

No. 865,512.

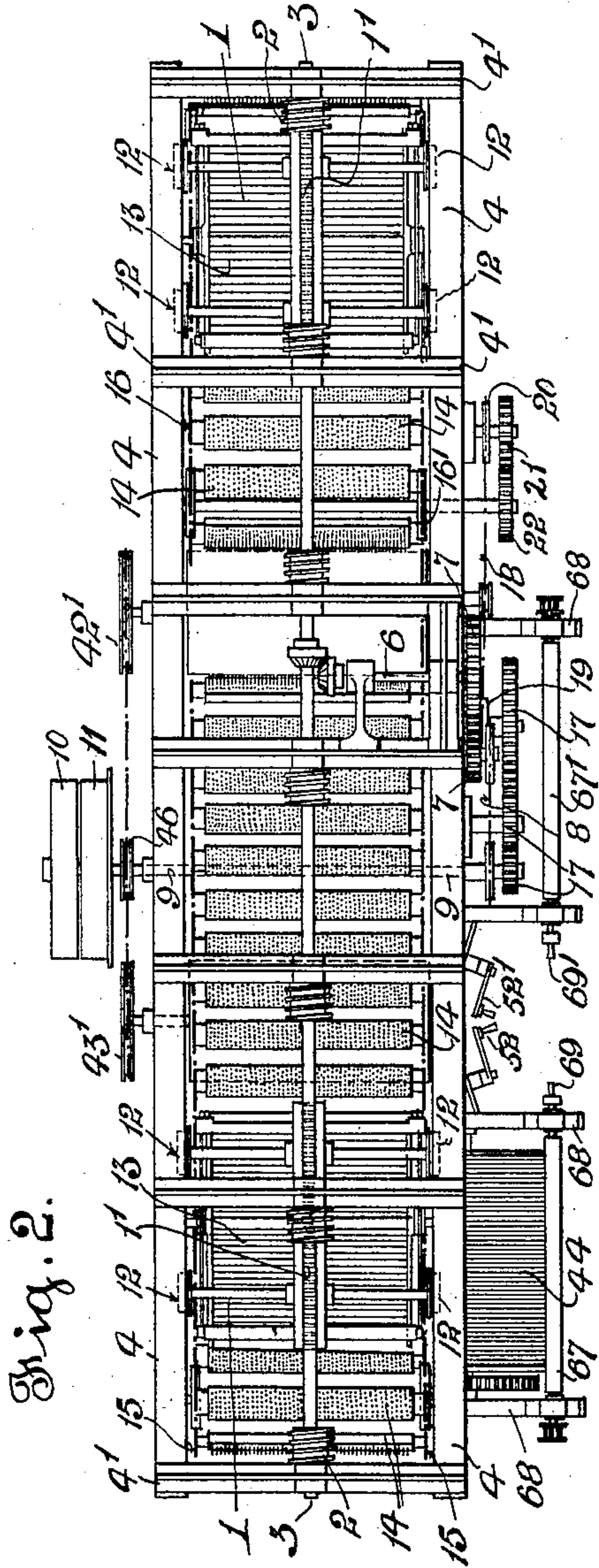
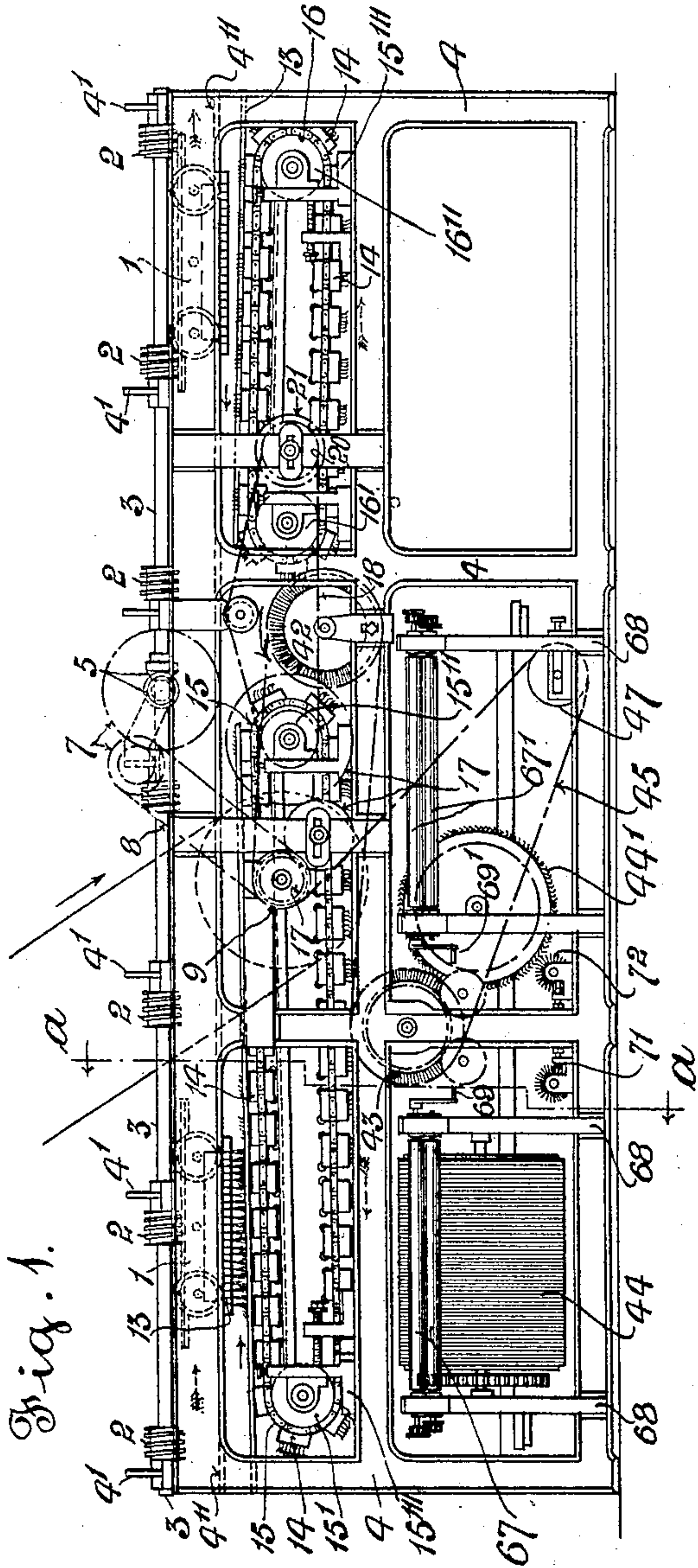
PATENTED SEPT. 10, 1907.

A. MELLOR & J. VILLY.

MACHINE FOR WORKING OR DRESSING TEXTILE FIBERS.

APPLICATION FILED JUNE 28, 1905.

10 SHEETS—SHEET 1.



Witnesses.  
T. L. NELSON  
W. H. CLARK

Inventors.  
Arthur Mellor  
Jean Villy  
By John C. Dewey  
Attorney

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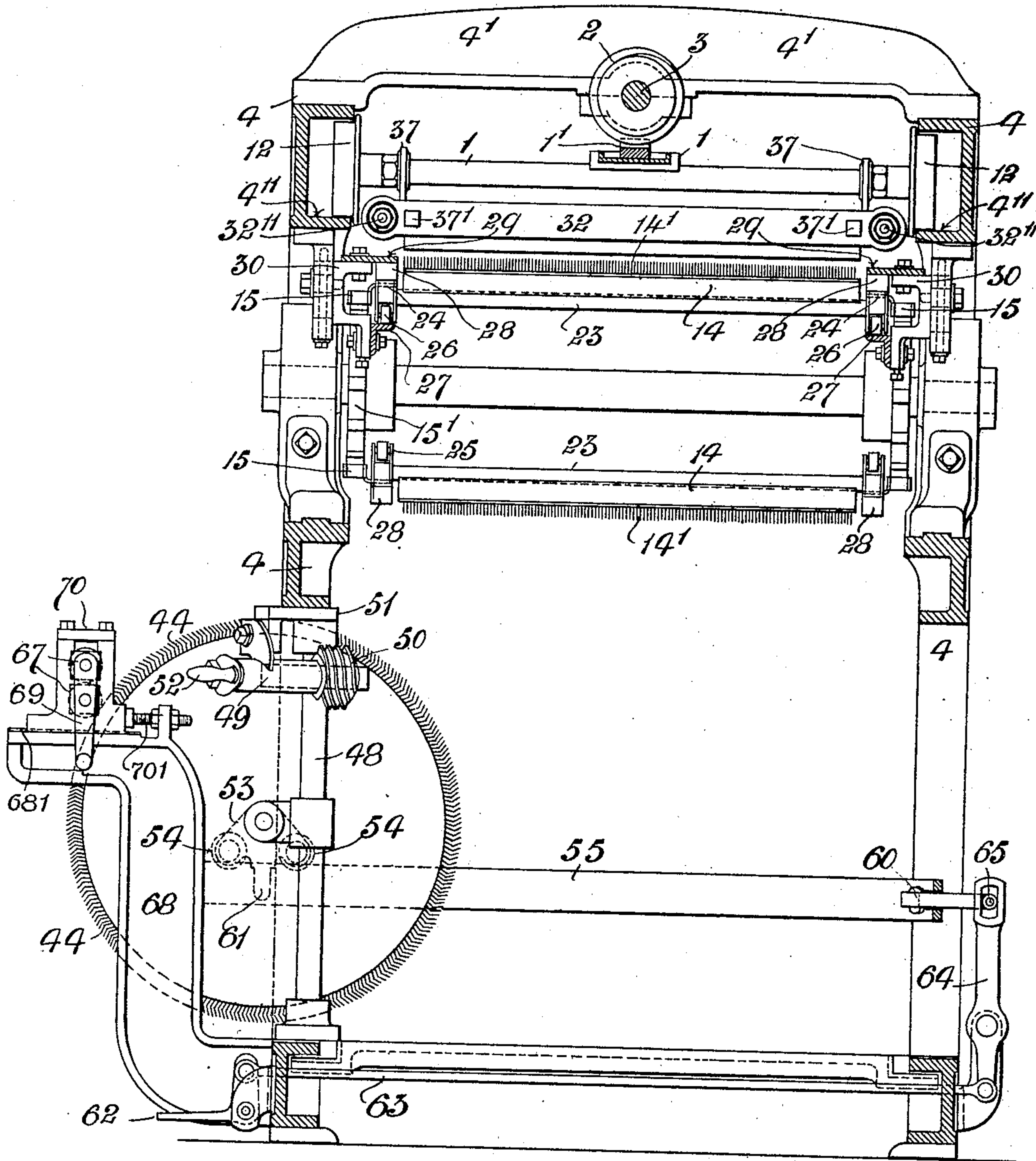
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10 SHEETS—SHEET 2.

Fig. 3.



Witnesses.  
T. L. NELSON.  
M. O'LEARY.

Inventors.  
Arthur Mellor,  
Jean Villy.  
By John L. Dewey  
Attorney



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Fig. 4.

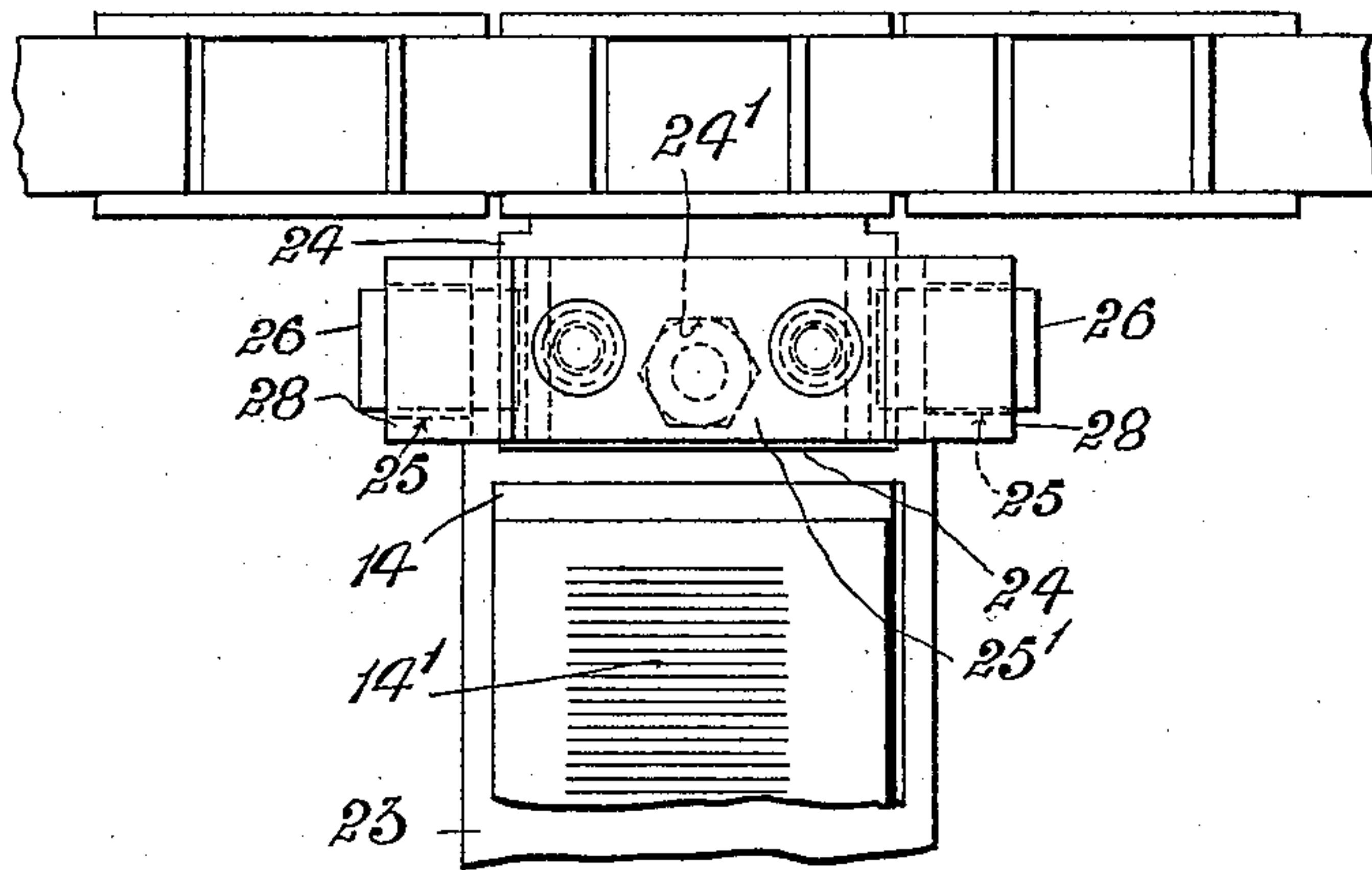
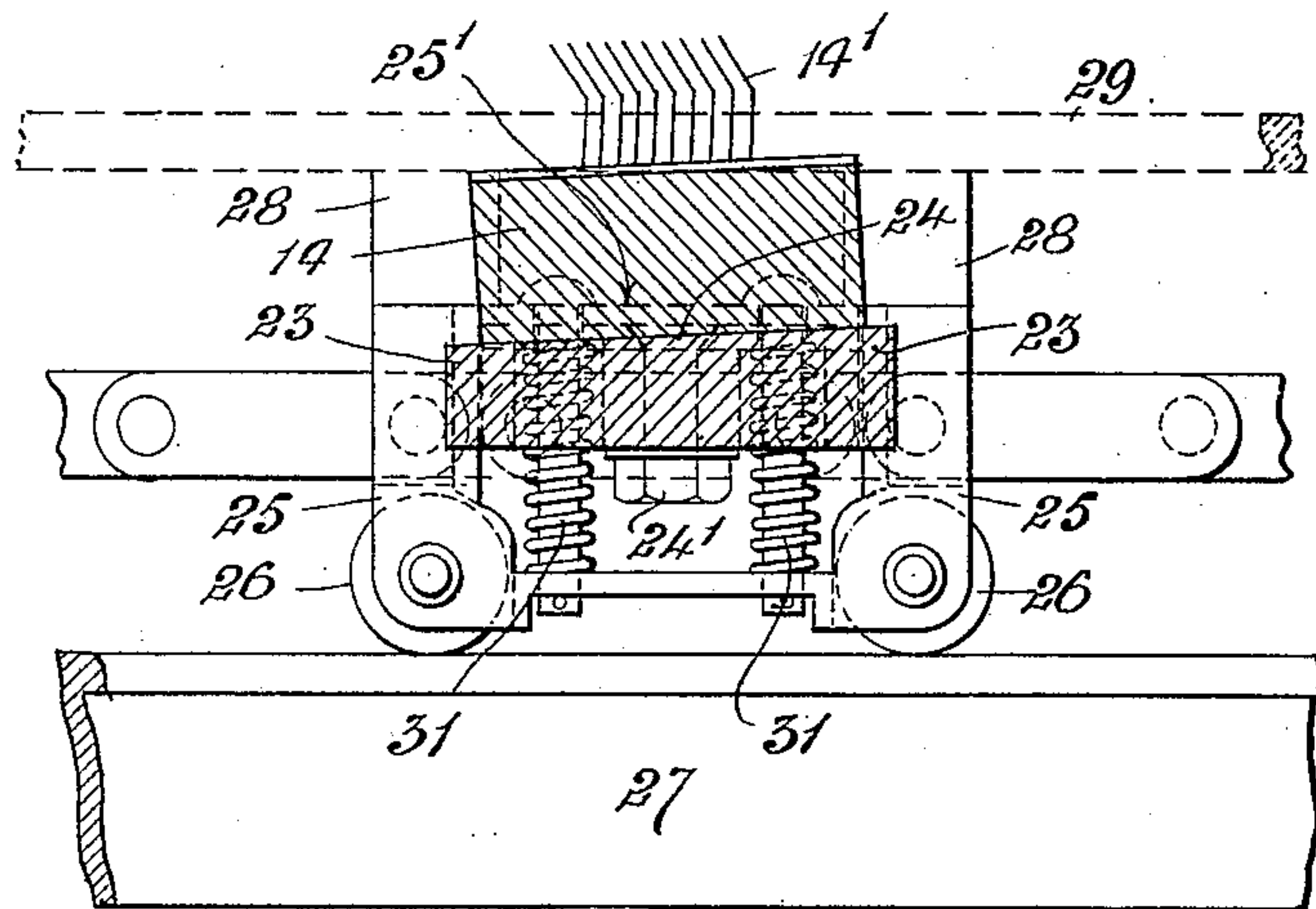


Fig. 5.



Witnesses.  
T. L. Nelson.  
W. Heas.

Inventors.  
Arthur Mellor  
Jean Villy.  
By John L. Dewey  
Attorney

No. 865,512.

PATENTED SEPT. 10, 1907.

A. MELLOR & J. VILLY.

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10 SHEETS—SHEET 4.

Fig. 6.

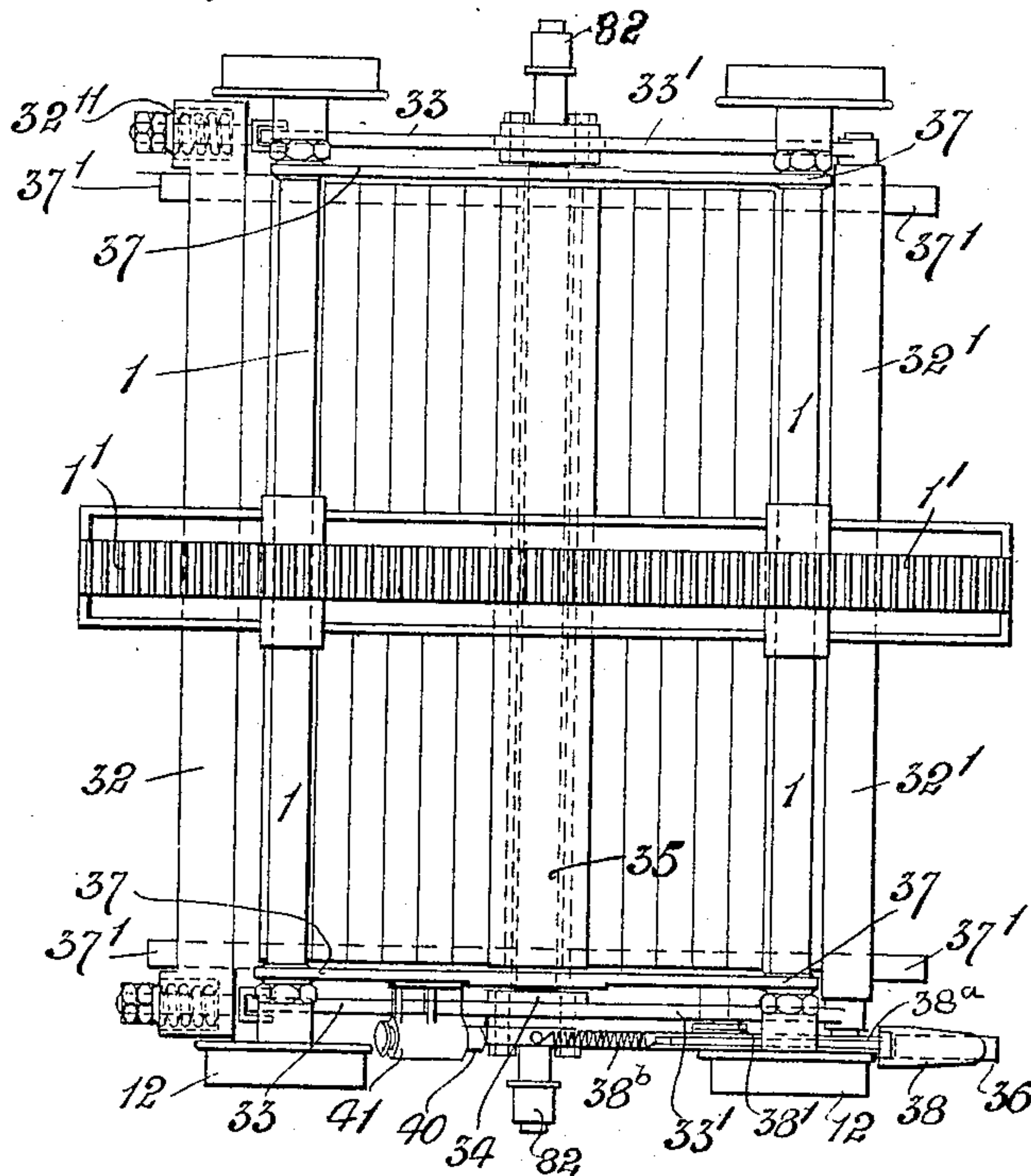


Fig. 7.

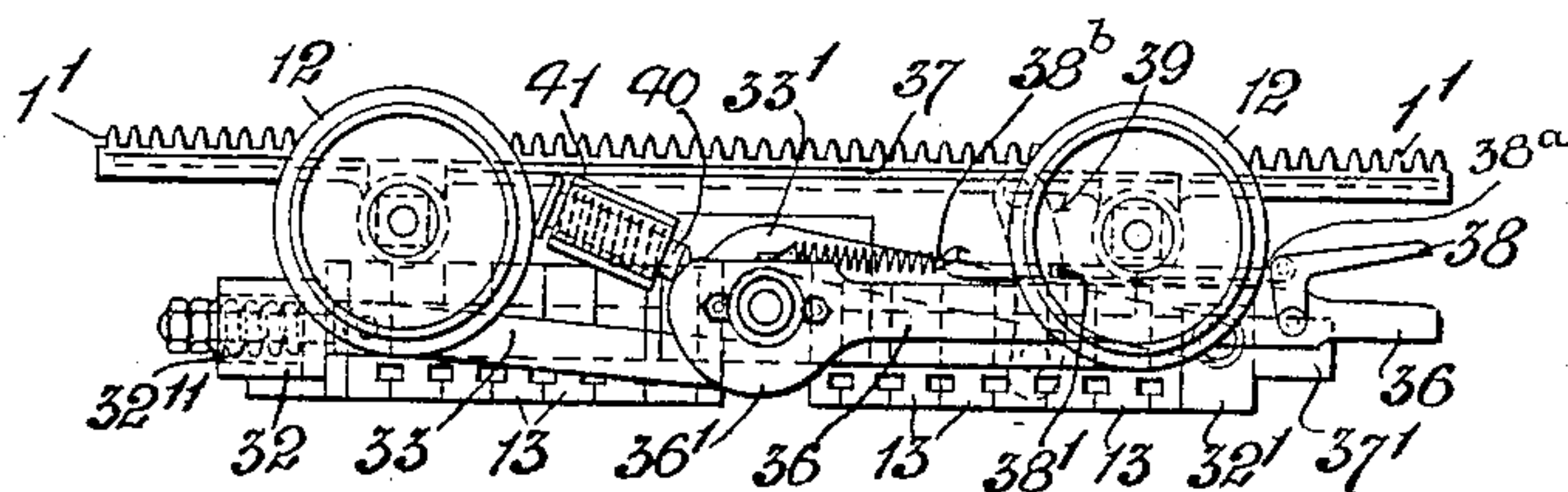
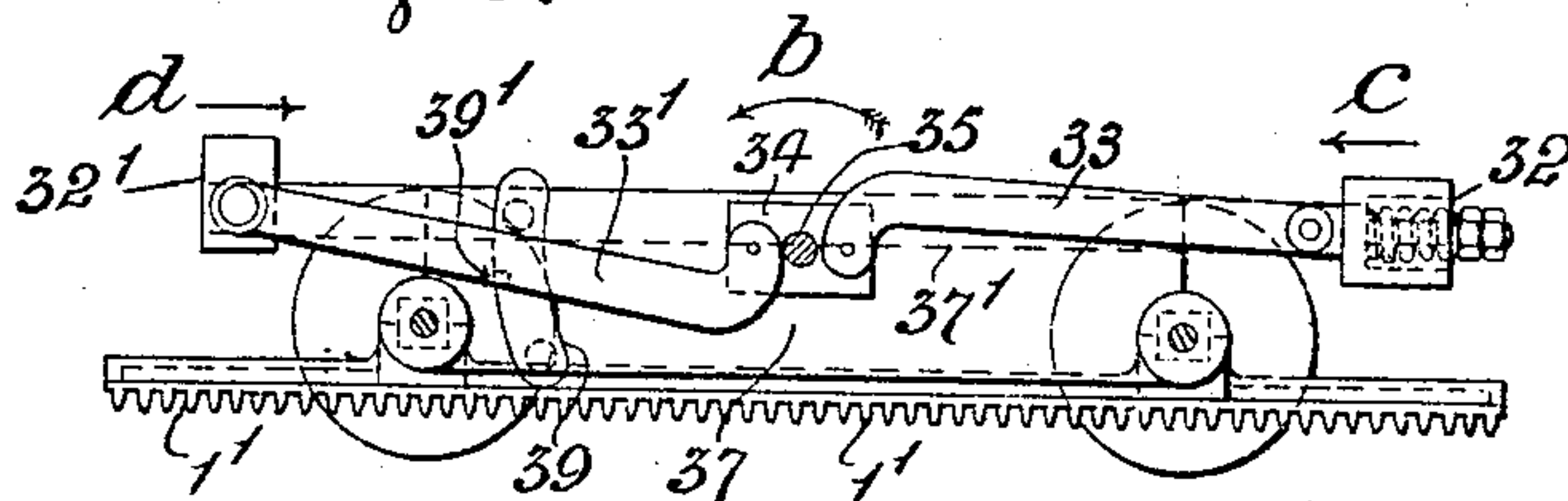


Fig. 8.



Witnesses.  
T. L. Nelson  
W. H. H. H.

Inventors.  
Arthur Mellor  
Jean Villy  
By John L. Dewey  
Attorney

No. 865,512.

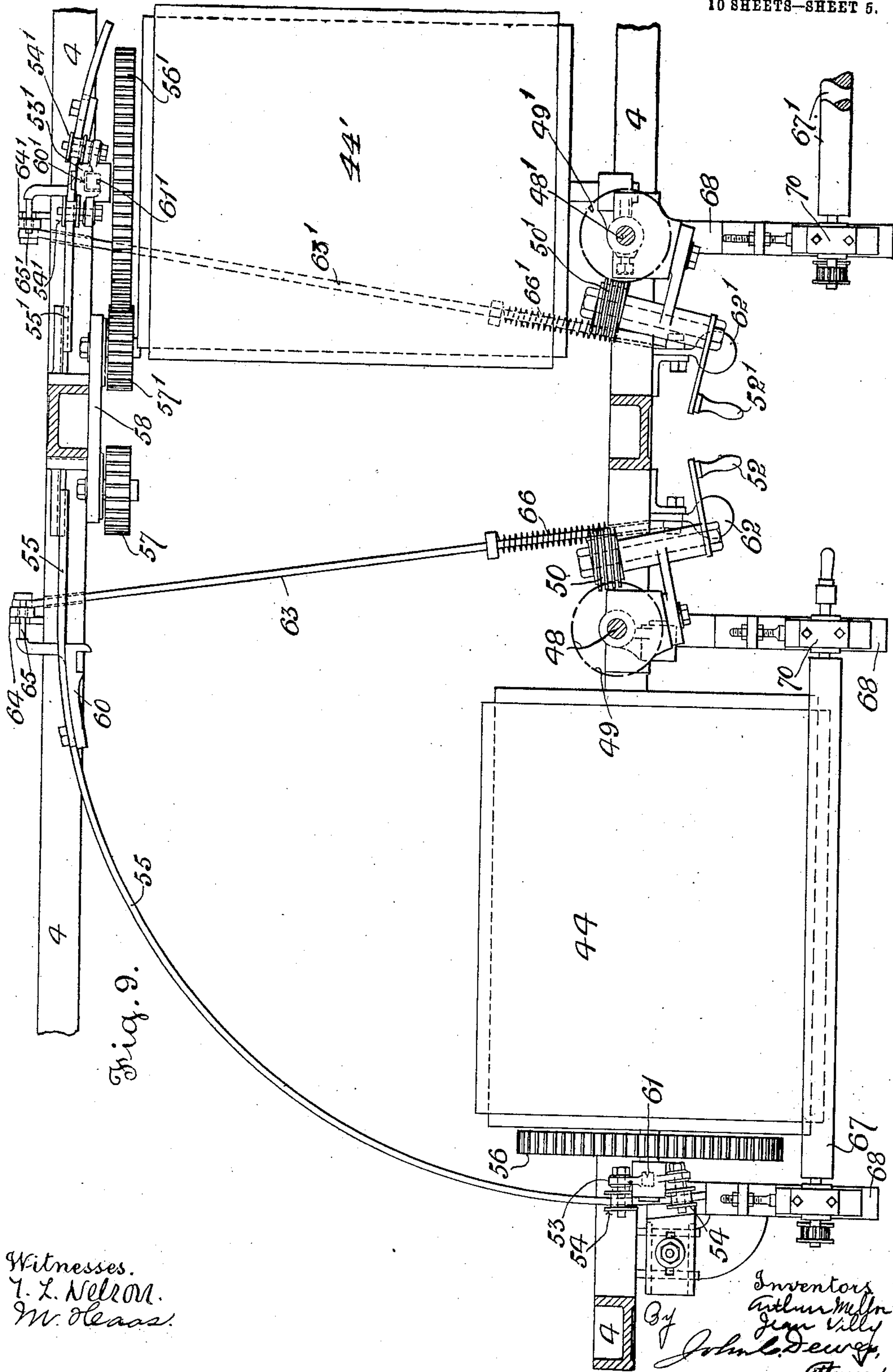
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A. MELLOR & J. VILLY.

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10 SHEETS—SHEET 5.



Witnesses.  
T. L. Nelson.  
W. Deas.

Inventors  
Arthur Mellor  
Jean Villy  
By John L. Dewey,  
Attorney



No. 865,512.

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A. MELLOR & J. VILLY.

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10 SHEETS—SHEET 6.

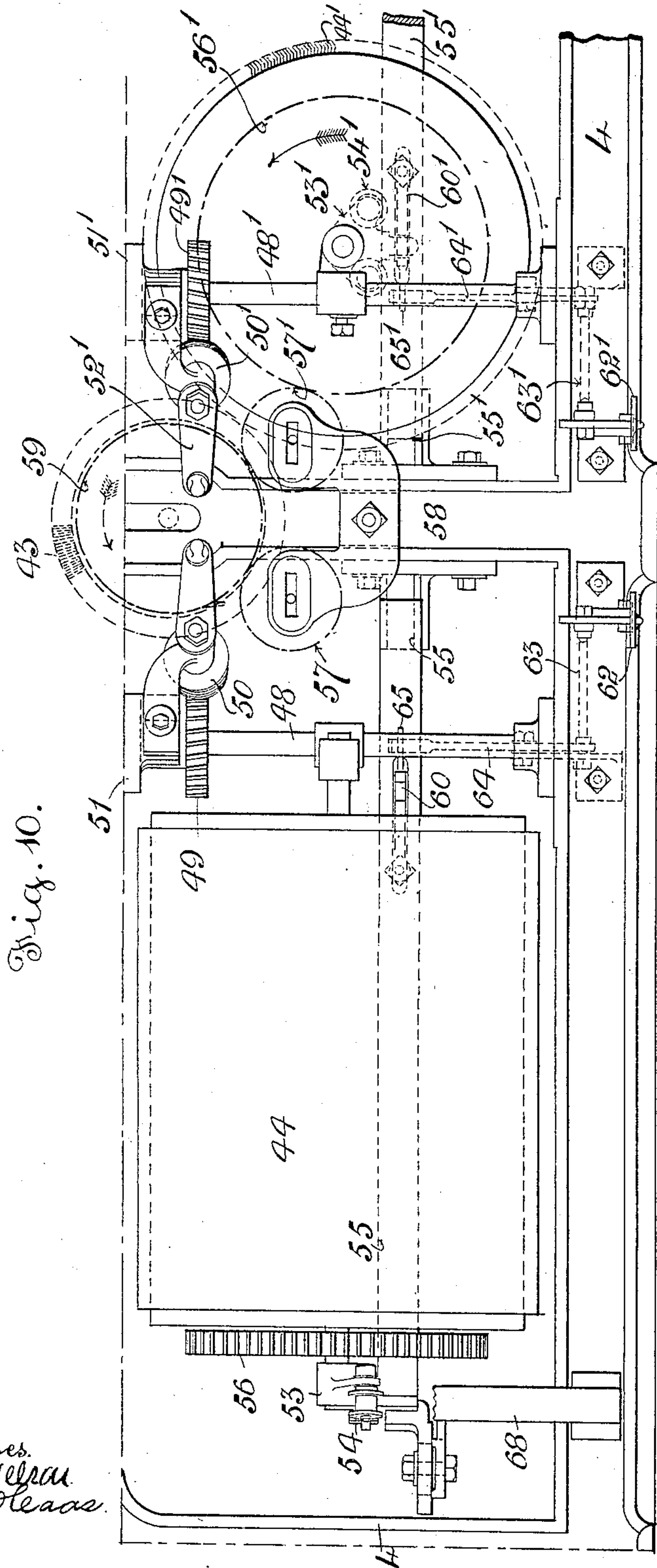


Fig. 10.

Witnesses.  
T. L. Nelson  
M. O. O'Leary

Inventors.  
Arthur Mellor  
Jean Villy  
By John C. Sedgwick  
attorney

No. 865,512.

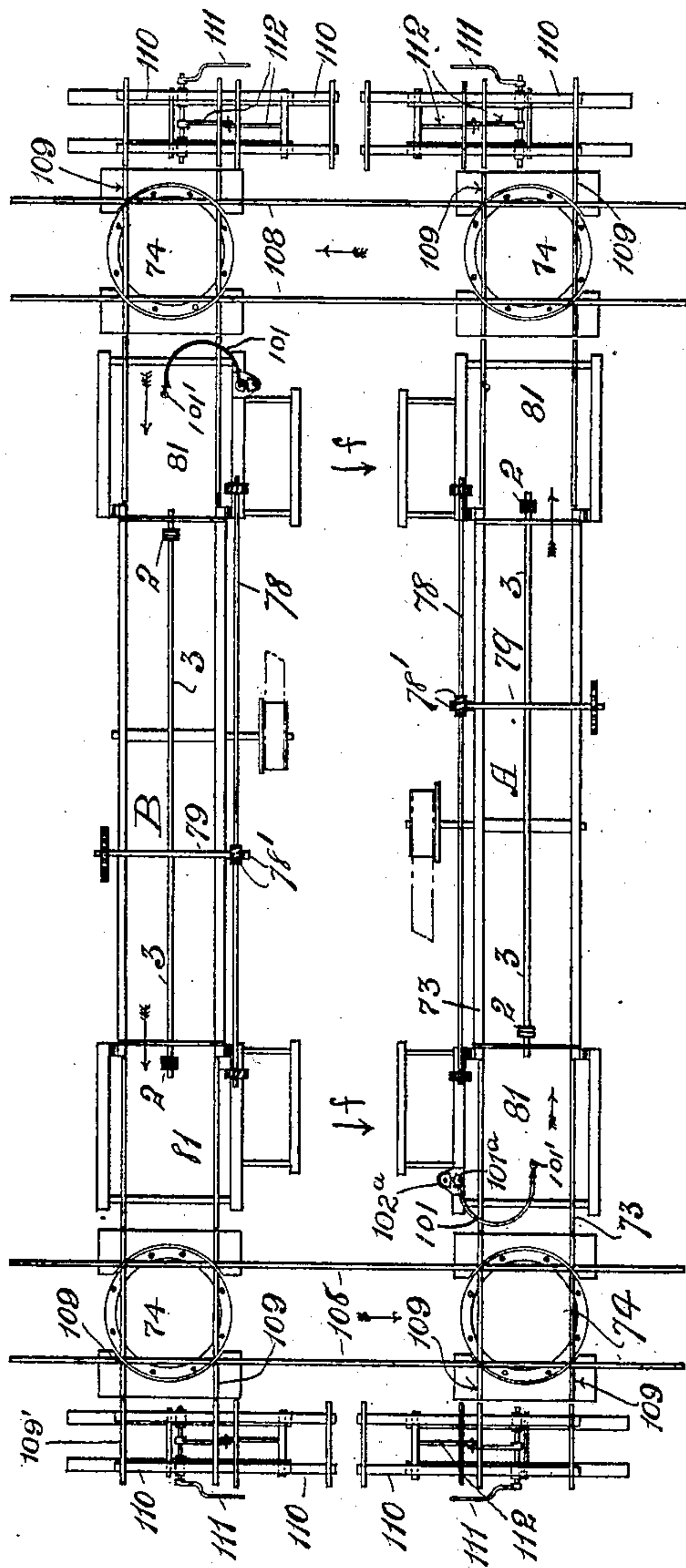
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A. MELLOR & J. VILLY.

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APPLICATION FILED JUNE 28, 1905.

10 SHEETS—SHEET 7.



Witnesses.  
T. L. Nelson.  
W. O. Case.

Inventors,  
Arthur Mello  
Jean Willy  
By John E. Dewey  
attorney.





No. 865,512.

PATENTED SEPT. 10, 1907.

A. MELLOR & J. VILLY.

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10 SHEETS—SHEET 9.

fig. 14.

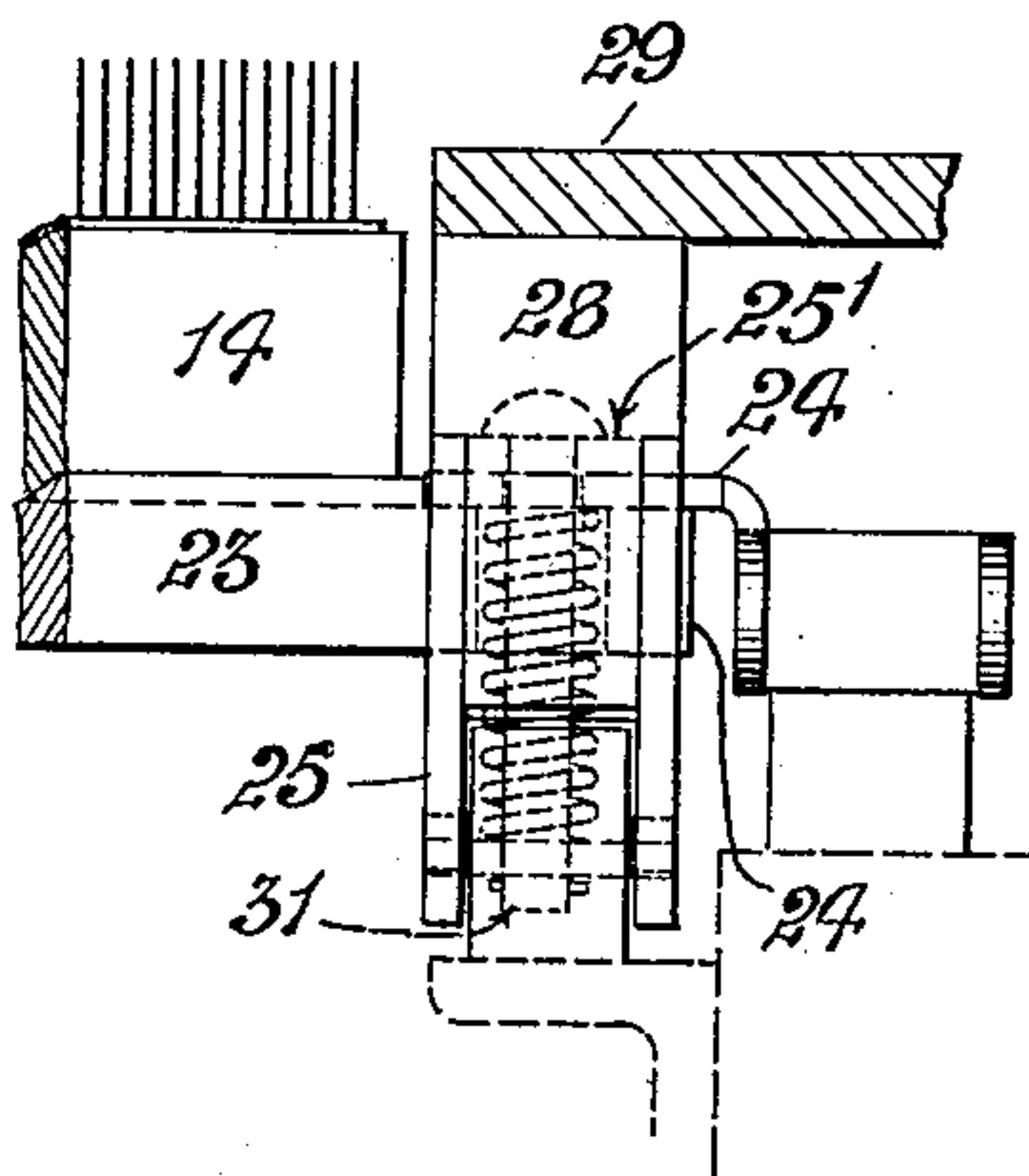


fig. 15.

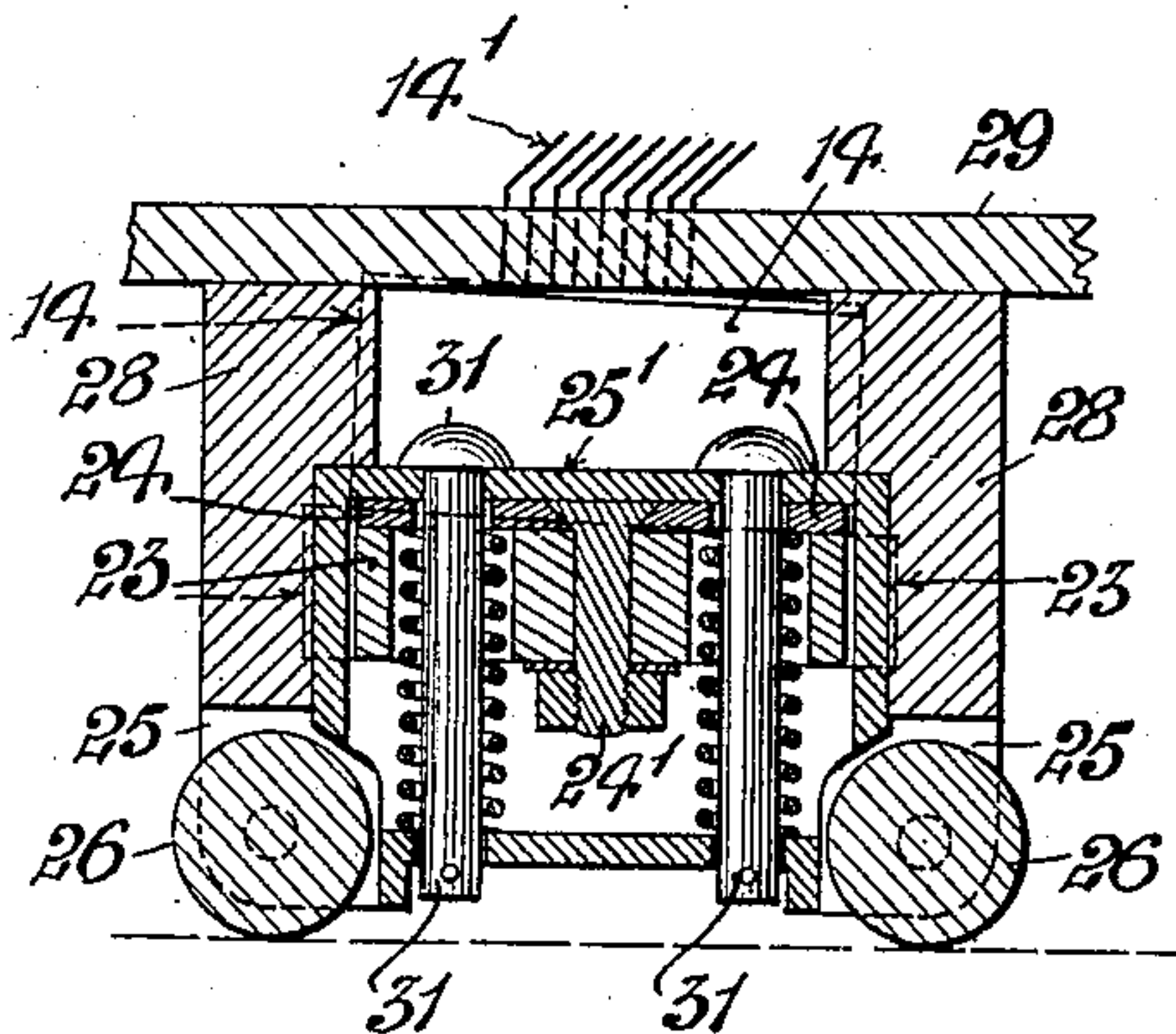


fig. 16.

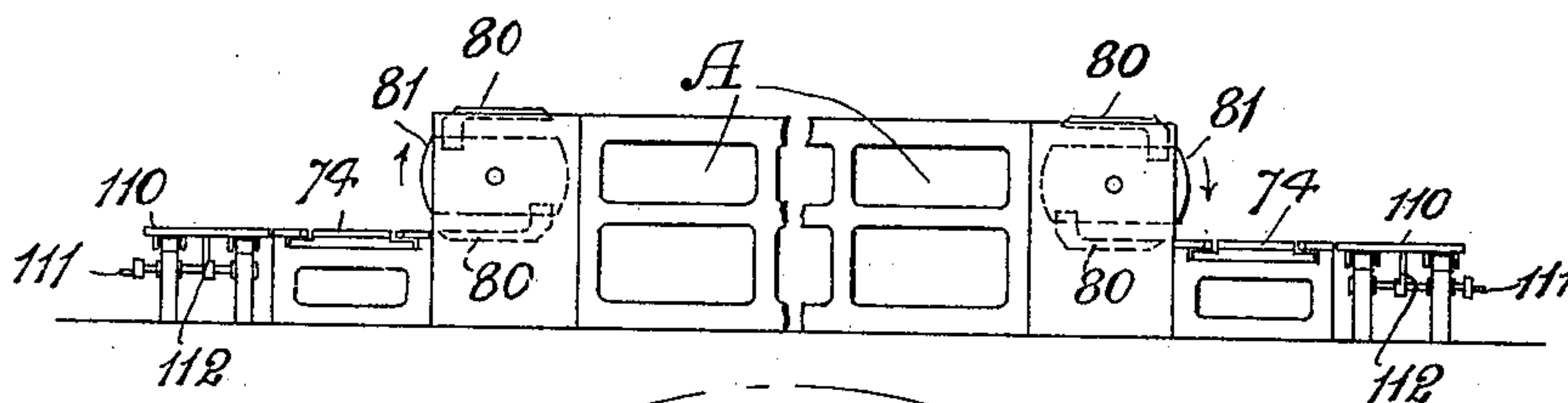
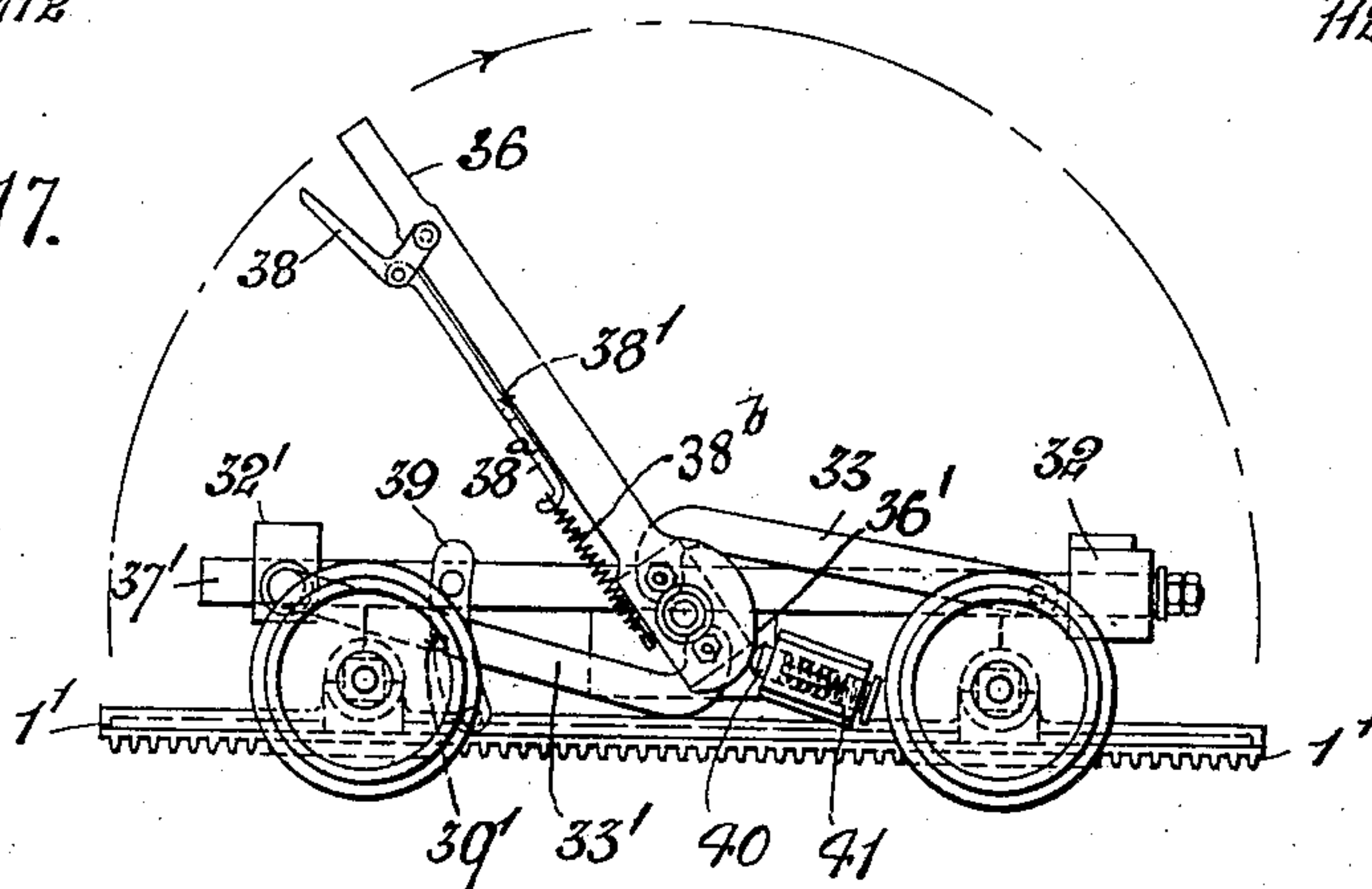


fig. 17.



Witnesses.  
T. L. Nelson  
W. H. Hearn.

Inventors.  
A. Mellor.  
J. Villy.  
By John C. Dewey, atty.

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PATENTED SEPT. 10, 1907.

A. MELLOR & J. VILLY.

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10 SHEETS—SHEET 10.

Fig. 18.

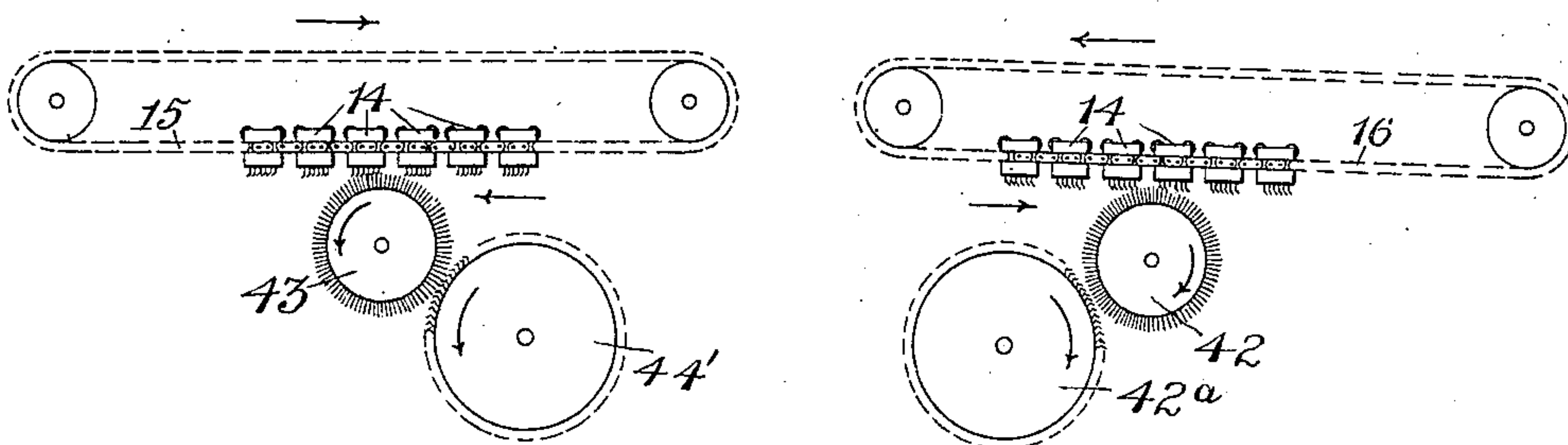
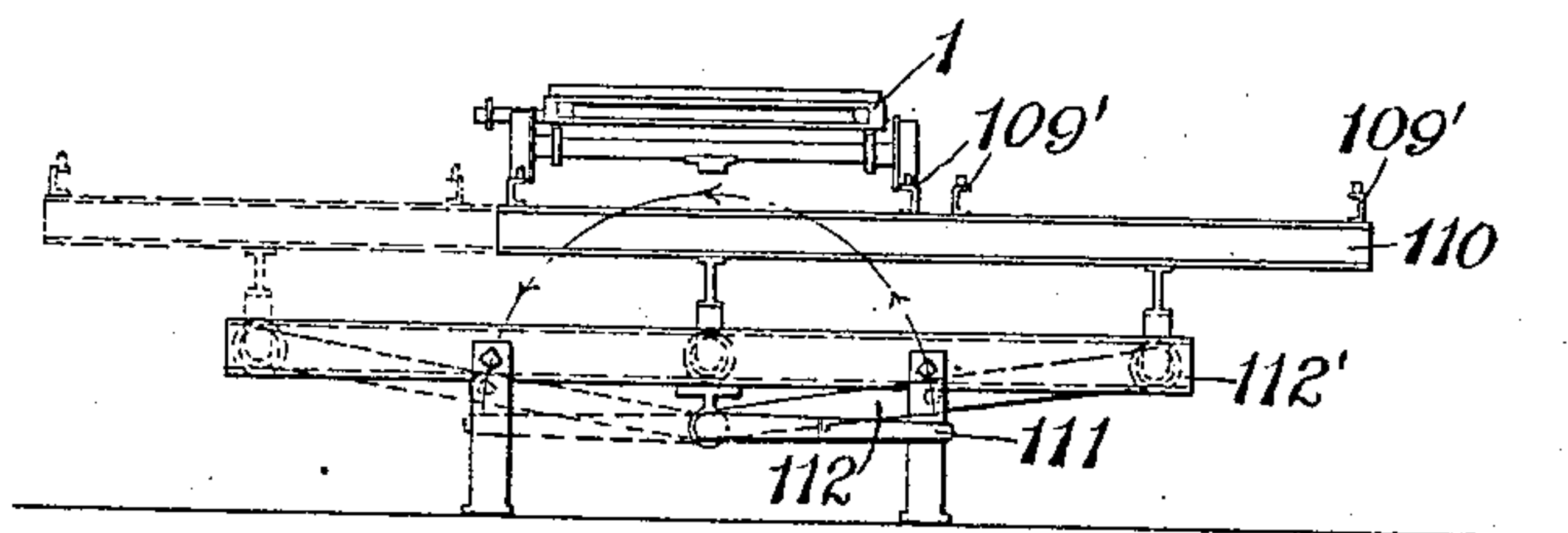


Fig. 19.



Witnesses.  
T. L. Nelson  
M. Heas.

Inventors.  
A. Mellor.  
J. Villy.  
By John C. Dewey atty.



# UNITED STATES PATENT OFFICE.

ARTHUR MELLOR, OF MACCLESFIELD, ENGLAND, AND JEAN VILLY, OF AMPLEPUIS, FRANCE.

## MACHINE FOR WORKING OR DRESSING TEXTILE FIBERS.

No. 865,512.

Specification of Letters Patent.

Patented Sept. 10, 1907.

Application filed June 28, 1905. Serial No. 267,391.

*To all whom it may concern:*

Be it known that we, ARTHUR MELLOR, a subject of King Edward VII of Great Britain, residing at Macclesfield, in the county of Cheshire, England, and JEAN VILLY, a citizen of the Republic of France, residing at Amplepuis, Rhône, France, have invented certain new and useful Improvements in Machines for Working or Dressing Textile Fibers, Especially Silk and the Like, of which the following is a specification.

10 This invention relates to machines for working, hatching or dressing textile fibers, and particularly to machines for dressing silk and like fibers.

At the present time, the dressing of silk is chiefly carried out in one or other of two machines working on different principles, one being known as the "flat" frame, and the other as the "circular" frame, and the object of our present improvements is to obtain the advantages of the two said principles or systems in one machine and to avoid their principal defects, and further to increase considerably the rate of production of dressed silk by a convenient organization of working.

20 The chief advantages obtaining in the use of the "flat" frame are, a large combing surface, and a very slow combing speed, which saves the fiber and therefore gives a good yield in draft. The "flat" frame is, however, defective in that, the combs being arranged above the tufts to be dressed, the chrysalides and other dusts or foreign matters on or in the silk cannot be taken away by the combs and the dressed silk therefore contains a considerable percentage of dust. For this reason "flat" dressing is more suitable for waste, containing very few chrysalides. The dressed silk has also a tendency to fit close to the book boards and the combs cannot very well pass through, the silk rendering it difficult to get drafts without small curls therein, and to regulate the machine; the combs being liable to scrape against and injure themselves and the boards. The combs also get filled with short fibers of silk, which have to be removed by hand, hindering or delaying the combing process and causing friction by the contact of silk with silk which becomes hot and causes the fiber undergoing the combing process to break, thus spoiling the yield. Further, the "flat" machine giving only a comparatively small production, the cost of dressing is very expensive. The advantages of "circular" dressing are; a greater production than in the "flat" frame, and the production of a cleaner draft, by reason of the combs acting on depending tufts of silk which pass more easily through the combs. The disadvantages or defects of the "circular" system of dressing are, the small combing surface presented by the tangent of two cylinders, which necessitates the running of the combing cylinder or cylinders at a high speed to get the silk sufficiently cleaned, the silk becoming hot and a large proportion of the fibers broken, which spoils the yield; also the combing cylin-

ders get full of combings and shorts thus rendering the "circular" system in this respect equally as objectionable as the "flat" frame.

The object of our invention is to obtain the advantages of the two machines or said systems of dressing and avoid the principal defects of both machines.

Our invention consists in providing means to work on the principle of slow combing with a large combing surface, as in the "flat" frame, and to have the silk above the combs so that the depending tufts have a tendency to pass easily into the teeth of the combs and be cleaned of the chrysalides or dust, as in the "circular" frame; the combs being constantly cleaned to remove the combings and shorts and therefore avoid the heating of the fibers.

According to our improvements we get a maximum yield and continuous dressing of the fibers without loss of time; the system of working enabling the attendants to perform the same kind of work over and over again, some constantly securing the silk in the frames and others being engaged in reversing the tufts to comb the opposite ends, whereby the duties are specialized and constant, and a production is obtained which is impossible in the ordinary "flat" or "circular" dressing machines.

The various novel features of our invention will be fully hereinafter described and particularly pointed out in the claims.

Referring to the drawings, Figure 1 shows, in side elevation, the general arrangement and construction of a machine for working or dressing silk or like textile fibers, embodying our improvements. Fig. 2 is a plan view of the machine shown in Fig. 1. Fig. 3 is a cross section of the machine, on a larger scale, taken on the plane indicated by the line *a, a*, Fig. 1, and looking in the direction of the arrows. Figs. 4 and 5 are details showing, respectively, in plan and cross section, a portion of one of the comb bars and one of the chairs in which the ends of the comb-supporting bars are mounted. Fig. 6 is a plan view of one of the carriages in which the book boards are traversed through the machine. Fig. 7 is a side elevation of Fig. 6 showing the carriage as it travels through the machine. Fig. 8 is a similar side elevation, but shows the carriage turned over, and opened to permit of the book-boards being removed for insertion, turning, or removal of tufts of fiber; the book-boards being omitted in this figure. Fig. 9 is a sectional plan view of a portion of the machine showing the arrangement of the strippers. Fig. 10 is a side elevation of the stripper arrangement and also shows the brush by which the combings are removed from the forward comb and transferred to the operative stripper; the drawing-off rollers being omitted from this view in order that the arrangement and construction of the strippers may be more clearly illustrated. Fig. 11 is a skeleton plan of two machines with



turn tables and turn-over apparatus at the ends thereof, and Figs. 12 and 13 are side elevations looking in the direction of the arrows *f*, in Fig. 11, of the turn-over apparatus at the front and rear ends, respectively, of the machine. Fig. 14 is a detail and Fig. 15 a sectional view of the means for supporting the comb-carrying bars. Fig. 16 is a diagrammatic view showing the relative positions of the machine proper and the devices for handling the carriages. Fig. 17 is another view of the carriage shown in Figs. 6, 7 and 8 with the parts in a different position. Fig. 18 is a diagrammatic view of a modified arrangement of the means for cleaning the combs. Fig. 19 is an elevation of one of the bogies hereinafter described.

Referring firstly to Figs. 1 and 2, in which the general arrangement and construction of the machine are shown, 1 represents the carriages in which the tufts of fibers are traversed through the machine by means of worms 2 carried by a longitudinal shaft 3 supported in bearings in the cross brackets 4' from the side frames 4 of the machine. The shaft 3 is driven through the bevel gears 5, cross-shaft 6, gears 7 and chain 8 from the driven shaft 9 on which are the fast and loose pulleys 10 and 11. The carriages 1 are provided with racks 1' with which the worms 2 engage, and with wheels or pulleys 12 which run on longitudinal rails 4'' formed on or attached to the side frames 4. In the drawings two carriages only are shown, but in actual working the carriages follow close upon one another to avoid loss of time. The tufts of fiber are nipped between book-boards 13 held in the carriages 1, as will be hereinafter more particularly set forth. The tufts of fiber, as will be seen from the drawings, depend from between the book boards 13 instead of projecting above the said boards, as is usual in the present construction of "flat" dressing machines.

The combing is performed by transverse comb bars 14 carried by the two series or sets of endless chains 15 and 16 arranged one behind the other longitudinally of the machine. The chain wheels 15', 15'' and 16', 16'', around which the comb-carrying chains 15 and 16 respectively pass, and by which they are traversed, are adjustably mounted in brackets 15'''. The comb-carrying chains 15 and 16, inclined, by suitable adjustments in the brackets 15''', that the teeth of the combs thereon, as they approach the end of their traverse, are brought gradually nearer to the roots of the depending tufts of fibers so as to render the combing action gradual. The comb-carrying chain 15 travels in the same direction as the carriages 1, that is to say, in the direction indicated by the arrows in Fig. 1, but at a quicker rate than said carriages. The teeth of the combs 14 are thus drawn through the depending tufts of fibers and dress them from one side thereof. After being operated upon by the combs on the chain 15, the depending tufts of fiber are traversed by the continuously rotating worms 2 over the comb-carrying chain 16 which travels in the contrary direction to the comb-carrying chain 15, and combs or dresses the opposite side of the depending tufts. The comb-carrying chain 15 is driven from the shaft 9 by the gears 17, and the comb-carrying chain 16 is driven by the chain 18 passing around the chain pulley 19 fast on the same shaft as the chain wheel 15'' and around the adjustably mounted chain wheel 20, a gear 21 on the axis of said chain wheel 20 communicating

motion to said chain wheel 16'. The speed at which the respective comb carrying chains travel may be changed independently as desired to give such speeds relative to the speed at which the tufts are traversed as may be found to produce the best results. The comb bars 14 carrying the combs 14' are secured to supporting bars 23, the upper faces of which are inclined (see Fig. 5) which causes the teeth of the combs to occupy such a position that the teeth in each comb engage the tufts gradually, that is, the front or foremost teeth in each comb only come into contact with the points or dressed portion of the tufts, while the rear teeth penetrate more nearly to the roots or undressed portions of the tufts. The gradual working or dressing of the fibers obtained by this arrangement and by the previously mentioned inclined position of the comb-carrying chains enables the tufts to be dressed thoroughly with a minimum production of "shorts" or broken fibers, due to harsh treatment thereof. As a further protection against tearing or breaking the fibers or damaging the teeth of the combs, each comb-bar is arranged to yield or rock in case an abnormally matted or hard tuft of fiber is presented thereto. To secure this result the ends of the comb-supporting bars 23, which are attached to the chain links by plates 24, and to which plates they are secured by bolts 24', are supported in chairs 25. These chairs are provided with bowls or wheels 26 which run on guide rails 27, and with wood friction blocks 28 which work against guide rails 29. The rails 27 and 29 are carried by vertically adjustable brackets 30 which can be adjusted to insure the teeth of the combs traveling in the desired inclined path, such adjustment of said brackets being in conformity to the adjustments of the chain wheels 15', 15'', 16', 16'', so that the chains 15 and 16 will run at the angles at which the rails 27 and 29 are inclined. The comb-supporting bars 23 are secured to the chairs 25 by spring bolts 31 passing through the bars 23 and plates 24 and through the top plates 25' of the chairs. When a comb meets with an abnormally matted portion of fiber through which the teeth of the comb cannot pass, the comb-bar 14 is permitted by the springs on the bolts 31 to rock over or yield downwardly a sufficient distance to allow the teeth of the comb to pass clear of the obstruction. After the obstruction is passed the springs encircling the bolts 31 return the comb bar to its normal position.

The front and rear ends of the carriages 1 are provided with cross bars or movable end pieces 32 and 32' which are coupled or attached at each side to levers 33 and 33' pivoted eccentrically on side plates 34 fast on the cross shaft or bar 35 extending across the carriage so that the side plates 34 at each side of the carriage move in unison.

To one of the side plates 34 or to the shaft or bar 35 is secured a hand lever 36, by moving which, the said plates 34 are partially rotated and, by reason of the pivot connections of the levers 33 and 33' being on opposite sides of the axis 35, the end pieces 32 and 32' are (as will be clearly understood from Figs. 6 and 7) drawn inwardly or forced outwardly, as the case may be. The end pieces 32 and 32' slide on guides 37' formed or provided on the inner sides of the side frames 37 of the carriage, and the end piece 32, or both end pieces if desired, is or are provided with spring connections 32'' between same and the connecting levers. The hand lever 36 carries a lever 38 to which is jointed a rod 38<sup>a</sup>



having a projection 38' and connected with a retracting spring 38<sup>b</sup>, said projection being adapted, when the carriage is closed, as shown in Fig. 7, to engage in a notch 39' (see Fig. 8) and thus retain said hand-lever 36 in locking position. To prevent the handle 36, when the carriage or frame is being opened, from flying up suddenly when the catch projection 38' is released, the inner end of said lever 36 is provided with a cam surface 36' against which bears a spring plunger 40 carried in a bracket 41 secured to the frame 37 of the carriage.

In Fig. 7 the carriage or frame is shown with the book-boards 13 secured between the end pieces 32 and 32', this being the positions of the parts when the tufts of fiber are nipped between and depend from said book-boards ready for traversing through the machine. When the tufts of fiber have been dressed and it is desired to turn them, in order that the undressed portions thereof may be next operated upon, or to remove dressed tufts in order that undressed tufts may be inserted, the carriage is run to the turn-table hereinafter described and turned over to bring the book-boards to the top. The catch lever 38 is then pressed to release the projection 38' from notch 39', and the hand lever 36 moved over (see Fig. 17) until the pivot centers of the levers 33 and 33' have been reversed, as shown in Fig. 8, this causing the end pieces 32 and 32' to be opened out and the book-boards to be released. To lock the carriage, the hand lever is moved to rotate the side plates in the direction of the arrow *b*, Fig. 8, causing the end pieces 32 and 32' to be moved, respectively, as indicated by the arrows *c* and *d*, and the book boards 13 will then be firmly nipped between said end pieces. The springs 32'' take up any undue pressure.

The combings or short fibers, chrysalides, dust and foreign matters removed from the fibers by the combs, are dealt with as follows: Between the two comb-carrying chains 15 and 16 is located a revolving brush 42 in contact with the teeth of the combs on each chain. This brush, in its revolution in the direction of the arrow on Fig. 1, removes the combings from the teeth of the combs on the chain 16 and transfers them to the teeth of the combs on the chain 15 from which such combings, as also the combings gathered by the combs on the chain 15 as the result of their operation on the fibers, are removed by another brush 43 and transferred by it to one of the two strippers 44 or 44'. The brushes 42 and 43 are driven by means of a rope or chain 45 passing around the pulley 46 on the driving shaft 9 and around the pulleys 42' and 43' respectively secured on the axes of said brushes. A pulley 47, around which said rope 45 also passes, affords a means for adjusting the tension on the said rope.

The strippers 44 and 44' are arranged to act alternately, that is to say, one stripper is in position to receive the combings from the brush 43 while the other stripper is being cleaned or having the combings removed therefrom. The arrangement and construction is shown clearly in Figs. 9 and 10 wherein the stripper 44' is shown in position to strip the combings from the brush 43 while the stripper 44 is swung out to one side of the machine to be cleaned. The strippers 44 and 44' are arranged to pivot on the vertical shafts 48 and 48' on which are worm wheels 49 and 49' meshing with worms 50 and 50' carried by the brackets 51 and 51'

from the machine frame and provided with operating handles 52 and 52'. The opposite ends of the strippers are supported by brackets 53 and 53' on their respective shafts, carrying bowls 54 and 54' which run on the curved supporting rails 55 and 55'. The strippers are driven, when in operative position, by means of gears 56 and 56' fast on their respective axes. These gears mesh with pinions 57 and 57' carried by the bracket 58 and are constantly driven by the gear 59 fast on the axis of the continuously revolving brush 43. The strippers are respectively locked in their operative positions by means of the catches 60 and 60' which are pivotally mounted in slots in the rails 55 and 55' and which engage projections 61 and 61' on the brackets 53 and 53' supporting the free ends of the strippers. (See Figs. 3, 9 and 10). The catches 60 and 60', which are adapted to swing horizontally, are released from their engagement with the stripper supporting brackets, when it is desired to swing the strippers out of action, by means of the foot levers 62 and 62' which, through the connections 63 and 63', operate the slotted levers 64 and 64' in which the projections 65 and 65' on the catches engage. Springs 66 and 66', respectively located on the connecting rods 63 and 63', normally maintain the catches 60 and 60' in proper position to engage the projections 61 and 61' on the strippers being moved into operative position. The strippers are provided respectively with adjustable presser brushes 71 and 72 (see Fig. 1) by which the combings are pressed on to the teeth of same. The strippers are cleared of their accumulated lap of combings by means of the pairs of cleaning or drawing-off rollers 67 and 67' carried by the brackets 68. These drawing-off rollers are respectively geared together and provided with handles 69 and 69' by which they can be rotated.

Instead of transferring the combings from the combs on the chain 16 to the combs on the chain 15 as described, a brush 42' may be arranged to revolve in contact with the combs on the chain 16 only, the said brush being stripped by a stripper 42<sup>a</sup> (see Fig. 18) located under the chain 16 and mounted in any suitable manner so as to be capable of being swung out to one side of the machine to be cleaned. In such case the combs on the chain 15 would be cleaned by brush 43 and the first combing would be transferred to the stripper 44' without being mixed with the shorter combings coming from the combs on the chain 16.

In cleaning a stripper the lap of combings is slit or separated longitudinally of the stripper by a knife or other tool and one severed end passed between the drawing-off rollers which are then rotated and the combings drawn off the stripper in the form of a lap.

The frames 70, by which the bearings for the drawing-off rollers are respectively carried, are provided with means for adjusting the position of said rollers nearer to or further from the peripheries of the strippers. To this end (see Fig. 3) the frames, 70, are mounted for horizontal movement upon suitable guideways 681, formed upon the upper ends of the brackets, 68, while suitable adjusting devices, herein shown as screws, 701, interposed between the frames, 70, and the brackets, 68, serve to fix the position of the frames, 70, and therefore of the drawing-off rollers, 67, 67', relative to the strippers 44 and 44'.

As previously mentioned, two machines constructed



as above described, are placed side by side, the tufts of silk, after leaving the first machine, being reversed so that the undressed portion of the tufts may be operated upon in the second machine, the feeding and delivery ends of the second machine being in alinement with the delivery and feeding ends respectively of the first machine.

We will now describe the means we have devised for reversing or turning over the carriage containing the book boards in order to present the tufts on the underside of the carriage on entering the machines so as to be operated upon by the combing surfaces, and on the upper side when the carriages leave the machines to present the tufts at the top of the carriage to facilitate reversal of the tufts or for the removal of the same and the substitution of fresh tufts, and for traversing same from one machine to the other to maintain a constant cycle in the passage of the carriage through the two machines. The said means are illustrated at Figs. 11, 12 and 13, the two latter figures showing exclusively the means for overturning the carriages at the feeding end and at the delivery end respectively of the machine. There are similar means on each machine, but it is only necessary to describe the means applied to the first machine.

Fig. 11 is a skeleton plan view of the two machines showing the direction of progression of the carriages therethrough, the turn tables, and transverse tracks over which the carriages are run from one machine to the other; the arrangements provided for enabling two, three or more carriages to be dealt with to reverse the tufts or introduce fresh tufts at the respective ends of the machines, as will hereinafter appear. Taking the machine lettered A in Fig. 11 to be the first machine, and the course of the carriages containing the book boards consequently as indicated by the arrows, the workman in first commencing operation pushes a carriage 1 forward along the rails 73 from the turn table 74, the said rails being at a lower level (see Fig. 13) than the rails 4'' over which the wheels of the carriages travel through the machine. The carriage passes to the machine the reverse side up to that which it must occupy in passing through the machine, and as it is pressed forward to the turn-over apparatus the rack 1' thereon engages the pinion 75 which is constantly driven through the train of gears 75' and chain 75'' from chain wheel 76' on shaft 76, the latter being driven by gears 77 from the longitudinal shaft 78. The shaft 78 receives motion through pinions 78' from a cross shaft 79 (see Fig. 11) which is driven by one of the gears 7 on the machine. As soon as the rack 1' is engaged by pinion 75 the carriage is moved automatically into the turn-over apparatus, the wheels of the carriage riding over side arms 80 secured to the turn-over table 81 and engaging at their upper surfaces with said table and thus being held or confined between the arms and the table. Just before the end of the forward movement of the carriage into the turn-over apparatus (see Fig. 12) the roller 82 on the carriage abuts against one arm of a two-armed lever 83 pivoted at 83' to the frame of the machine and rocks said lever, a link 84 pivotally secured to the other arm of said lever and to an angle lever 85 actuating said angle lever which, through the link or connecting rod 86, gives partial rotation to a cam 87 loose on an upright shaft 88; the cam acting against a bowl or roll 89'

on a pawl 89, mounted on a lever 89'' and moving said pawl out of engagement with a ratchet wheel 90 fast on the shaft 88. The withdrawal of the pawl 89 from the teeth of the ratchet wheel releases the shaft 88 which is immediately turned through part of a revolution by the gravity action of a weight 91 suspended from the end of a chain passing over a pulley 91' and connected to an arm 92 fast on the said shaft 88.

On the upper end of shaft 88 is secured a fork 93 engaging at its free end an annular recess in the boss of a gear wheel 94 rotatively secured on shaft 76 but free to slide endwise thereon, and when the shaft 88 is oscillated as described, the fork slides the gear 94 along the shaft 76 and into gear with a spur wheel 95 fixed on a disk or face wheel 96 mounted on a stud or shaft 96' supported in bearings in the side framing of the machine, whereby rotary motion is imparted to the disk 96.

The turn-over table 81 is mounted to turn upon a shaft 81' on which is secured a disk 97 shaped on two sides to register with the periphery of the disk 96 and normally lock the turn-over apparatus after each actuation. The disk 96 has two recesses 96'' in its periphery and is provided with gear segments 96''' opposite said recesses. As the disk 96 rotates, one of these gear segments 96''' is brought into mesh with a gear wheel 98 fast on the shaft 81' and rotates the same, the longer radii of the disk 97 entering the recess 96'' presented by the disk 96 and turning freely therein to the extent of half a revolution which is the movement given to the shaft 81', such half circular movement turning over the table 81 to bring the carriage 1 from the under to the upper side thereof and thereby present it in line with the rails 4'' extending through the dressing machine and with the tufts depending from the book boards in readiness for being dealt with by the traveling combs.

The pawl 89 is carried by a lever 89'' loosely mounted on shaft 88 and having connected to one arm thereof a weight 99 and provided at the extremity of its other arm with a bowl or roll which normally is in engagement with one of two cam surfaces 100 on the disk 96. As the disk 96 rotates, the bowl on lever 89'' rides clear of the cam surface 100 and the lever 89'' is thereupon caused by the weight 99 to move upon its center and bring the pawl 89 into re-engagement with the ratchet wheel 90. Before the completion of the revolving movement of the disk 96 the bowl on lever 89'' is engaged by the other cam surface 100 and the lever moved about its pivot in the opposite direction whereby the pawl 89 is moved forward and turns the ratchet wheel to the extent of one or more teeth and partly rotates the shaft 88 whereby the fork 93 moves the gear 94 out of driving contact with the gear 95 and places the disk 96 out of operation until another carriage is run into the turn-over apparatus when the same cycle of movements as above described is repeated. The carriage which has thus been overturned and placed in the upper position is pushed against the first worm on the shaft 3 by means of a curved arm 101. The said arm supports at its free end a small roller 101' mounted on a plate having an elastic or spring connection with the arm 101 in order that there may be a certain amount of elasticity in the movement of the arm to insure the proper engagement of the rack 1' on the carriage with



the worm 2. The arm 101 is pivoted on a stud carried by the frame and is provided with a gear segment 101<sup>a</sup> (see Fig. 11) which meshes with a gear segment 102<sup>a</sup> fast on an upright shaft 102 on which is also secured a lever 103 to one arm of which is connected a chain passing over a suitable pulley carried by the frame and having on its outer end a weight 104, while the other arm is provided with a bowl or roll engaging normally with one of two cam surfaces 105 on the back of the disk 96. The weight rocks the shaft 102 when the cam surface 105 passes clear of the lever 103, such movement of shaft 102 drawing back the arm 101, while on the lever engaging the other cam 105 when brought into proper position by the rotation of disk 96, the shaft 102 is rocked in the contrary direction and forces the arm 101 forward, the roller 101' engaging the carriage just brought to the upper position and forcing it forward to bring the rack 1' into mesh with the nearest worm 2. The moment this takes place the carriage is carried forward through the machine as previously described. On the carriage arriving at the delivery end of the machine it enters the yoke formed by the arms 80 and the turn-over table 81 as shown at Fig. 13, the pulley or bowl 82 engaging the lever 83 and by similar connections and gears to those described with reference to Fig. 12 and indicated by corresponding reference numerals, brings into motion the apparatus for overturning the table 81 and bringing the carriage to its lower level with the tufts of silk on the upper side so as to be ready for removal and reversal. The cycle of operations is repeated on each carriage entering and leaving the machine, the carriages following one behind the other with only slight intervals in between.

In Fig. 13 the pinion 75 is rotated by a pinion driven by a pawl and ratchet wheel from the gears 75', such ratchet wheel permitting the attendant, if he so desires, to draw out the carriage at a greater speed than that given by the train of gears. In each turn-over apparatus shown in Figs. 12 and 13, the pinions 85 are carried by weighted levers 107 to allow of slight bodily movement of said pinions in the event of the teeth of the racks on the carriages not registering accurately in first moving into gear with same.

At each end of the two machines there are turn-tables as shown at Fig. 11, in order that the carriage may be turned and transferred from the delivery end of one machine to the feeding end of the other machine and presented the right way about to the feeding ends of the machines. Rails 108 extend between each turn-table over which the carriages are moved transversely from one machine to the other. Beyond the turn-tables short rails 109 extend to carry the carriages to small bogies or platforms 110 provided with rails 109' parallel to the rails 109. There are two pairs of such rails upon each bogie or platform and either pair can be brought in alinement with the rails 109 by actuating the hand lever 111, each bogie being coupled to its hand lever by an arm 112 and link 112'. These bogies form reserve places for receiving the carriages as they come out of the respective machines, enabling a staff of workmen at each end to change the tufts of silk, reversing said tufts between the delivery ends of machine A and feeding end of machine B, and removing the dressed tufts and substituting fresh tufts between the delivery end of ma-

chine B and the feeding end of machine A. These bogies, arranged as shown, shorten the total length of the machines and enable workmen to be constantly engaged in reversing or changing the tufts of silk so that the carriages may be kept constantly passing through the machines without loss of time and without having to handle manually any of the carriages.

We can dispense with the turnover tables shown and described and use the spaces occupied thereby as reserve spaces to receive the carriages before entering and after leaving the machine, the means for drawing the carriages into the machine from the space at the front and discharging them from the machine, to the space at the rear, being as before described. In this case bogies may discharge and pick up the carriages at any point or any number of reserve spaces between the delivery end of one machine and the feeding end of the other machine may be provided. The bogies would run over rails laid on the floor and the level of the carriages would not be altered at any part of their progression from one machine to another.

Having thus fully described our said invention what we claim as new and desire to secure by Letters Patent is:—

1. In a machine of the character described, the combination with a longitudinally movable carriage provided with means for holding tufts of fibers, and a combing device movable in a rectilinear path which converges slightly toward the path of movement of said carriage.

2. In a machine of the character described, the combination with a longitudinally movable carriage provided with means for holding tufts of fibers, of a combing device movable in a rectilinear path which converges toward the path of movement of said carriage, said combing device leaving a combing surface inclined toward the path of movement thereof.

3. In a machine of the character described, the combination with a carriage provided with means for holding tufts of fibers, means for traversing said carriage through the machine with the fibers depending therefrom, and means for reversing said carriage at the end of its movement through the machine, of two endless chains, located beneath the path of said carriage, combs carried by said chains and adapted to engage said fibers, mechanism for moving said two series of chains in opposite directions, means comprising rotary brushes for removing the combings collected by the combs, movable strippers to receive the combings from said brushes, said strippers being adapted to be swung out to one side of and clear of the machine for cleaning, and means for removing the combings from the strippers when inoperative.

4. In a machine of the character described, the combination with a carriage provided with means for holding tufts of fibers, and means for traversing said carriage through the machine, of means for reversing said carriage at the end of its movement through the machine.

5. In a machine of the character described, the combination with a longitudinally movable carriage provided with means for holding tufts of fibers, of mechanism for reversing said carriage comprising a turn-over table and means for automatically actuating said table upon the insertion of a carriage thereinto.

6. In a machine of the character described, the combination with combing mechanism, and a longitudinally movable carriage provided with means for holding tufts of fibers, of mechanism for reversing said carriage comprising a turn-over table, means for automatically actuating said table upon the insertion of a carriage thereinto, and means for presenting a carriage from said turnover table to said combing mechanism.

7. In a machine of the character described, the combination with a carriage provided with means for holding tufts of fibers and means for traversing said carriage through



the machine, of mechanism for reversing said carriage at the end of its movement through the machine, said mechanism comprising a turn-over table constructed and arranged to receive said carriage from said traversing means, means for automatically actuating said table upon the insertion of a carriage, thereinto, and means for ejecting said carriage from said table.

8. In a machine of the character described, the combination with a comb bar, of a bar having an inclined face upon which said comb bar is mounted, a chair for supporting said last-named bar, guides within which said chair is movable longitudinally of the machine, and a yielding connection between said chair and said last-named bar.

9. In a machine of the character described, the combination with a comb bar and means for moving the same longitudinally through the machine, of a yielding connection between said bar and said means.

10. In a machine of the character described, the combination with a pair of endless chains, comb bars carried by said chains, yielding connections between said bars and said chains, and means for actuating said chains.

11. In a fiber-combing machine, a carriage for carrying the tufts of fibers to be combed through the machine, comprising a plurality of book boards between which the fibers are nipped, movable end pieces between which said book boards are clamped, guides upon which said end pieces are adapted to slide, links connected to said end pieces, side plates upon which said links are eccentrically pivoted, a rod connecting said side plates, a hand lever operatively connected to said rod, a spring latch for holding said hand lever in a predetermined position, a cam formed on said hand lever, and a spring plunger engaging said cam surface to control the movement of the hand lever.

12. In a fiber combing machine, a carriage for carrying the tufts of fibers to be combed through the machine, comprising a plurality of book boards between which said fibers are nipped, movable end pieces between which said book boards are clamped, guides upon which said end pieces are adapted to slide, links yieldingly connected to said end pieces, a pivoted plate upon which said links are eccentrically pivoted, and a hand lever operatively connected to said plate.

13. In a machine of the character described, the combination with a carriage provided with means for holding tufts of fibers, and means for traversing said carriage

through the machine, of devices for turning said carriage over at the feeding and delivery ends of the machine, and means for holding a plurality of such carriages in reserve beyond said turning-over devices.

14. As an adjunct to a fiber combing machine employing a carriage for the material to be combed, means for supporting in reserve a plurality of such carriages, and means whereby said supporting means may be moved to present any one of said plurality of carriages to the machine.

15. As an adjunct to a fiber combing machine, employing a carriage for the material to be combed, means for supporting in reserve a plurality of such carriages comprising the platform 110 provided with a plurality of tracks 109', a track 112' extending transversely of the machine upon which said platform is movable, and means for moving said platform 110 along said track 112' to present any predetermined pair of tracks 109' to said machine.

16. In combination, a pair of fiber dressing machines employing carriages for the material to be dressed, means at either end of either machine for turning over said carriages, a turn table at either end of either machine beyond said turning-over means, and tracks connecting the corresponding turn tables of said machines.

17. In a machine of the character described, the combination with means for combing fibers, of a revolving brush for collecting combings from said combing means, a plurality of movable strippers each adapted when in operative position to receive the combings from said brush, vertical shafts upon which said strippers are pivoted, curved guide rails on which the free ends of said strippers are supported, devices for moving said strippers from operative to inoperative position, and vice versa, devices for locking said strippers in operative position, and means for cleaning or drawing off the combings from said strippers when in inoperative position.

In testimony whereof we affix our signatures in the presence of two witnesses.

ARTHUR MELLOR.  
JEAN VILLY.

Witnesses as to Arthur Mellor:  
ERNALD SIMPSON MOSELEY,  
MALCOLM SMETHURST.

Witnesses as to Jean Villy:  
HENRI DOLL,  
HENRY DANZIG.