

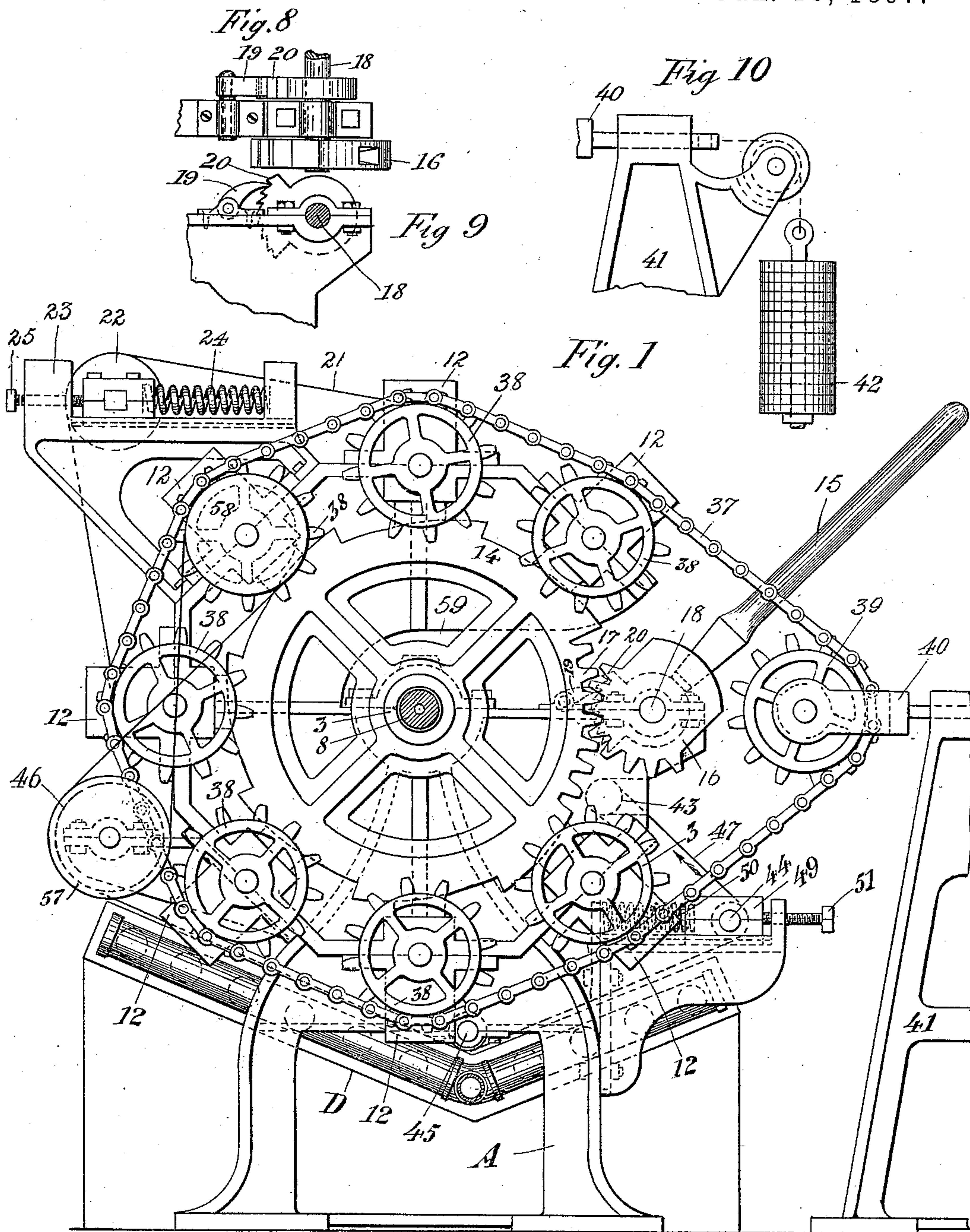
(No Model.)

6 Sheets—Sheet 1.

C. JENSEN.  
MANGLE.

No. 575,665.

Patented Jan. 19, 1897.



Witnesses:  
Ole Folaas,  
A. S. Johnson.

Inventor  
Christian Jensen.  
By J. D. Merwin  
his Attorney

(No Model.)

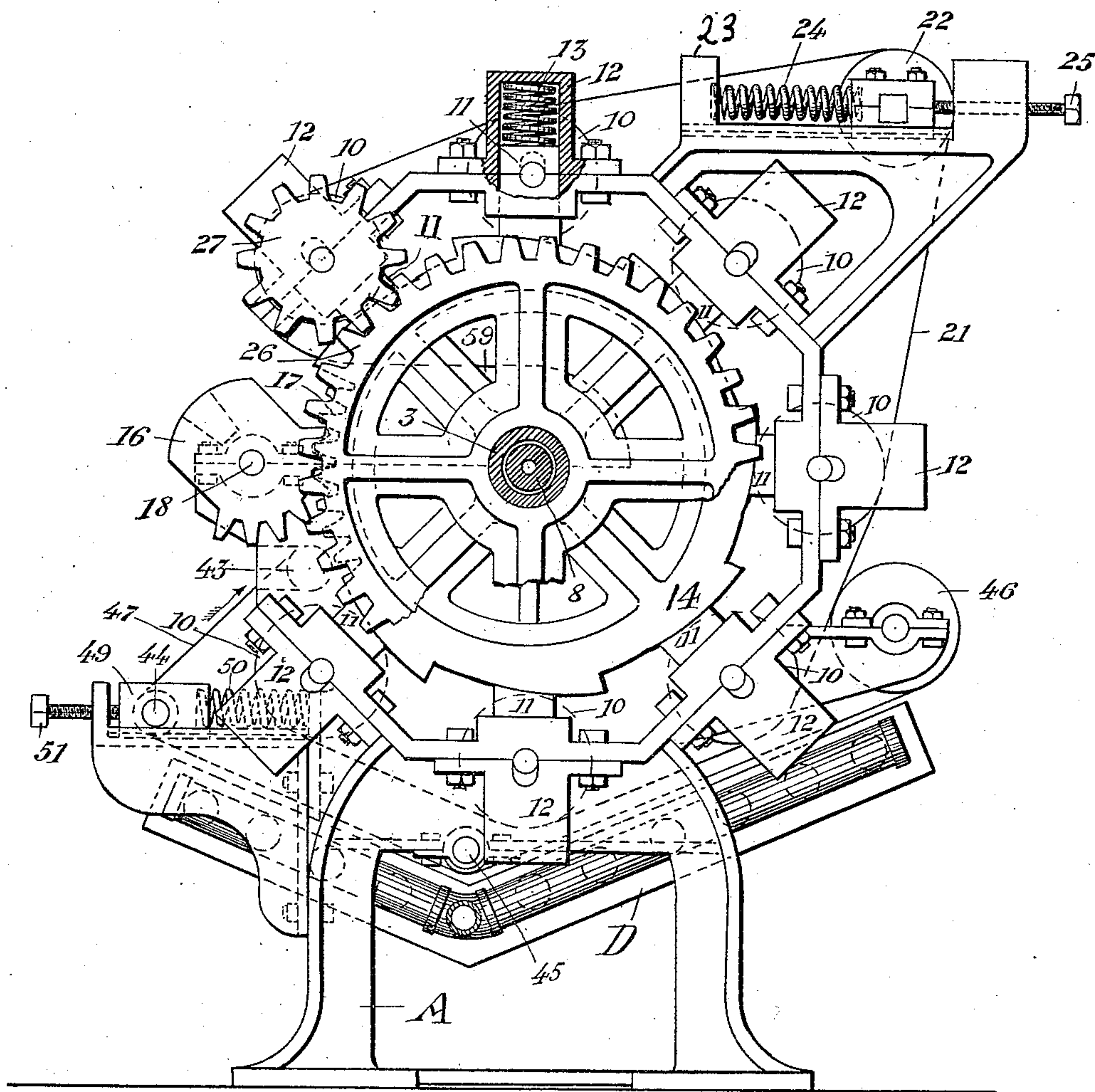
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*Fig. 2*



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(No Model.)

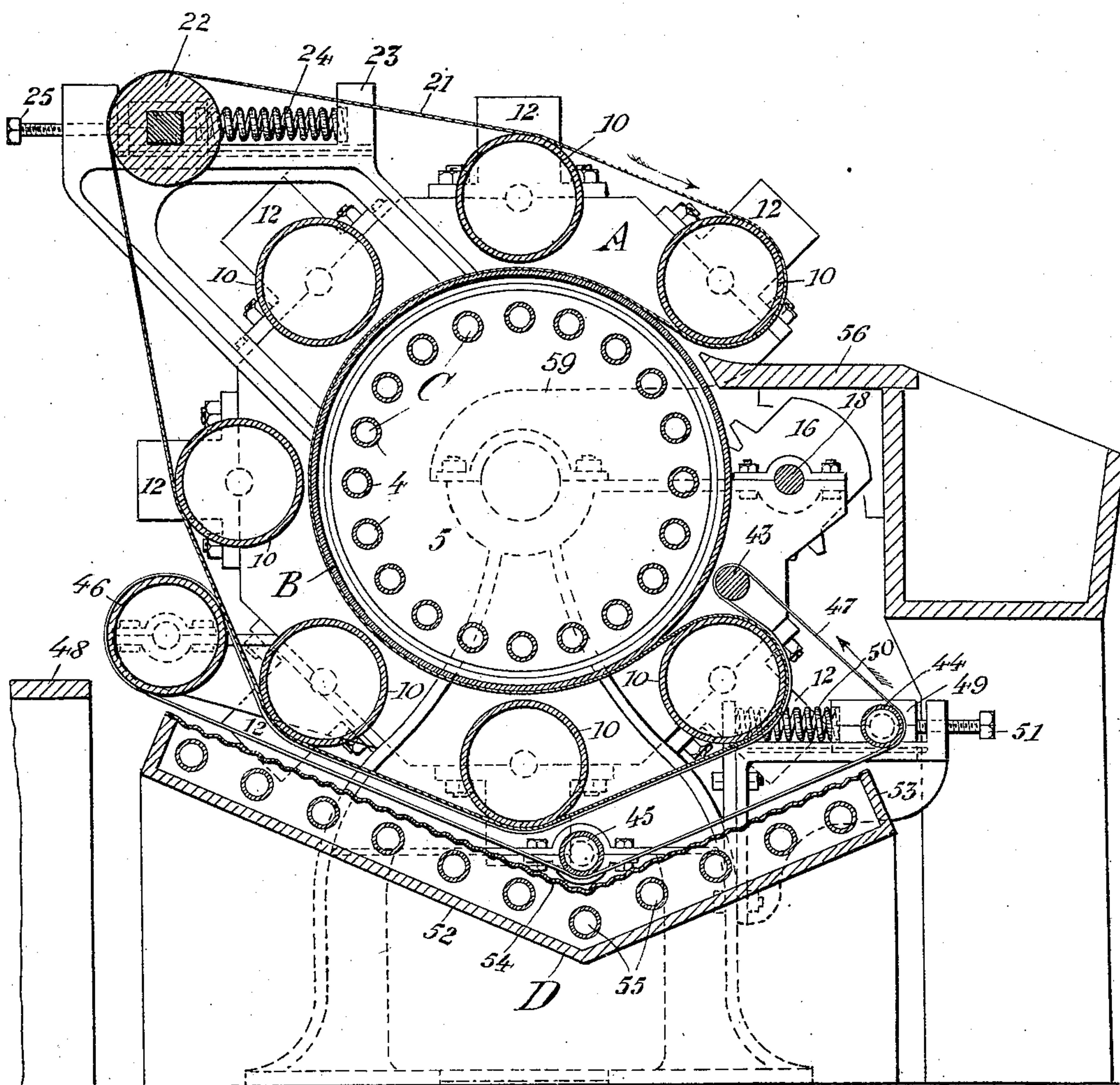
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*Fig. 3*



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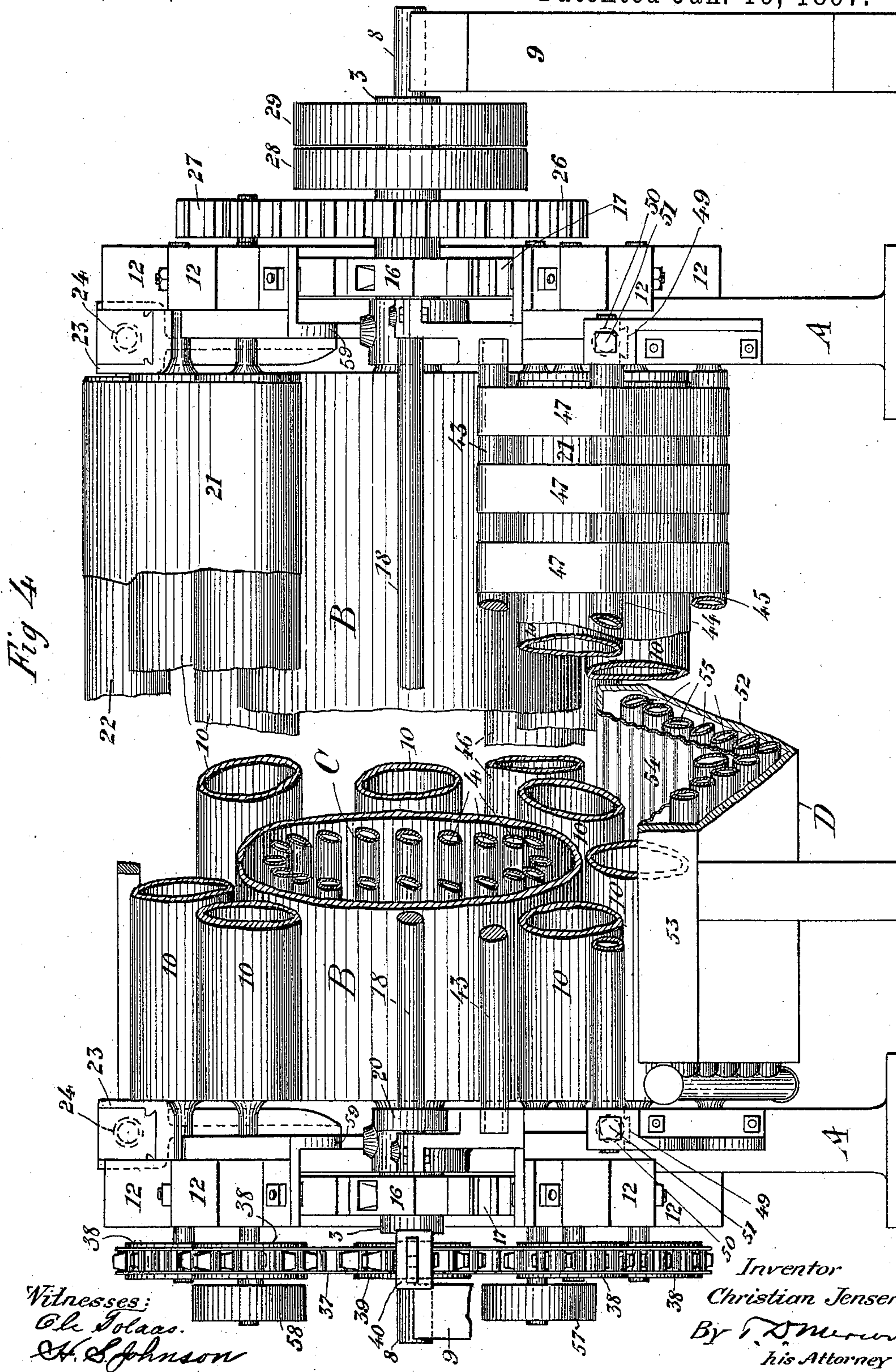
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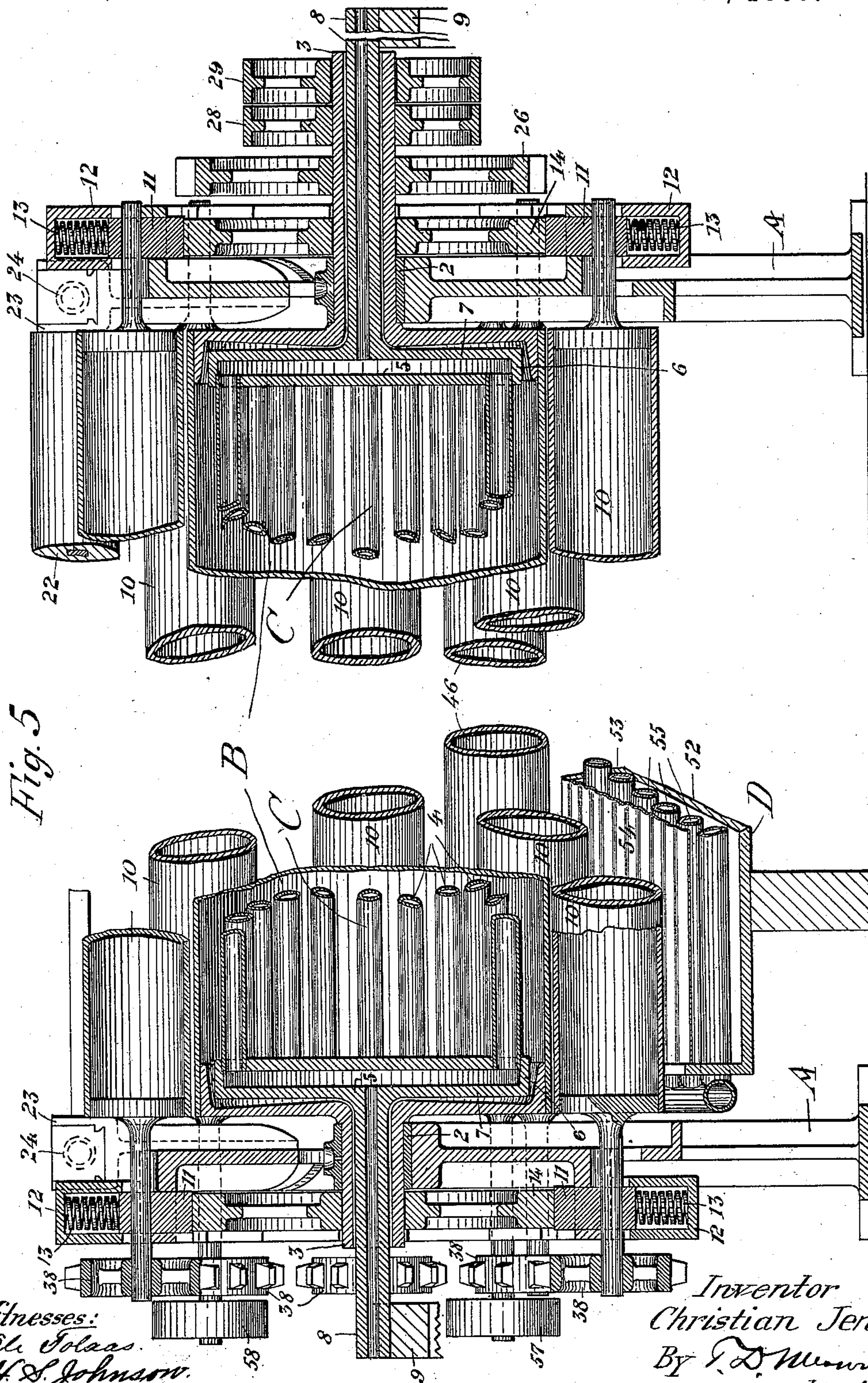




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(No Model.)

6 Sheets—Sheet 6.

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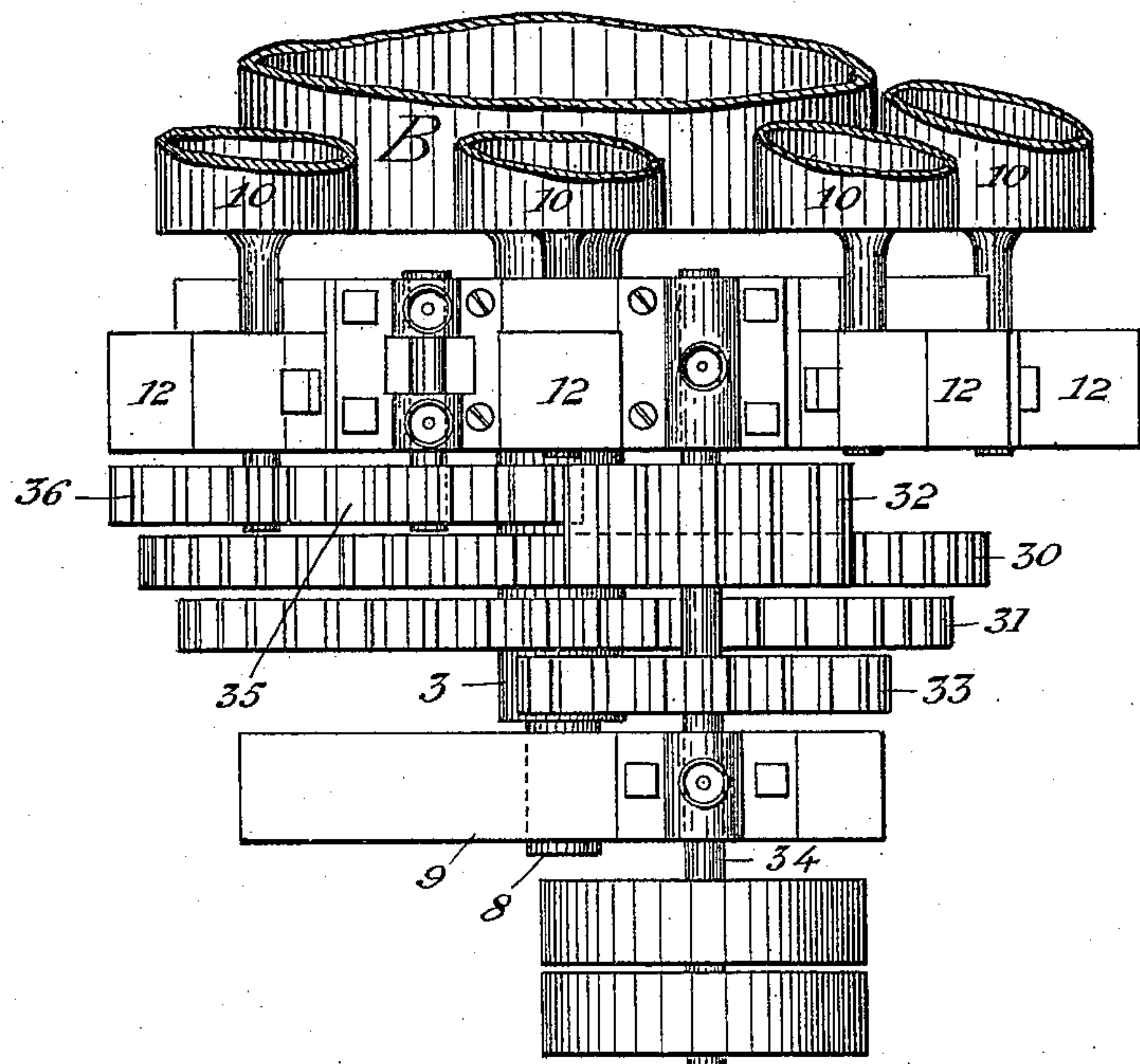


Fig 7

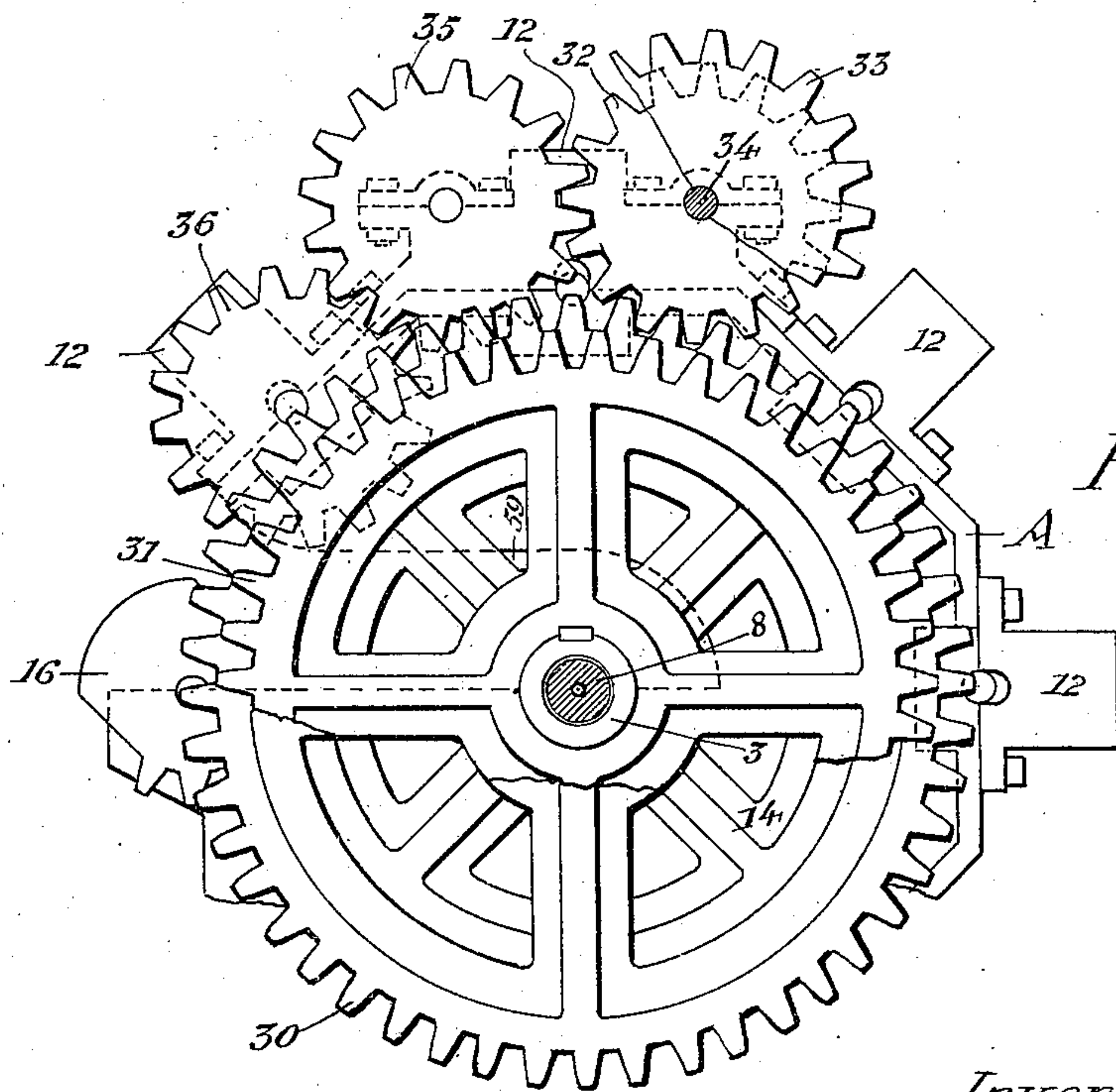


Fig 6

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# UNITED STATES PATENT OFFICE.

CHRISTIAN JENSEN, OF ST. PAUL, MINNESOTA, ASSIGNOR OF ONE-HALF TO  
THOMAS WILTBANK, OF MINNEAPOLIS, MINNESOTA.

## MANGLE.

SPECIFICATION forming part of Letters Patent No. 575,665, dated January 19, 1897.

Application filed January 30, 1895. Serial No. 536,713. (No model.)

*To all whom it may concern:*

Be it known that I, CHRISTIAN JENSEN, of St. Paul, Ramsey county, Minnesota, have invented certain Improvements in Mangles, of which the following is a specification.

My invention relates to improvements in mangles, its object being to furnish a machine of light weight, ease and efficiency in adjustment and operation, and in which the smoothing-drum can be run at varying speeds with relation to the carrying-apron.

To this end my invention consists in providing a hollow rotatable drum, within which is a series of non-rotating steam-pipes, and grouped around said drum is a series of apron carrying and driving rolls, which rotate in bearings adjustable on radial lines to and from the drum. These bearings are normally thrust inward or toward the drum by springs and are crowded outward against the tension of the springs by means of cam-wheels at each end of the drum, which are simultaneously and uniformly operated by means of a lever and secured in adjusted positions by any suitable means, such as a dog-and-ratchet attachment. One of the rolls in the series is driven from the source of power and the rest of the series operated from it by means of a sprocket-chain, the tension and adjustment of which are maintained by means of a sliding idler sprocket-wheel, to which is connected a suspended weight, whereby the operation of the rolls is unaffected by their position. Arranged upon and driven by these rolls is an endless apron for delivering the articles to be smoothed upon the drum and carrying them around in contact therewith. Arranged underneath the drum and series of rolls is a series of endless belts arranged to throw off from the drum and receive from it the articles when the smoothing operation is completed and to convey them back underneath the same to the receiving-table. Arranged underneath all of the above-described parts is a chest or box having a corrugated sheet-metal top, within which are arranged steam-pipes to supply heat for the drying of the apron and belts and the articles carried thereon and to thus complete the drying operation of the drum. The carrying-apron is held under suitable tension and guided by

means of a non-rotating bar or cylinder, over which it is carried and which is arranged in sliding bearings, with an adjusting-screw at each end to determine its angular position with reference to the axes of the carrying-rolls. By the adjustment of this bar or cylinder the apron may be controlled so as to run perfectly true upon the driving-rolls, and all tendency of it to "run" or become displaced laterally, as is the case where all of the parts over which it runs rotate, is wholly prevented. The driving-gear of the machine is so arranged that the drum and surrounding rolls may be operated at uniform peripheral speeds, or at different speeds where it is desired to polish the articles while being smoothed.

My invention further consists in the specific features of construction and combination hereinafter more particularly described and claimed.

In the accompanying drawings, forming part of this specification, Figure 1 is an end elevation of my improved mangle, showing the means for driving and adjusting the apron-carrying rolls, the apron-tension device, and the steam-box underneath the machine. Fig. 2 is an opposite end view of the same with parts broken away to show the gear connecting the drum with one of the series of rolls and one of the spring-controlled adjustable journal-boxes. Fig. 3 is a vertical central section of the machine, showing the arrangement of the carrying-apron and the series of belts, their tension devices, and the steam heating-pipes in the drum and steam-box. Fig. 4 is a front elevation of the machine, shown broken in two and the ends brought nearer together to come within the compass of the drawing-sheet, certain parts being broken away to disclose the interior construction. Fig. 5 is a central vertical longitudinal section showing the steam heating-pipes, the journal-boxes for the apron-carrying rolls, and other features. The driving-gear shown in Figs. 2, 4, and 5 is adapted to operate the drum and apron-carrying rolls at the same peripheral speed. Fig. 6 is a detail end view of a modification, showing the variable-speed driving-gear for preferred use with the machine, shown partly broken away, by means



of which the drum may be operated at the same or higher peripheral speed than the apron-carrying rolls. Fig. 7 is a detail plan view of the same. Figs. 8 and 9 are details of the pawl-and-ratchet attachment for maintaining the adjustment of the position of the apron-carrying rolls with reference to the drum, and Fig. 10 is a detail of the automatic tension device for the driving sprocket-chain.

In the drawings, A represents the frame of the machine; B, the smoothing-drum, mounted in bearings 2 upon said frame. The journals 3 of the drum are hollow, as shown in Fig. 5, and within the drum is supported the series of steam-pipes C. This is made up of the parallel pipes 4, secured in the heads 5, which are held within the flanges 6 of the heads 7, with an intermediate steam-space, the heads 7 having hollow non-rotative axes 8, the ends of which extend through the hollow journals 3 of the drum and rest upon suitable supports 9, one being connected suitably to the source of steam-supply and the other serving as an outlet.

The apron-carrying rolls are grouped around the drum B and supported in journal-boxes 11, slidable in radial guides or standards 12 and normally thrust inward toward the drum by the springs 13. The boxes can be adjusted outward or away from the drum simultaneously and uniformly against the tension of their springs by means of the cam-wheels 14, arranged one at each end of the drum and provided with a cam adjacent each of the boxes and adapted to bear against the same with the rotating of the wheels. These wheels are operated by means of the lever 15, engaging a segmental pinion 16, which meshes with the segmental gear 17 upon one of the cam-wheels, the pinion being connected to a similar pinion meshing with the gear upon the other cam-wheel by means of the shaft 18, to which both are fixed. The cam-wheels are secured in adjusted positions by means of a pawl or dog 19, engaging the segmental ratchet 20 upon the shaft 18.

As shown in Figs. 2, 4, and 5, the drum B is operatively connected to one of the rolls 10 by means of the gear 26, mounted upon the drum-shaft and engaging the pinion 27, carried by the roll-shaft, whereby the drum and roll move at the same peripheral speed, power being applied to the drum-shaft, as by means of the belt-pulley 28, adjacent to which is the idler-pulley 29, running loose on the shaft, for carrying the belt when the machine is thrown out of operation. The other rolls 10 are driven from the first-named roll by means of the chain 37, running over the sprocket-wheels 38, which are fixed to the roll-shafts, and the idler sprocket-wheel 39, which is mounted in sliding bearings 40, supported in the standard 41, its position being controlled by a suspended weight 42, so as to maintain uniform tension of the chain.

In Figs. 6 and 7 I show my preferred form of driving-gear, by means of which the drum

and apron-carrying rolls may be driven at the same peripheral speed, or, when so desired, the drum may be driven at a higher speed, so as to polish the articles while being smoothed. I accomplish this by means of the connected gears 30 and 31, mounted to slide upon the drum-shaft and prevented from turning thereon by means of a spline, the larger one, 30, being adapted to mesh with the relatively long pinion 32, secured to the driving counter-shaft 34, which is provided with a tight and a loose pulley for the driving-belt in the ordinary manner, the smaller gear 31 being adapted to mesh with the pinion 33, secured upon the shaft 34. The pinion 35 is interposed between and meshes with the pinion 32 upon the counter-shaft and the pinion 36 upon the shaft of one of the rolls 10. By means of this construction when the pinion 32 is in engagement with the gear 30 the drum and carrying-rolls are rotated with the same peripheral speed, but when the gears 30 and 31 are moved on the drum-shaft to throw the gear 30 out of engagement with the pinion 32 and the gear 31 into engagement with the pinion 33 it is evident that while the speed of the rolls 10 continues the same the peripheral speed of the drum is increased, whereby the articles carried over its surface are polished. The rolls 10 are covered with felt or other material, as may be desired, and carry and drive an endless apron 21, which serves to convey the articles to be smoothed upon and around the drum.

Where an endless apron or belt runs over driving or idler rolls, there is a tendency for it to run or work laterally off from the ends of the rolls and in some cases onto the bearings or other fixed parts. In order to prevent this and to maintain uniform tension, it is common to have an idler-roll which can be adjusted so as to maintain the required tension, and is also susceptible of angular adjustment to vary the relative tension upon the edges of the belt to correct the tendency to run. This tendency, however, cannot be entirely prevented or controlled by a rotating roll. I therefore provide the apron 21 with a non-rotating tension bar or cylinder 22, from which it slides in its travel. This bar is mounted to slide, but not to turn, in suitable supports 23, being thrown outward normally, so as to apply tension to the apron by the springs 24, one at each end of the bar. The springs 24 are interposed between the ends of the bar and a fixed portion of the support 23, as shown in Fig. 3. Arranged at each end of the bar and bearing against the same opposite the spring 24 (see Fig. 3) is the screw 25, by the varying adjustment of which the relative tension upon the edges of the apron may be varied so as to prevent any tendency of it to run upon the carrying-rolls.

I arrange underneath the drum and apron-carrying rolls the series of rolls 43, 44, 45, and 46, and upon these the series of narrow endless belts 47. The roll 43 is placed close to



the drum B, so that the belts 47, being carried in the direction indicated by the arrow which is opposite to that of the drum, will clear off from its surface any articles which  
 5 cling to it and will convey them downward and underneath the lower rolls 10 and between the apron and belts and thence over the roll 46, delivering them onto the receiving-table 48. The tension of the belts 47 is  
 10 maintained by means of the roll 44, working in sliding bearings 49, controlled by the springs 50 and the set-screws 51.

The belts may be driven by any suitable connection with the moving parts of the machine, as by means of a belt connecting the pulley  
 15 57 upon the shaft of the roll 46 with the pulley 58 upon the shaft of one of the rolls 10.

Underneath the above-described parts of the machine I arrange a chest or box D, the  
 20 bottom 52 and sides 53 of which are made preferably of wood to prevent heat radiation, and the top 54 of corrugated sheet metal to freely radiate heat to the parts immediately above. Within the box I arrange a series of  
 25 steam-pipes 55, connected to the source of steam-supply, whereby a sufficient degree of heat is maintained, and the belts and articles passing over the box are further dried by the heat radiated therefrom.

30 The frame A at each end of the drum is formed with an opening from the front to the center adjacent the shaft of the drum, (indicated by dotted lines in Fig. 3 and by full and dotted lines in Fig. 1,) through which the  
 35 shaft of the drum can be carried to enable the drum to be readily disconnected and moved from the machine without taking down the whole machine.

In operation, the parts being adjusted to  
 40 proper relative positions and the drum and rolls being geared to either travel at the same speed for ordinary work or at different speeds in order to polish the articles, the articles are placed upon the feeding-table 56, and are  
 45 delivered underneath the apron 21 and directly upon the roll B. Thence by the motion of the drum and the apron they are carried around the drum to the last roll 10, at which point as the apron leaves the drum the  
 50 articles follow the apron or are cleared from the drum by means of the belts 47. Thence the articles are carried between the apron and belts underneath the rolls 10 and over the roll 46 and deposited upon the receiving-  
 55 table 48, being smoothed or polished and thoroughly dried by the heat of the drum and also the heat radiated from the box D. The position of the rolls 10 with reference to the drum is adjusted according to the work  
 60 being done and by means of the lever 15 used to turn the segmental gears 16, and thereby the cam-wheels 14, the adjusted position being maintained by means of the dog or pawl 19 engaging the segmental ratchet 20, as  
 65 above described.

It is evident that the series of rolls 10 being held in place by sliding bearings arranged

in the standards 12, bolted onto the outside of the frame-pieces A, it is possible to unship  
 70 any one of the rolls for the purpose of repairs without disturbing any other part of the machine.

I claim—

1. In a mangle, the combination with the endless apron and its carrying-rolls, of the  
 75 non-rotative tension cylinder or bar, its tension-springs and the adjustable means at each end of the bar for independently limiting the action of the adjacent spring.

2. In a mangle, the combination with the  
 80 endless apron, of the non-rotative cylinder or bar for said apron, the tension-springs for said bar and the counteracting screws therefor, by the adjustment of which the angular position of the bar may be varied. 85

3. In a machine of the class described, the combination with the heating-drum, the series of apron-carrying rolls arranged symmetrically around the same, and mounted in  
 90 radially-slidable bearings and the means for simultaneously and uniformly adjusting the position of said rolls to and from said drum, of the train of gearing connecting one of said rolls to a source of power, the sprocket-chain  
 95 operatively connecting the said first-named roll with all of the other rolls, and the automatic tension device for said chain.

4. In a machine of the class described, the combination with the heating-drum, of the series of rolls arranged symmetrically around  
 100 the same, their radially-slidable bearings, the means for simultaneously and uniformly adjusting the position of said rolls to and from said drum, the train of differential gear connecting said drum and one of said rolls to a  
 105 common source of power, the chain operatively connecting said roll with all of the other of said rolls, and the automatic tension device for said chain.

5. In a machine of the class described, the  
 110 combination with the heating-drum and the series of rolls arranged around the same, of the radially-slidable bearings for said rolls, the springs tending to thrust said bearings inward, the cam-wheels engaging said bearings,  
 115 the segmental gear upon each of said wheels, the connected segmental pinions engaging each of said gears, the lever for turning said pinions, and the dog-and-ratchet-retaining device for said pinions. 120

6. In a mangle, the combination with the smoothing-drum, of the series of apron-carrying rolls surrounding and radially adjustable to and from the same, the springs for  
 125 holding said rolls at the inner limit of adjustment, the cam-wheel at each end of the machine for simultaneously and uniformly engaging the bearings of the rolls and thrusting said rolls outward, and means for simultaneously and uniformly operating said wheels  
 130 to adjust the position of said bearings.

7. In a mangle, the combination with the heating-drum, of the series of apron-carrying rolls surrounding the same, the cams for uni-



formly and simultaneously adjusting the radial position of said rolls with reference to said drum, the sprocket-wheels carried by said rolls, the chain for driving said sprocket-wheels, and the automatic tension device for said chain.

8. In a mangle, the combination with the heating-drum, of the series of rolls surrounding the same, their radially-slidable bearings, the cams for engaging and uniformly and simultaneously adjusting said bearings to and from said drum, the differential driving-gear connecting the source of power with said drum and one of said rolls, whereby they may be operated at will at the same or different speeds, the chain-and-sprocket connection between the first-named roll and the other rolls of the series, whereby they are all driven positively at a uniform speed, and the automatic tension device for said chain.

9. In a mangle, the combination with the heating-drum, of the series of rolls surrounding the same, their radially-slidable bearings, the springs tending to thrust said bearings toward said drum, the cam-wheels engaging said bearings, the gears carried by said cam-wheels, the segmental pinions engaging said gears fixed upon a counter-shaft, means for turning said counter-shaft and for holding it in adjusted positions, and adjustable means for driving said rolls from the source of power at the same or different peripheral speed, as that of said drum.

In testimony whereof I affix my signature in presence of two witnesses.

CHRISTIAN JENSEN.

Witnesses:

T. D. MERWIN,

MINNIE THAUWALD.