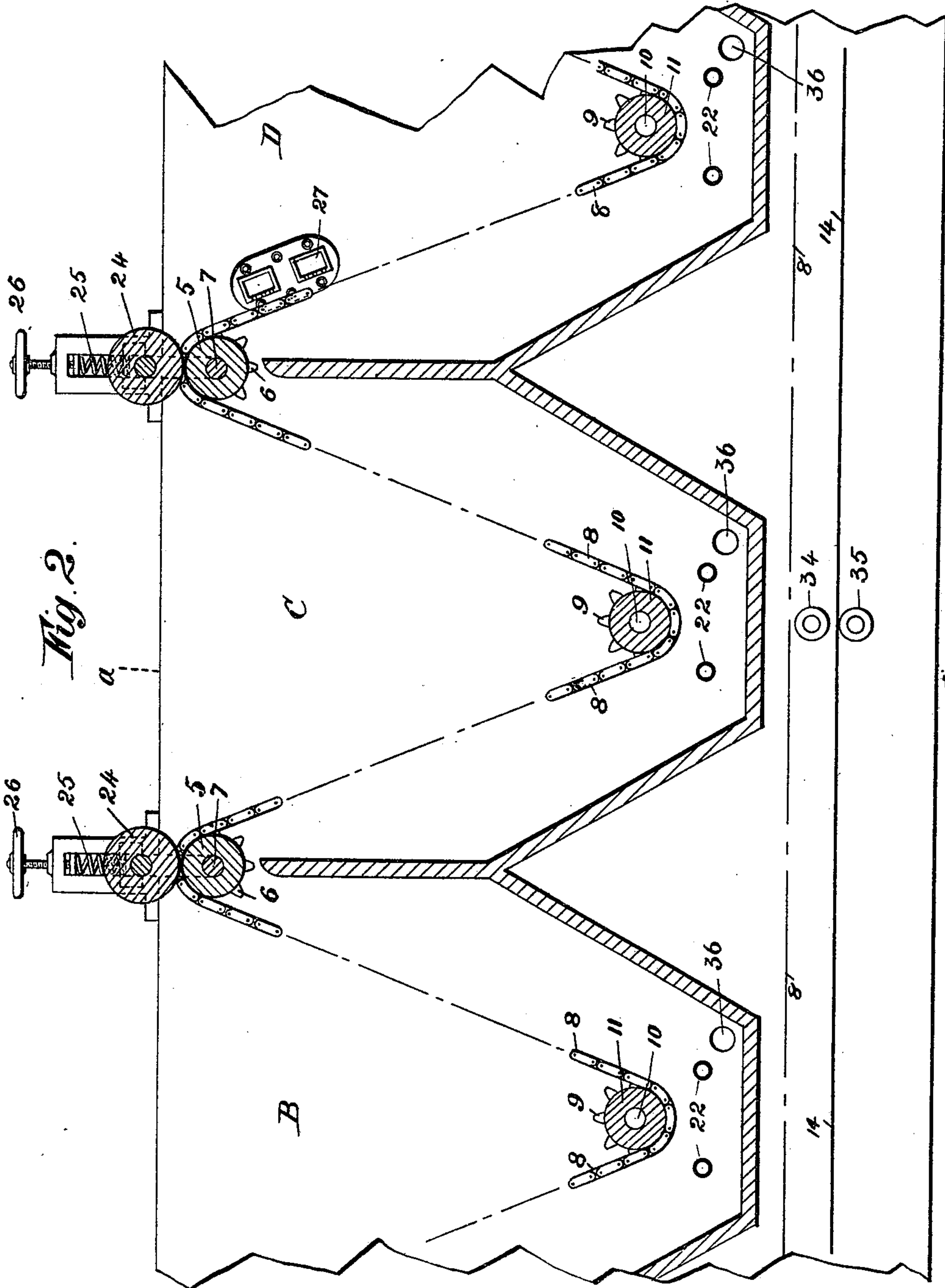
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8 Sheets—Sheet 3.

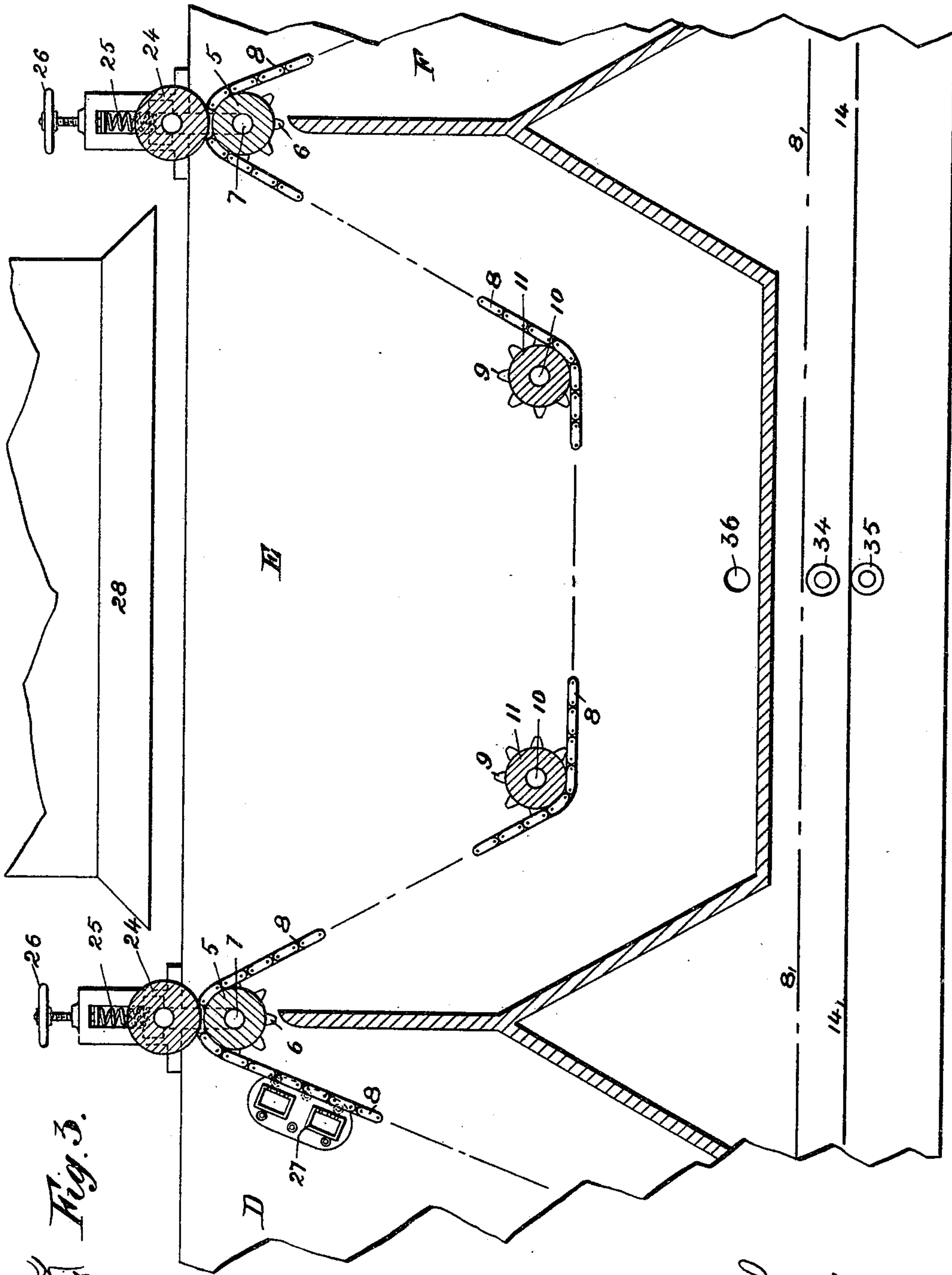


Fig. 3.

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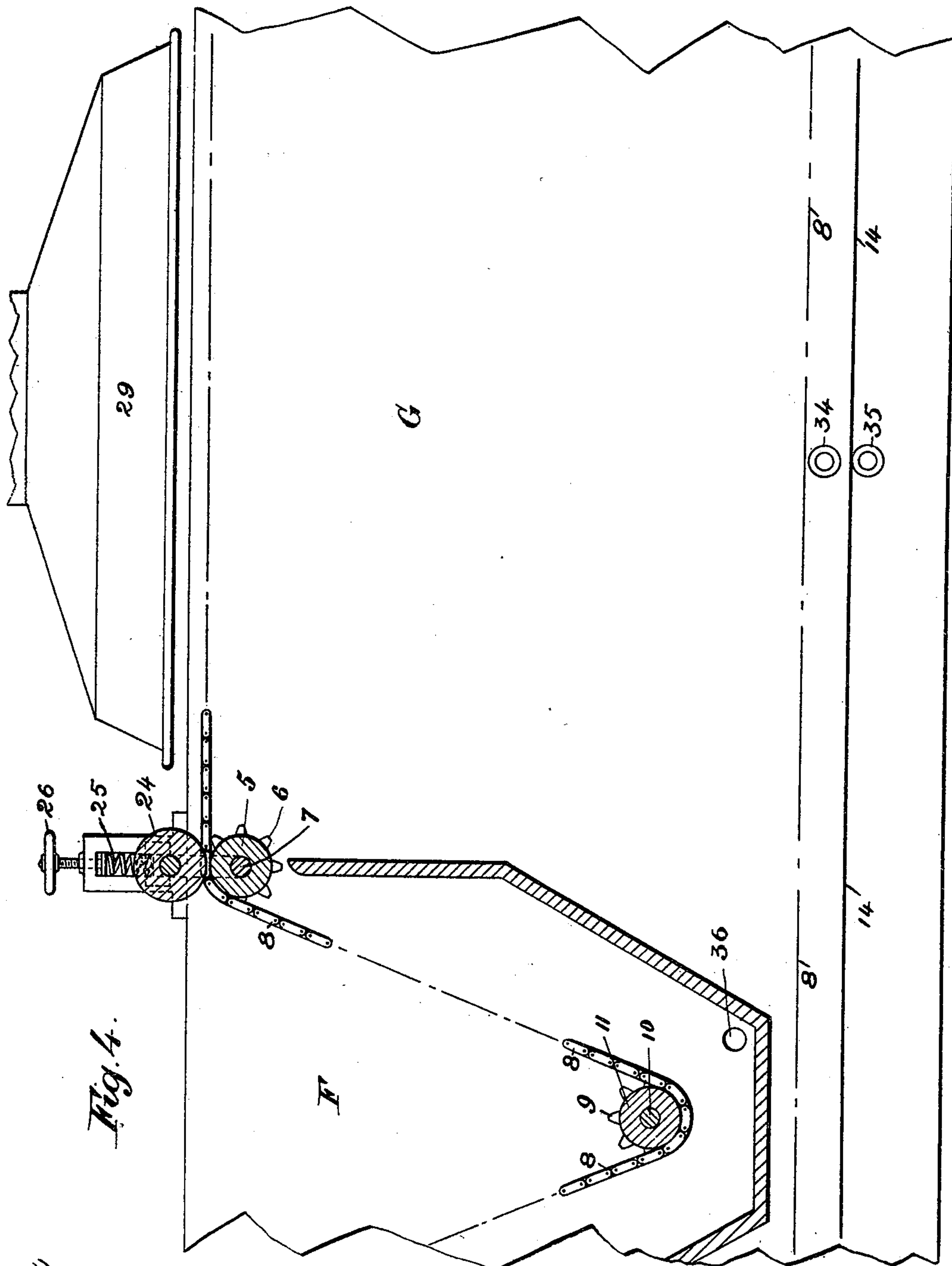
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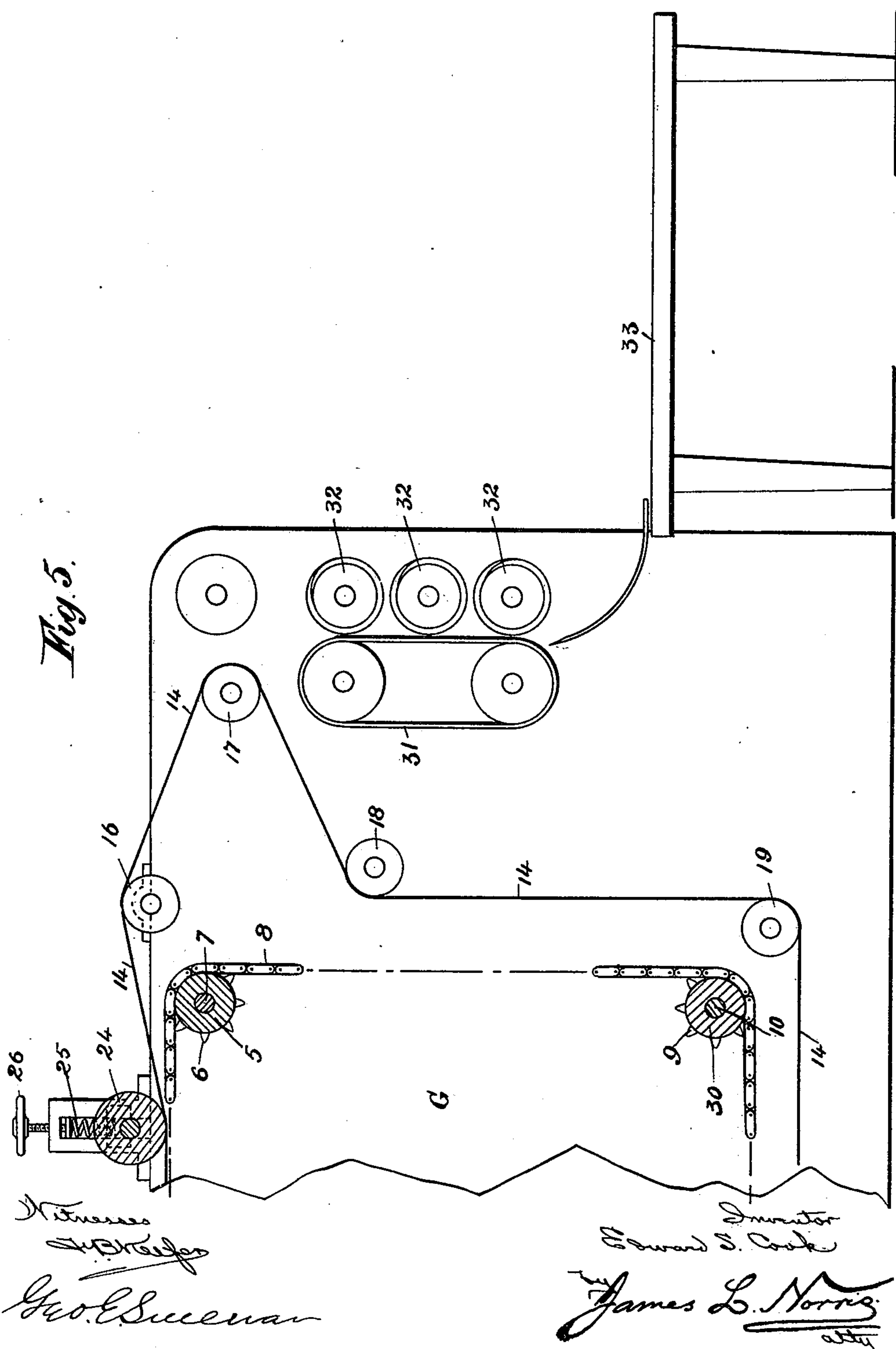
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8 Sheets—Sheet 5.



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8 Sheets—Sheet 6.

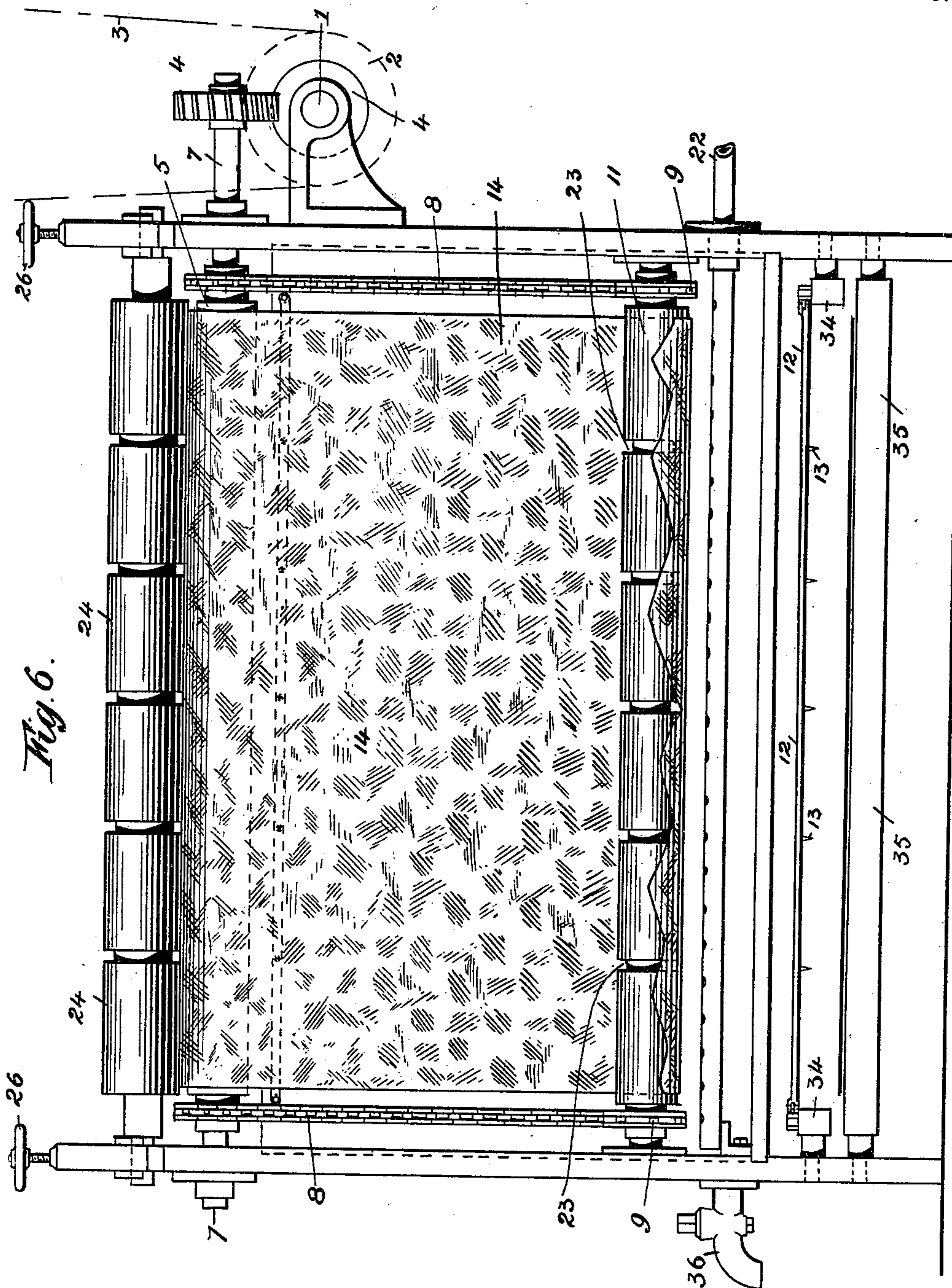


Fig. 6.

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8 Sheets—Sheet 7.

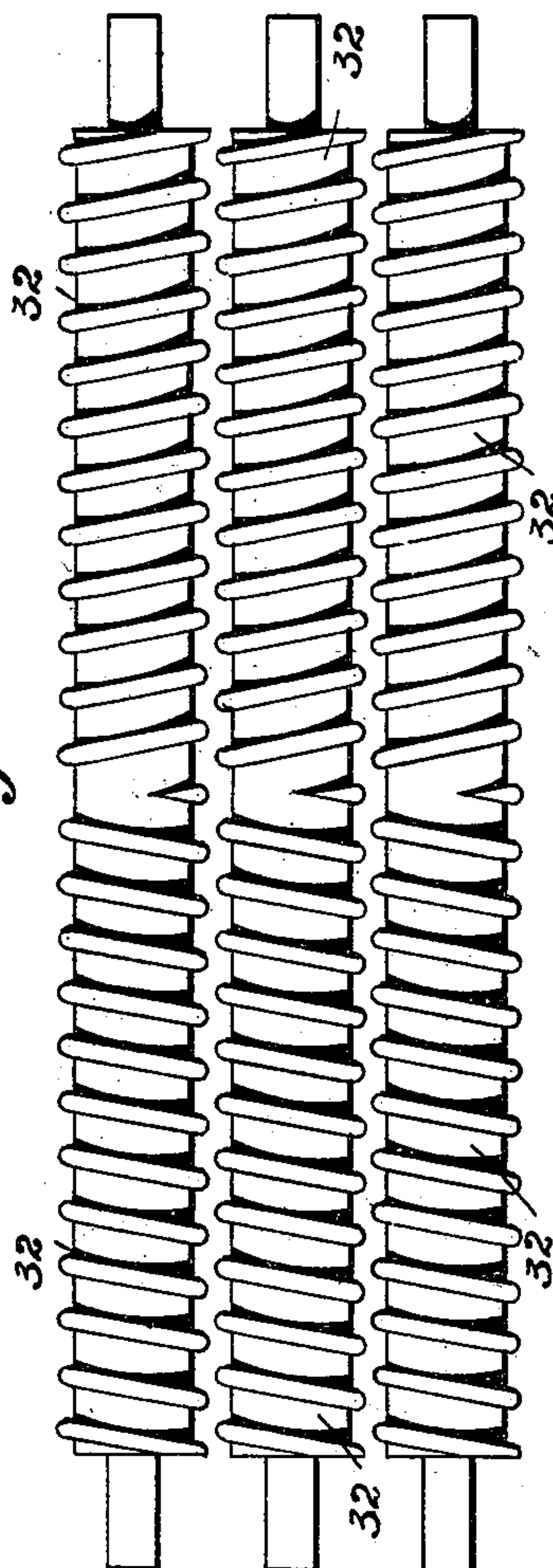
Fig. 7.



Fig. 8.



Fig. 9.



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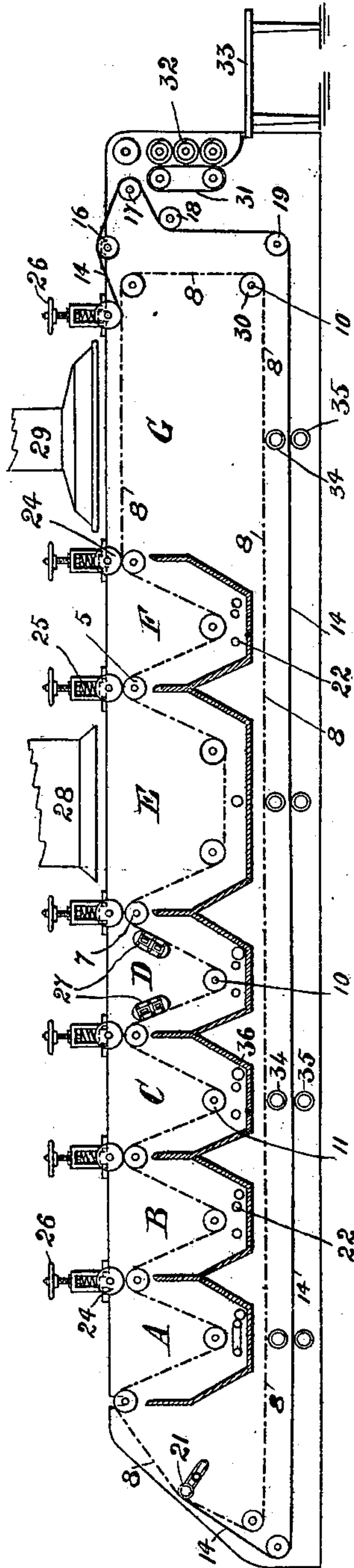
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(No Model.)

8 Sheets—Sheet 8.

Fig. 10.



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UNITED STATES PATENT OFFICE.

EDWARD SAMUEL COOK, OF LONDON, ENGLAND.

WASHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 644,498, dated February 27, 1900.

Application filed May 22, 1899. Serial No. 717,767. (No model.)

To all whom it may concern:

Be it known that I, EDWARD SAMUEL COOK, a subject of the Queen of Great Britain, residing at 274 South Lambeth road, London, England, have invented certain new and useful Improvements in Washing-Machines, of which the following is a specification.

This invention relates to certain means and apparatus connected with the washing or cleansing of household linen—such as sheets, blankets, and the like—which can be laid open upon an endless traveling band and be conveyed by such band through a series of soapy or other baths or tanks and in transit be passed through wringers in succession and then be subjected to the action of steam-spray and then passed through a bluing-bath and a starch-bath also, if desired, and finally to spread out hot-air currents for drying the articles before removal or sufficiently dry to be placed in a hot closet for completely drying them, the several operations being followed in succession mechanically and without hand labor.

The invention is as follows: A contiguous series of tanks are supplied with guide-rollers, around which a band is passed sinuously and from tank to tank, each tank being also provided with wringers by which the surplus water of each bath is returned. The band then travels over a screen in the next or subsequent tank and under a spray of steam, which drives through the meshes and forces the remaining dirt out of the household fabric articles which had been arranged upon the band, and those next travel through clean-water tanks and again through wringers, after which they are subject to a driving current of hot air to dry or partially dry them; but previous to this they can pass through a blue-water bath or, if desired, a starchy-liquid bath while still on the band before being subjected to the hot-air treatment, after which, if sufficiently dry, they can be assorted and packed, or they can be removed to a hot closet or to the calenders for the final drying. The first bath may have hot or cold water for soaking the articles or may have a hot somewhat strong soapy soda solution, and as the articles travel down and to and fro through the liquid the dirt is first thereby attacked and materially removed. They then pass between wringers and

out into the next tank, wherein is a soapy soda liquid of weaker solution and in a boiling condition. The traveling action in this tank by the rollers causes the dirt to be removed, or nearly so, from the articles, and then from the wringers of this tank, or after again passing through a stronger-solution tank, if necessary, they pass under the steam-spray, which completes the cleansing. The next tank may contain clear water or be provided with a water-sprayer, from which the material passes after being wrung to a tank containing the blue for toning the articles, or it may be the starchy solution or a combined solution for toning and stiffening purposes, after which they are again wrung and carried through a chamber for hot-air drying. The endless band on which the articles are arranged is moved along by power communicated to the rollers and wringers in any desired manner and speed, and the return of the band may be from beneath the tanks or by overhead guide-rollers.

My invention is represented on the annexed drawings.

Figure 1 is a longitudinal section of entry end of machine with first wash or soaking trough; Fig. 2, a longitudinal section of a continuing portion of the machine, showing the second, third, and fourth troughs; Fig. 3, a longitudinal section of the rinsing and shower trough; Fig. 4, a longitudinal section of bluing and starching trough and part of drying-compartment; Fig. 5, a longitudinal section of delivery end of machine; Fig. 6, a transverse section of machine through lines *a a* of Fig. 2; Fig. 7, a side elevation, and Fig. 8 a plan, of one of the pin-bars; Fig. 9, an elevation of three spirally-ribbed rollers for removing creases and spreading out the fabrics at delivery end of the machine. Fig. 10 is a view, partly in longitudinal section and partly in elevation, of the parts of a complete machine connected together in operative relation.

The machinery and the working are as follows: A horizontal shaft 1, driven by pulley 2 and strap 3 from overhead or otherwise, transmits the motion by worm-gear 4 to all the upper band-carrying rollers 5 for rotating toothed wheels 6 on the roller-axes 7, said shaft 1 being continued along the whole length

of the machine on the outside. The toothed wheels 6 of each trough are driven at the same speed, and the teeth are shaped to enter between the links of the endless chains 8 for their propulsion, other toothed wheels 9 being within and near the bottoms of the troughs, respectively, and on axles 10 of annularly-grooved rollers 11, so that the chains 8 are led down and up through the troughs in succession.

12 12 are bars with pins 13 and have their ends connected with the chains 8, and the pins are of such a length that they pass through horsehair or like open-worked webbing 14 as to afford sufficient nip to cause the horsehair webbing to travel with the chains 8 into and out of the troughs in succession until automatically released from the pins 13 by traveling over a guide-roller 16 at a higher level, as seen at Fig. 5, said horsehair endless band then passing around guide-rollers 17, 18, and 19 under the several troughs back to the entry end of the machine, where by the guide-rollers 20 it is led up to the adjustable roller 21, where it comes into line with the chains 8, and pins 13 pass through the horsehair band, again ready for the reception of the sheet, blanket, or other like household linen to be washed.

30 The linen to be washed is spread out flat and hooked over the pins. It is thus carried through the first wash or soaking water in trough A, Fig. 1, which water is heated by steam in the pipe 22 near the bottom of said trough to the desired temperature. The linen, with the horsehair webbing 14 and chains 8, then travels under the roller 11, which has annular grooves 23 in it to allow the pins 13 to pass freely, and then up and over the plain roller 5, above which is a rubber-covered roller 24, pressed down by springs 25 and adjustable as to pressure by the hand-wheel 26. This rubber-covered roller 24 squeezes back the excess of water taken up by the linen and the horsehair webbing and returns it into the trough A. The linen, the horsehair webbing 14, and the chains 8 next pass into trough B, containing a fairly-hot yet weak solution of soap and soda to attack any dirt the linen may possess, from whence after passing under the roller 11 it rises up and travels between the roller 5 and the squeeze-roller 24, which by pressure returns the superfluous water back to the trough B. The linen still on the horsehair webbing 14 then passes through trough C in the same manner, said trough containing a strong solution of soapy water. The linen, with the band 14 and chains 8, then passes between the rollers 5 24 to squeeze out any dirt remaining and all particles of solid matter, such as soap, which the linen may have adhering to it and not completely removed by the previous treatment, and to further insure this I pass the linen through trough D, similarly provided with rollers, and in which trough I employ steam-boxes 27, having perforated bottoms whereby

to cause jets of steam to impinge upon and by their force to pass through the woven meshes of the linen both in entering and leaving said trough D to thoroughly and perfectly render the linen clean. The linen next passes between the roller 5 and the squeeze-roller 24, from which it again descends in trough E, which is empty, but is subject to a powerful shower or heavy spray of water from the overhead tank 28, for rinsing the linen previous to its entry into the trough F, containing blue water and starch for color-toning and stiffening the linen, and then direct to the drying-compartment G, where a powerful current of hot air is thrown from the hood 29 onto the linen. The linen by the squeezing action of the upper rollers of each trough is rendered fairly dry before again being wetted by the waters through which it has to pass in succession. As the linen and the horsehair band are leaving the drying-compartment G they are caused to rise by passing over the roller 16 to dislodge the pin-points 13 of the chain cross-bars 12 therefrom, the chains 8 continuing their travel to and under the roller 30 back to the front end under the machine. The detached horsehair band 14, with the linen lying on, it passes over the elevated roller 16 and thence over roller 17, where the linen becomes freed and passes or is led down between the endless band 31, against which it becomes pressed by reverse spirally-ribbed rollers 32 and by them drawn downward simultaneously with a spreading-out action to flatten the washed article out squarely and ready for delivery onto the table 33 for folding by an attendant or attendants or through an ironing-machine of the usual construction before the folding. Thus the process of washing sheets or articles of like character—such as counterpanes, serviettes, blankets, and like household linen—is continuous and mechanically effected in a machine without manual labor except for entering the articles in a dirty or soiled condition and their reception in a cleaned and fairly-dry condition, in some cases the articles being blue-colored and starched or blue-colored only before the drying or starched only before the drying.

34 and 35 are rollers for guiding and supporting the chains 8 and endless band 14, respectively, under the troughs.

36 is a draw-off cock, one being fitted to each trough.

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

1. In a washing-machine, the combination with a series of troughs of endless chains, a series of rollers on which said chains are mounted and so arranged as to guide said chains into and out of each trough in succession and then under the entire series of troughs, a series of bars carried by said chains and provided with pins or projections, an endless apron supported on rollers in juxtaposition to said chains and adapted to be pierced by the pins of said bars, and guide-

rollers arranged to lead said apron away from the chains at one end of the machine whereby to disengage it from said pins, and toward the chains at the opposite end of the machine
5 whereby the pins may again engage the apron, substantially as described.

2. In a washing-machine, the combination with a series of troughs of endless chains, a series of grooved rollers carrying at their ends
10 sprocket-wheels on which said chains are mounted, said rollers being so arranged as to guide said chains into and out of each trough in succession and then under the entire series of troughs, and certain of said rollers being
15 located, respectively, over the division between each pair of troughs, an adjustable roller located above each of said last-named rollers to form in conjunction therewith a

wringer, a series of bars carried by said chains and provided with pins or projections, an
20 endless apron supported on rollers in juxtaposition to said chains and adapted to be pierced by the pins of said bars, and guide-rollers arranged to lead said apron away from
25 the chains at one end of the machine whereby to disengage it from said pins, and toward the chains at the opposite end of the machine whereby the pins may again engage the apron, substantially as described.

In testimony whereof I have hereunto set
30 my hand in presence of two subscribing witnesses.

EDWARD SAMUEL COOK.

Witnesses:

HENRY GARDNER,

RICHARD CORE GARDNER.