

O. D. JOHANTGEN.  
 RIBBON FEEDING MECHANISM FOR CALCULATING MACHINES.  
 APPLICATION FILED JULY 27, 1906.

953,090.

Patented Mar. 29, 1910.

2 SHEETS—SHEET 1.

Fig. 1.

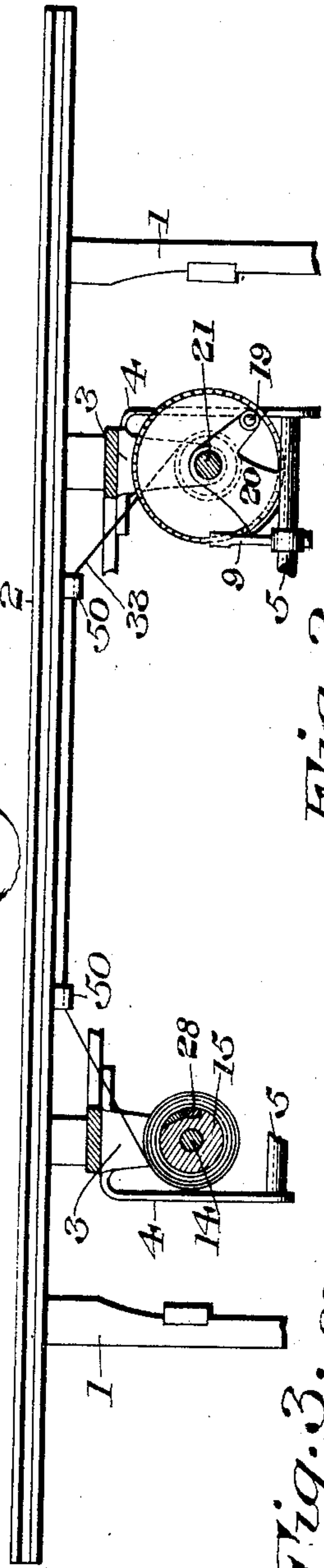


Fig. 2.

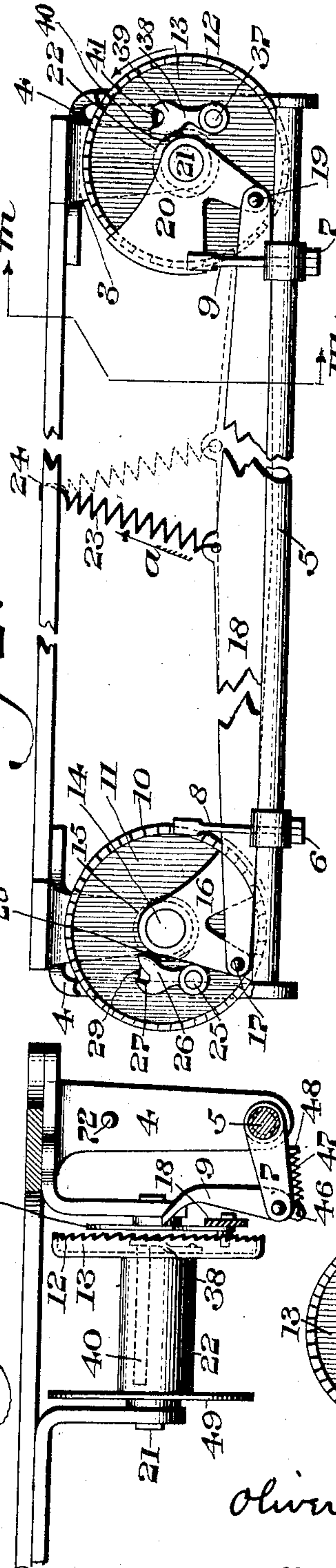


Fig. 3.

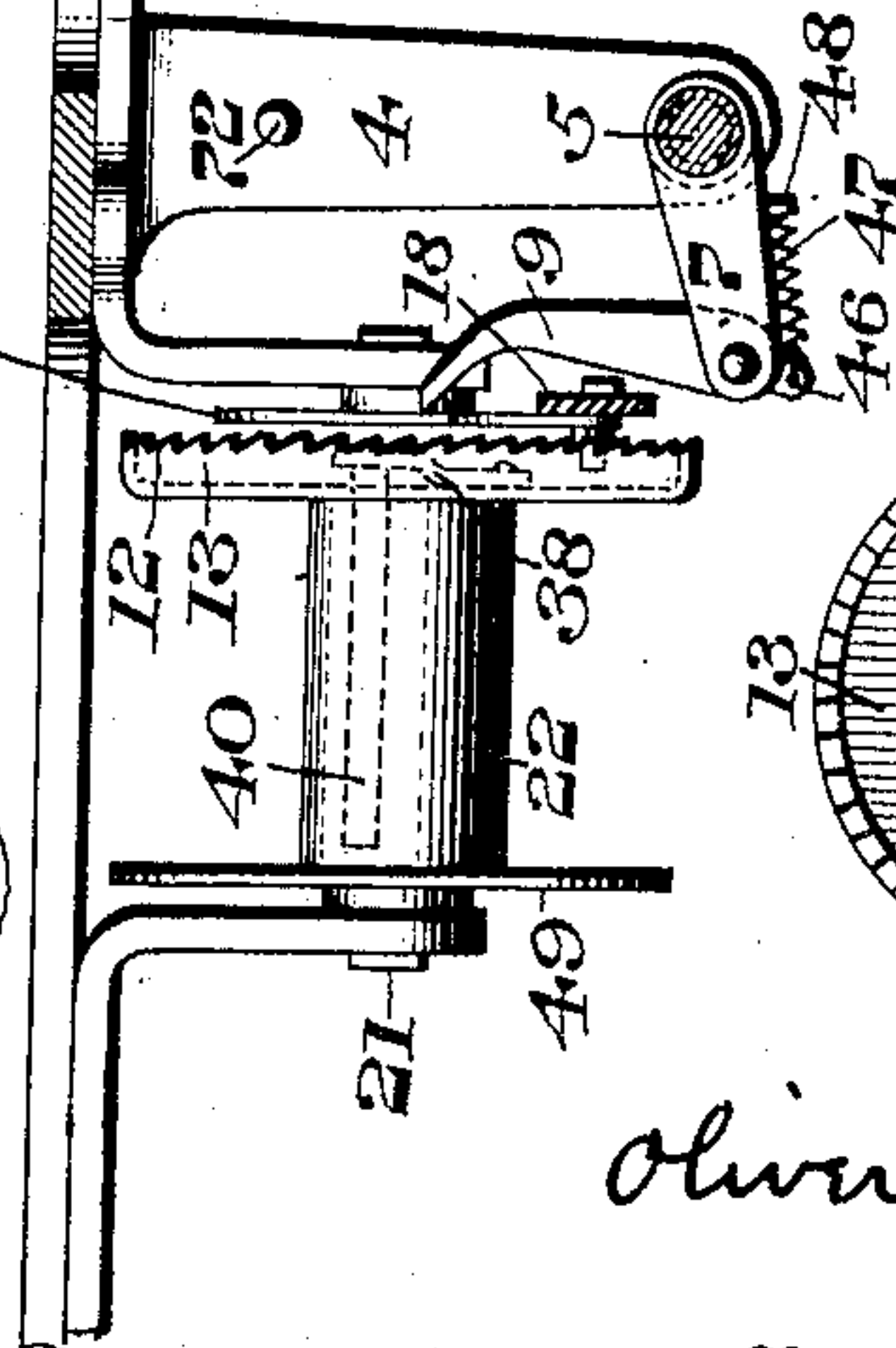


Fig. 4.



Fig. 5.

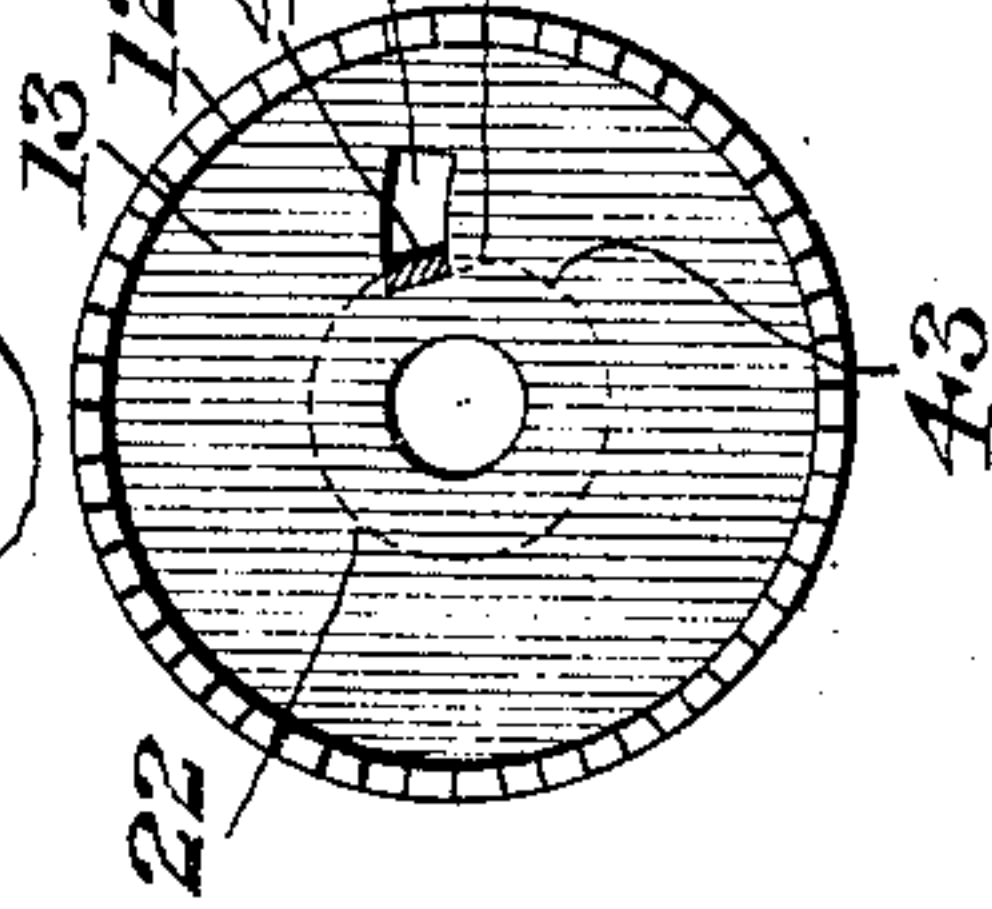


Fig. 6.

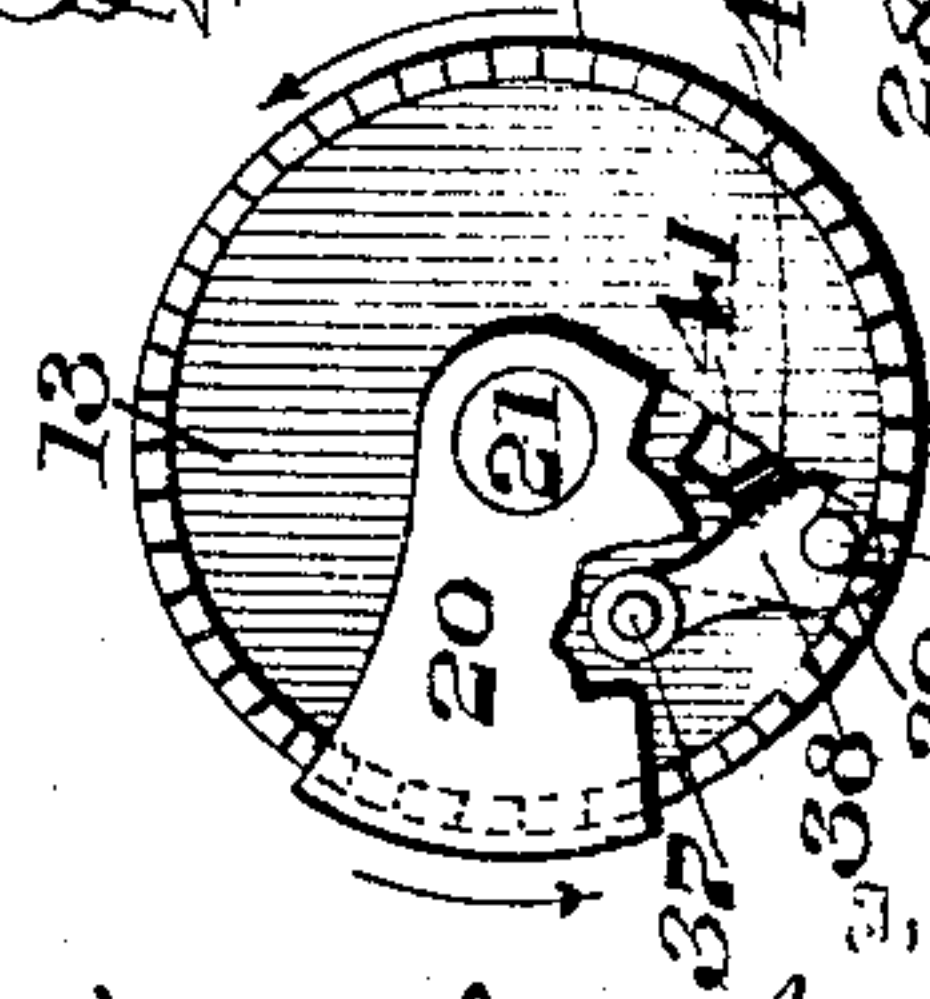


Fig. 7.

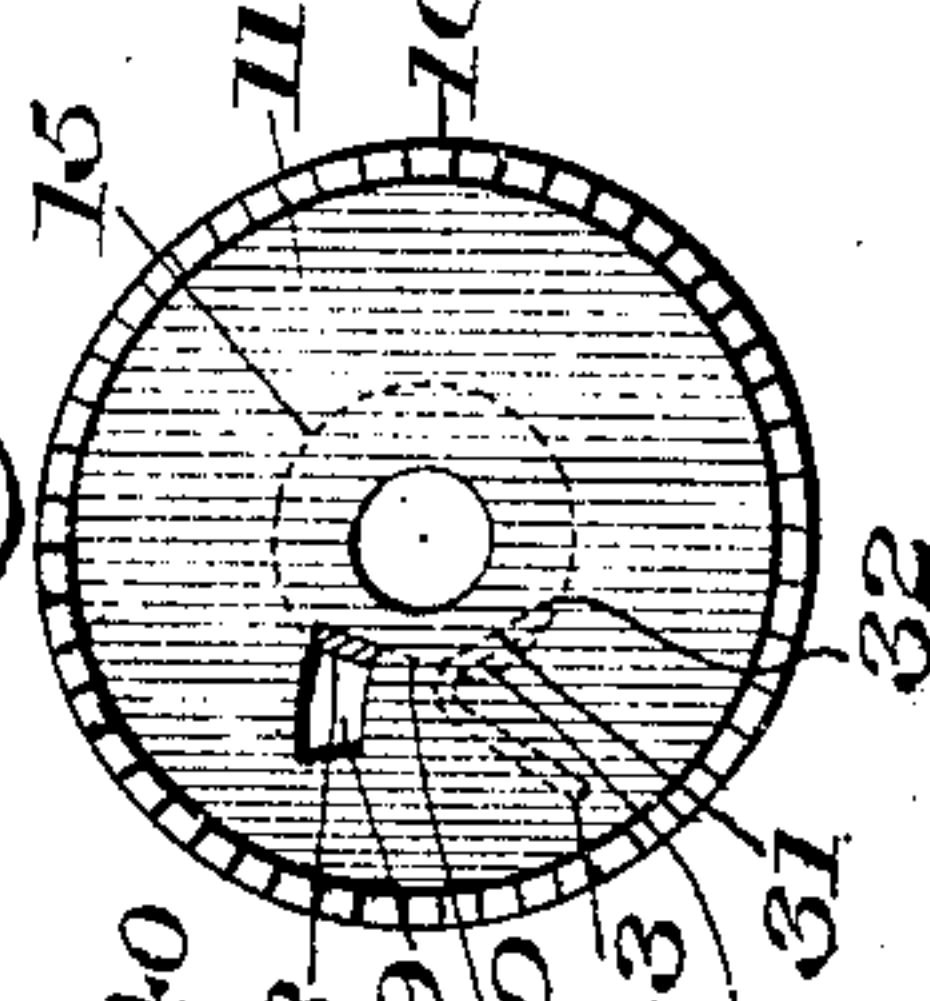


Fig. 8.

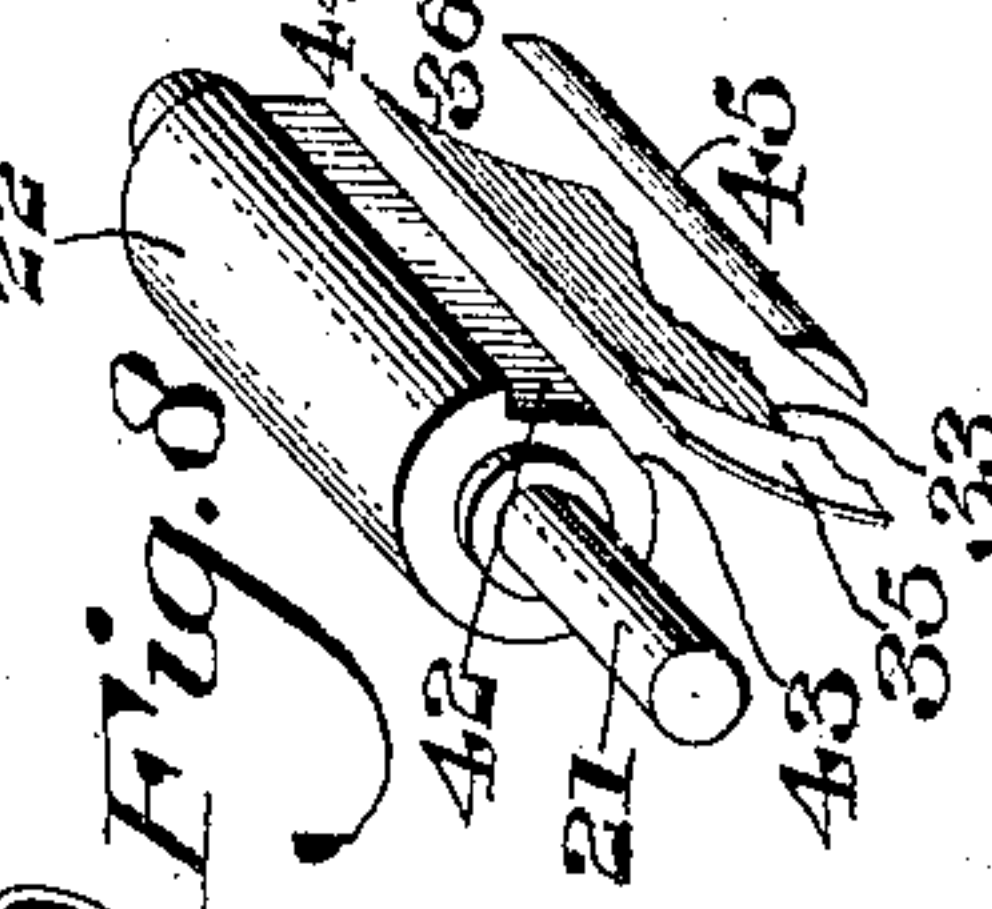
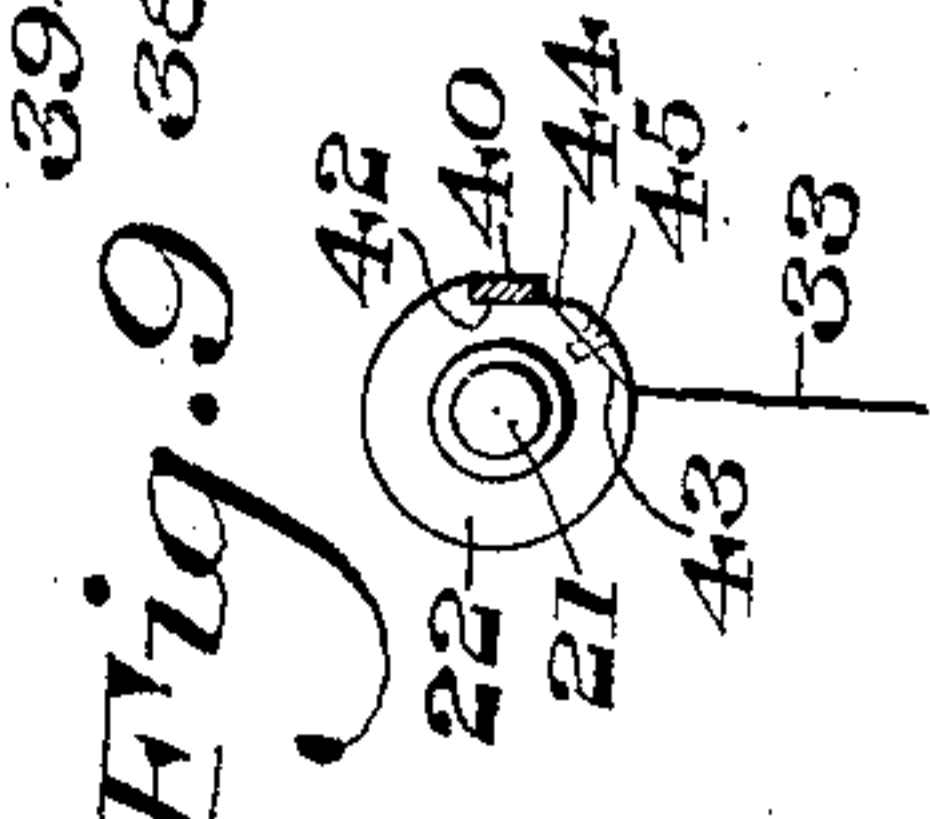


Fig. 9.



Witnesses  
 P. F. Nagler.  
 L. Rouville.

Oliver S. Johantgen.  
 By  
 Wiedersheim & Fairbanks.  
 Attorneys

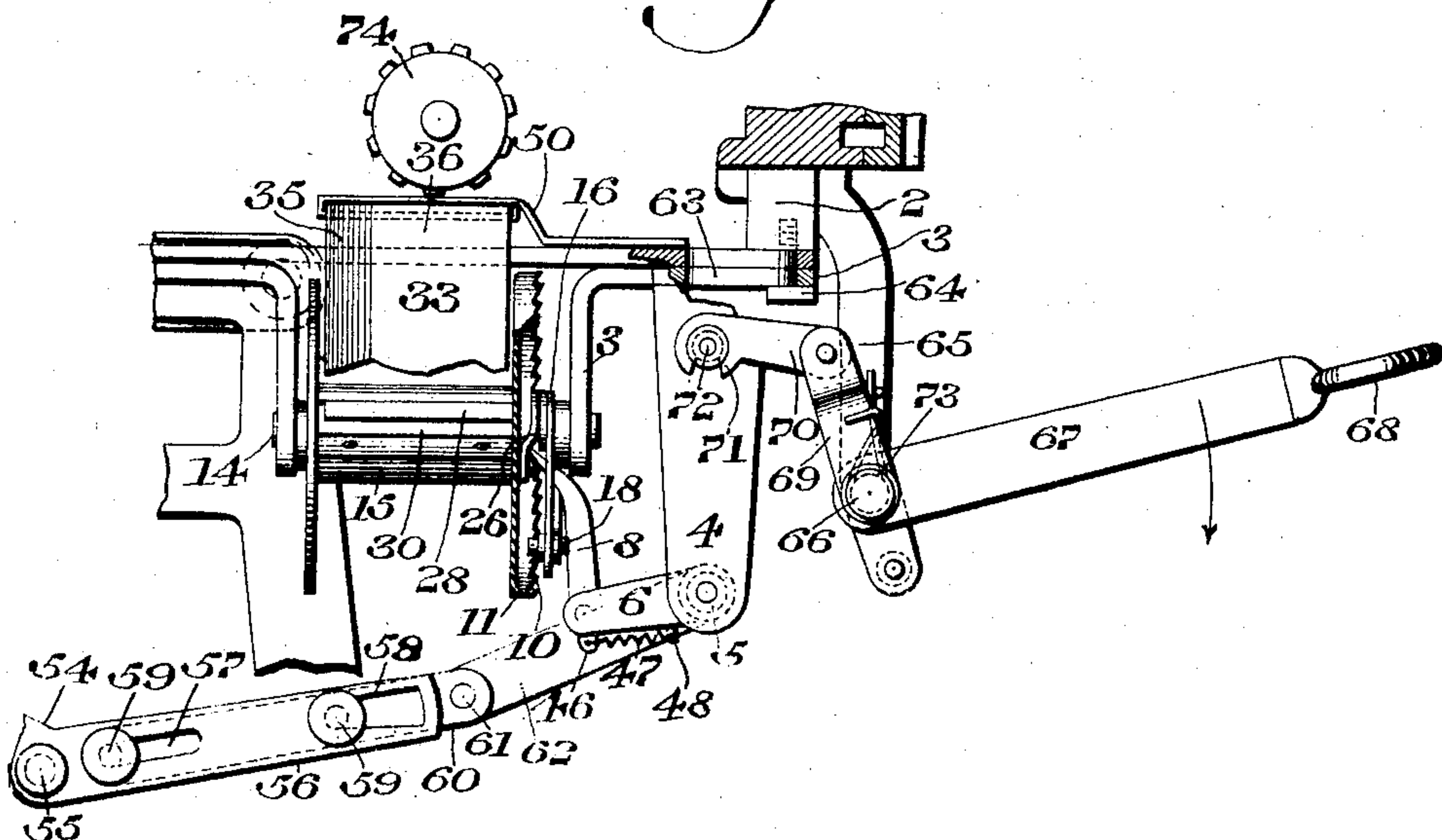
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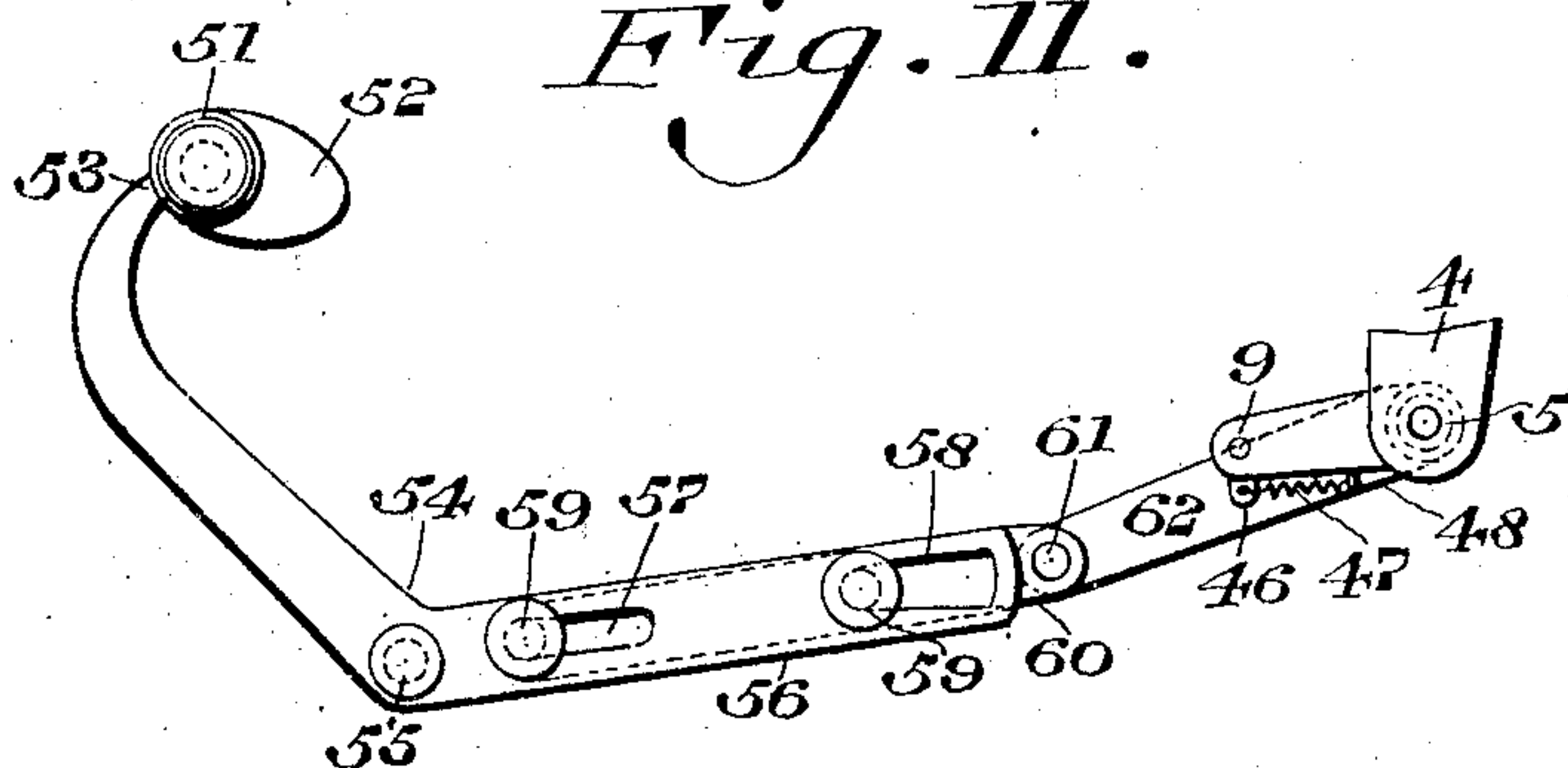
Patented Mar. 29, 1910.

2 SHEETS—SHEET 2.

*Fig. 10.*



*Fig. 11.*



Witnesses  
P. F. Nagle.  
L. Rouville.

Inventor  
Oliver D. Johantgen.  
By  
Niedersheim Garbano  
Attorneys



# UNITED STATES PATENT OFFICE.

OLIVER D. JOHANTGEN, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF ONE-FOURTH TO JOHN W. DUNTLEY, ONE-FOURTH TO J. FRANK JOHANTGEN, AND ONE-FOURTH TO WILLIAM O. DUNTLEY, ALL OF CHICAGO, ILLINOIS.

RIBBON-FEEDING MECHANISM FOR CALCULATING-MACHINES.

953,090.

Specification of Letters Patent.

Patented Mar. 29, 1910.

Original application filed January 19, 1906, Serial No. 296,880. Divided and this application filed July 27, 1906. Serial No. 328,025.

*To all whom it may concern:*

Be it known that I, OLIVER D. JOHANTGEN, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Ribbon-Feeding Mechanism for Calculating-Machines, of which the following is a specification.

In a contemporaneously pending application filed by me January 19, 1906, Serial No. 296,880, I have described and claimed in conjunction with my present invention, a novel and useful construction of a computing or calculating machine in which the number of working parts employed is reduced to a minimum.

My present invention, which is a division of the above mentioned application, consists broadly of a novel construction of a ribbon mechanism which may be employed to advantage in conjunction with any desired or conventional type of recording or calculating machine, said ribbon mechanism being so constructed that the ribbon feed is automatically reversed when the ribbon is unwound or nearly unwound, from one or the other of its carrying or actuating members.

It further consists of a novel construction of a device for actuating the ribbon carrying members.

It further consists of a novel construction of ribbon carrying members provided with ratchets, pawl members co-acting therewith, and means for automatically moving one or the other of said pawls into or out of operative relation with its co-acting ratchet wheel.

It further consists, of a novel construction of spools on which the ribbon is wound and a novel construction of releasing mechanism carried by each spool.

It further consists of novel features of construction, all as will be hereinafter fully set forth.

In order to illustrate my invention, I have shown one form of a device which I have found in practice to give very satisfactory results, although it is to be understood that the principal instrumentalities of which my

invention consists may be variously arranged and organized and are not limited to this specific arrangement and organization.

Figure 1 represents on a reduced scale, a front view, partly in section, of a ribbon feeding mechanism for calculating machines embodying my invention, certain of the elements being omitted for clearness of illustration. Fig. 2 represents on an enlarged scale, a front elevation, partly broken, of the ink ribbon carrying and actuating mechanism, certain of the parts being omitted for the sake of clearness of illustration. Fig. 3 represents a vertical section on lines *m—m*, Fig. 2 and viewed in the direction indicated by the arrows. Fig. 4 represents a perspective view in detached position of one of the reversing pawls seen in Fig. 2. Fig. 5 represents a front elevation of the ribbon carrying spool seen at the right of Fig. 2. Fig. 6 represents a side elevation of a portion of the reversing mechanism. Fig. 7 represents an end view in detached position of the ribbon carrying spool seen at the left of Fig. 2. Fig. 8 represents a perspective view of the body of the spool seen in Fig. 3 showing also the means for securing the ink ribbon in place. Fig. 9 represents an end view of the roll of the device, seen in Fig. 8 showing the ribbon secured in position thereon, and the pawl bar seen in Fig. 4 being in section. Fig. 10 represents a side elevation, partly broken away, showing the device for actuating the ribbon mechanism. Fig. 11 represents a side elevation of the rock shaft actuating means.

Similar numerals of reference indicate corresponding parts in the figures.

Referring to the drawings: In the present instance I have shown the ribbon mechanism as being movably mounted in a suitable support or frame, although it will be apparent that this support or frame will vary according to the type of recording mechanism in conjunction with which it is employed.

1 designates uprights or standards having at their upper ends, cross bars or supports which carry the ribbon frame 3, which



latter is adjustably secured with respect to the supports 2 for a purpose hereinafter described.

4 designates hangers depending from the ribbon support 3 and having journaled therein at a suitable point a rock shaft 5.

6 and 7 designate arms secured to the shaft 5, the outer ends of said arms having pivoted thereto the dogs or pawls 8 and 9 respectively; which are adapted to engage at certain times with the teeth 10 in the ratchet wheel 11 or with the teeth 12 on the ratchet wheel 13. The wheel 11 is secured to the shaft 14 that carries the ribbon spool 15. The shaft 14 has loosely mounted thereon a shield 16 which is adapted at certain times to be brought in the path of the dog or pawl 8 in order to prevent the latter from coming into contact with the teeth 10. The shield 16 has pivoted thereto at 17 one end of a link or bar 18 whose opposite end is pivoted at 19 to a shield 20, which is loosely mounted on the shaft 21 of a ribbon spool 22 journaled in the ribbon frame 3. The link 18 has secured thereto one end of a spring 23 whose opposite end is secured to a suitable fixed point as 24 in or on the ribbon frame 3, it being noted that when the parts are in the position seen in Fig. 2, the spring 23 exerts a pull on the link 18 in the direction indicated by the arrow *a* and for a purpose hereinafter described.

The ratchet wheel 11 has pivoted thereon at 25 an arm 26 provided with a hook 27 and a bar 28, it being noted that said ratchet wheel 11 has an opening 29 therein through which the bar 28 may be passed. The bar 28 is adapted to fit in a recess 30 in the spool 15, as best seen in Fig. 7.

The spool 15 has a flattened portion 31 thereon, as seen in Fig. 7, upon which is placed one end 32 of the inking ribbon 33 after which a strip 34 is placed upon said end 32 and secured in position on the spool 15 by screws or other equivalents. The inking ribbon 33 is preferably provided with two or more colors of ink and in the present instance I have shown in Figs. 8 and 10 a ribbon having a plurality of contrasting colors employed, one such as red being indicated at 35 and one as black, at 36, whereby the printing may be done in two colors, one of which may be applied to the individual items and the other as the red to totals or sub-totals.

The ratchet wheel 13 has pivoted thereon at 37, an arm 38, provided with a hook 39 and a bar 40, as seen in Fig. 4, it being noted that said ratchet wheel 13 has an opening 41 therein through which may be passed the bar 40. The ribbon spool 22 is provided with a recess 42, as indicated most clearly in Fig. 8, adapted to receive the bar 40 carried by the arm 38. The spool 22 has a flat-

tened portion 43 thereon upon which is placed the end portion 44 of the ribbon 33, said end portion 44 being held in position on the spool 22 by a strip 45 secured in any suitable manner to the spool 22.

It will be apparent from the foregoing that the manner of attaching the ribbon to each spool is substantially the same and I have provided convenient means for securing and detaching the ribbon from its support. In the present instance I have shown the pawl 9 as being provided at its lower end with an ear or lug 46 to which one end of the spring 47 is secured, the other end of said spring being secured to a suitable fixed point such as 48, whereby the pawl 9 has a yielding tension acting thereon which tends to move said pawl toward the ratchet wheel contiguous thereto. It is of course to be understood that the pawl 8 is provided in a similar manner with a suitable spring or equivalent device, although it is to be understood that in some instances this spring may be dispensed with and the pawls 8 and 9 may be so pivoted that they will normally by their own weight, engage their respective ratchet wheels or the shields with which they co-act.

49 designates a washer or shield which is seated on the end of the shaft 21, it being understood that a similar member is mounted on the shaft 14, these members serving as a guide for the ribbon and forming the ribbon spools.

50 designates guides carried by the support 2 for the ribbon and through which the ribbon passes as it is being wound or being unwound from a spool.

51 designates a rotatable shaft having mounted thereon a cam member 52, which co-acts with one end 53 of a bell crank lever 54 suitably fulcrumed at 55, while its other member 56 is provided with cam slots 57 and 58 through which are passed studs 59, which are secured in a link 60. The link 60 is pivoted at 61 to a link 62 which is secured to the rock shaft 5, so that when the shaft 51 is rotated, the cam 52 will co-act with the bell crank lever 54 and owing to the provision of the links 60 and 62, the shaft 5 will be rocked as will be apparent.

The ribbon frame 3 is fitted in the frame 2, so as to be capable of sliding therein and in the present instance the connection between the main frame and the ribbon frame consists in providing the ribbon frame with slots 63 through which are passed the screws or bolts 64 that are screwed into the supports 2 of the main frame, it being noted that the heads of said bolts 64 support the ribbon frame in position in the main frame.

65 designates a bracket depending from the frame of the machine, in which is rotatably mounted a shaft 66 on which is



fixed an operating lever 67 provided with a presser piece 68, the latter being actuated by the finger or thumb of the operator, said lever being integral with or fast upon said shaft, so that said lever and shaft will rock or be actuated in unison. At or near the extremities of the shaft 66 are secured upwardly extending rock arms 69, at the upper ends of which are pivoted one end of links 70, the opposite ends of said links being provided with a hook 71 which is adapted to drop over and engage the pin 72, it being apparent that this pin 72 is carried by the depending bracket of the ribbon frame 3, so that when the parts are in their normal position they will appear substantially as seen in Fig. 10, but upon a depression of the lever 67 the inking ribbon frame will be moved forwardly, so that the printing will appear in a different color when said lever 67 is actuated. In order to maintain the ribbon frame in its normal position, a torsional spring 73 is mounted on the rock shaft 66, said spring tending to maintain the ribbon frame in the position seen in Fig. 10.

74 designates a printing wheel of any suitable or conventional type.

The operation of the ribbon mechanism will now be readily apparent to those skilled in the art.

It will be apparent that while I have shown in the present instance, the necessary actuation or intermittent oscillation of the rock shaft 5 as being derived from the rotation of the shaft 51 and the cam 52 thereon, which in my application of which this is a division, is an element of a calculating machine. I may intermittently actuate the shaft 5 by other means so as to effect the desired actuation of the parts 11 and 13 at the proper intervals.

Assuming that the parts are in the position indicated in Figs. 2, 10 and 11, the shaft 51 is rotated by any suitable means and the cam 52 carried thereby will engage the end 53 of the lever arm 54, which co-acts therewith and will cause said arm to turn on its pivot and owing to the provision of the link 62 which is fixed to the rock shaft 5 and pivoted to the end 56 of the link 54, said rock shaft 5 will be rocked. As the shaft 5 is rocked, the dog or pawl 8 will co-act with the teeth 10 in the ratchet wheel 11, causing said ratchet wheel 11 to be rotated in such a manner that the ribbon will be unwound from the spool seen at the right of Fig. 2 and wound upon the spool seen at the left of Fig. 2.

It is to be noted that when the parts are in the position seen in Fig. 2, the dog or pawl 9 slides freely upon the shield 20 so that said pawl does not engage with the teeth 12 of the ratchet wheel 13. The bar

28 rests against a flattened spot on the spool 15 while the bar 40 rests against a similar spot on the spool 22, the length of the said bars being apparent from Fig. 3. Each bar is provided with an arm 26 and 38 respectively and said bars are inserted in position through the slots 29 and 41 and are held in position by the ribbon 33 being wound around them. When one of the spools, as 22, is unwound or nearly unwound and the ribbon is unwound from the bar 40, said bar will be removed to the right of the position seen in Fig. 2 and the arm 38 will also move on its pivot pin 37 by reason of its own weight so that the hook 39 will hang in the position seen in Fig. 6. Since the ratchet wheel 13 is turning in the direction of the arrow seen in Fig. 2, it will be apparent that the inner end of the pin 19 will be in the path of said hook and as said hook strikes said pin the link 18 and its adjuncts will be shifted to the right of the position seen in Fig. 2 so that said link and spring 23 will appear as seen dotted in said figure. The shield 20 will now assume a position, such as is shown at the right of Fig. 1, whereupon the pawl 9 is now operative and the pawl 8 is inoperative, since the shield 16 has been moved to the right of the position seen in Fig. 2. For the sake of clearness of illustration, I have omitted the arm 38 from the upper right hand portion of Fig. 1. It will thus be apparent that the ribbon feed is automatically reversed when a desired quantity of ribbon is unwound from one of the spools.

With the parts as seen in Fig. 10, the portion 36 or the black surface of the ribbon is operative but when it is desired to print in a contrasting color, such as red, as indicated at 35, the operator depresses the lever 67 thus causing the shaft 66 to be rocked against the tension of the spring 73 and owing to the provision of the links 69 and 70 and the manner in which they are pivoted, the ribbon frame 3 will be caused to move forwardly so that the portion of the ribbon 33 having a contrasting color, such as red, as indicated at 35, will be brought into operative position. As soon as the operator releases his pressure from the presser piece 68 of the lever 67, the torsional spring 73, mounted on the shaft 66, will cause said shaft to rock and the ribbon frame 3 will be returned to its normal position, as indicated in Fig. 10. The proper oscillation is given to the shafts whereby the proper pawl as 8 or 9, is operated by the rotation of the cam 52 whereby the feeding of the ribbon is properly effected at all times.

In order to permit the forward and rearward movement of the ribbon frame, the elbow lever 54 has its arm 56 slotted or recessed as seen at 57 and 58 and since the



studs 59 pass through said slots and are secured in the link 60 it will be apparent that relative movement of the elbow lever 54 and the link 60 is permitted so that at all times, the shaft 5 is intermittently rocked on the rotation of the cam turning shaft 51. In order to permit free relative movement of the links 60 and 56, I have shown the slot 58 as being slightly larger than the slot 57.

It will, of course, be apparent that while I have shown my present invention as being adapted to be employed in conjunction with a calculating machine such as is described and claimed in my co-pending application to which I have hereinbefore referred, my novel construction of ribbon mechanism and actuating means therefor may be employed to advantage in conjunction with any known or conventional type of calculating or recording mechanism.

I have deemed it best for the purpose of illustration, to show the shields carried by the spools as being connected by means of a suitable spring actuated member which is pivoted at its end to each shield, but it is apparent that this would vary in accordance with the type of recording mechanism in conjunction with which the ribbon mechanism is employed.

It will now be apparent from the foregoing, that I have produced a novel and useful construction of ribbon mechanism and actuating mechanism therefor, which embodies the features of advantage enumerated as desirable in the statement of invention and the above description and while I have, in the present instance shown and described the preferred embodiment thereof, it is to be understood that it is susceptible of modification in various particulars without departing from the spirit and scope of my invention or sacrificing any of its advantages.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In a ribbon mechanism, means for feeding the ribbon, and means mounted on a ribbon-spool shaft for interposition between members of the feeding means for automatically reversing the feed.

2. In a ribbon mechanism, a pair of spools on which the ribbon is wound, ratchet wheels on said spools, pawls adapted to actuate said wheels, a rock shaft on which said pawls are mounted, and means mounted for interposition between a pawl and its ratchet for maintaining one or the other of said pawls in operative relation with its respective ratchet wheel.

3. In a ribbon mechanism, a pair of spools on which the ribbon is wound, ratchet wheels on said spools, pawls adapted to actuate said wheels, a rock shaft on which said pawls are

mounted, and means mounted for interposition between a pawl and its ratchet for maintaining one or the other of said pawls in operative relation with its respective ratchet wheel, and means for automatically reversing the ribbon feed when one or the other of said spools is nearly unwound.

4. In a ribbon mechanism, a frame movably mounted, a pair of spools mounted therein on which the ribbon is wound, guides for said ribbon carried by said frame, each of said spools having a flattened portion, apertured ratchet wheels carried by said spools, bars adapted to engage the flattened portions of said spools and passing through the apertures of said wheels, arms secured at one end to said bars and pivotally supported at their other, a rock shaft, pawls carried thereby adapted to actuate said ratchet wheels, shields for said ratchet wheels adapted to hold one or the other of said pawls out of engagement with its respective ratchet, and a connection pivoted to said shields, one or the other of said arms co-acting with the pivot of the connection in proximity thereto to reverse the ribbon feed when said ribbon is nearly unwound from the spools.

5. In a ribbon feeding mechanism for computing machines, a pair of spools, an inking ribbon wound thereon, a ratchet wheel on each of said spools, shields for said wheels, a shaft journaled in proximity to said spools, arms on opposite ends of said shaft, spring actuated pawls on said arms, and means for shifting said shields in unison and thereby automatically throwing one of said pawls out of engagement with its ratchet wheel.

6. In a ribbon mechanism for computing machines, a pair of spools having a flattened portion, bars normally lying against said portion, arms secured to said bars at one end and pivotally mounted on the other end, movable shields for said spools, a spring actuated bar joining said shields, ratchet teeth on said spools, and a rod carrying pawls engaging said ratchet teeth alternately.

7. In a ribbon feeding mechanism for computing machines, a pair of spools each having a flattened portion, a bar lying against each of said portions, arms secured to said bars at one end and pivotally mounted on the other, movable shields for said spools, a spring actuated connection joining said shields, ratchet teeth on said spools, a rock shaft, and pawls carried by said rock shaft adapted to engage alternately with the ratchets of said spools.

8. In a ribbon feeding mechanism for computing machines, a pair of spools each having a flattened portion, bars normally lying against said portions, arms secured to said bars at one end and pivotally supported at the other, movable shields for said spools,



a spring actuated bar to which said shields are pivoted, said arms being adapted to co-act with one of the pivots of said bar to actuate said shield, ratchet teeth on said spools, pawls co-acting with said ratchet teeth, said shields being adapted to throw one or the other of said pawls out of engagement with its respective ratchet wheel, and a rock shaft for actuating said pawls.

9. In a ribbon feeding mechanism for computing machines, a frame, a pair of shafts journaled therein, spools mounted on said shafts, ratchet teeth associated with said spools, bars lying against said spools, arms secured to said bars at one end and pivotally mounted at the other, a shield mounted in proximity to each of said spools, a spring actuated bar joining said shields, pawls engaging alternately with said teeth, and means for actuating said pawls.

10. In a ribbon mechanism, a frame, a pair of spools journaled therein on which the ribbon is wound, said spools having a recess therein, a bar adapted to engage said recess, an arm pivotally supported at one end and having a hook at the other end to which said bar is secured, ratchet wheels having apertures through which said bars extend, a rock shaft, pawls carried thereby, shields for permitting the coöperation of one or the other of said pawls with its respective ratchet wheel, and a spring actuated connection pivoted to said shields, said hooks co-acting with the pivots of said connections, when a portion of the ribbon is unwound from a spool, to reverse the ribbon feed.

11. In a ribbon feeding mechanism for computing machines, a main frame, a ribbon frame movably mounted therein, a pair of spools carried by the ribbon frame, an inking ribbon having a plurality of colors wound on said spools, a ratchet wheel on each of said spools, shields for said wheels, a rock shaft journaled in proximity to said spools, arms on said shaft, spring actuated pawls on said arms, co-acting with said ratchet wheels, means for shifting said shields in unison and thereby automatically throwing one of said pawls out of engagement with its ratchet wheel, and means for moving said ribbon frame to bring a different color of the ribbon into operative position.

12. In a ribbon feeding mechanism for computing machines, a main frame, a ribbon frame movably mounted therein, spools carried by the ribbon frame, an inking ribbon mounted on said spools, a ratchet wheel on each of said spools, shields for each of said wheels, a rock shaft journaled in proximity to said spools, arms carried by said shaft, pawls carried by said arms and co-acting with said ratchet wheels, means for shifting

said shields in unison, and thereby automatically throwing one of said pawls out of engagement with its ratchet wheel, a bracket depending from the main frame, a shaft journaled in said bracket, a link secured to said shaft, an actuating lever carried by said last named shaft, a link pivoted to said first-mentioned link and having pivotal relation with the ribbon frame, and yielding means for maintaining the ribbon frame in its normal position.

13. In a ribbon mechanism, a ribbon having contrasting colors thereon, spools on which said ribbon is wound, means for intermittently feeding said ribbon, means embodying a movably-mounted shield controlled by the ribbon for automatically reversing the feed thereof, and means for moving said ribbon laterally so as to present either of said contrasting colors to the printing device.

14. In a ribbon mechanism, a carrying member, a ribbon carried thereby, means pivoted to said member and controlled by said ribbon for automatically reversing the feed thereof, actuating means for said member, and a movably-mounted shield for automatically rendering said actuating means inoperative when the ribbon feed is reversed.

15. In a ribbon mechanism, a carrying member having a flattened portion thereon, a ribbon secured adjacent to said flattened portion, means for actuating said member, and a radially-guided mechanism normally engaging said flattened portion and coacting with said ribbon to reverse the feed of said member.

16. In a ribbon mechanism, a carrying member, a ribbon secured thereto, means pivoted on said member and controlled by said ribbon for automatically reversing the feed thereof, actuating means for said member, and a shield adapted to be interposed between the spool-actuating pawl and its ratchet and pivotally mounted adjacent said member for rendering said actuating means inoperative when the ribbon feed is reversed.

17. In a ribbon mechanism, a carrying member having a plurality of flattened portions thereon, a ribbon provided with contrasting colors secured on one of said flattened portions, reversing mechanism engaging the other of said flattened portions for automatically reversing the feed of said member and controlled by said ribbon, means for actuating said member, devices for automatically rendering said actuating means inoperative, and means for bringing the desired color of said ribbon into operative position.

18. In a ribbon mechanism, a carrying member, a ribbon carried thereby, means pivoted to said member for automatically



reversing the feed thereof, said means being normally held in engagement with said member by said ribbon and adapted when released by said member to move outwardly by gravity and actuating means for said member, and a shield pivoted adjacent said member and adapted to render the actuating means inoperative.

19. In a ribbon mechanism, a frame movably mounted, carrying members supported therein, a ribbon engaging said members, separate means for actuating each of said members, means including a pivoted shield for rendering the actuating means for one or the other of said members inoperative, yielding means for maintaining said ribbon in normal position, and means for moving said frame to bring a contrasting color of said ribbon into operative position.

20. In a ribbon mechanism, a carrying member having ratchet teeth on one end thereof and having an aperture through a side thereof, a ribbon provided with contrasting colors engaging said member, means engaging said ratchet for actuating said member, a shield adjacent said ratchet for preventing the engagement of the member actuating means therewith, a bar passing through said aperture and controlled by said ribbon, and means carried by said member and coacting with said shield to render inoperative the member actuating means.

21. In a ribbon mechanism, a frame, a plurality of carrying members supported therein, a ribbon provided with contrasting colors carried by said members, means for feeding said ribbon, means for automatically reversing the feed thereof, means for moving said frame to bring the contrasting color into operative position, and a torsional tension device for said frame moving means.

22. In a ribbon mechanism, a frame movably mounted, a pair of spools provided with ratchets having an aperture through a side thereof carried by said frame, a ribbon provided with contrasting colors secured to said spools, separate pawls coacting with each ratchet, a tension device for said pawls, means for actuating said pawls, and a reversing device including bars passing through said apertures, arms provided with hooks to which said bars are secured, and shields pivotally mounted and adapted to throw one or the other of said pawls out of engagement with its respective ratchet.

23. In a ribbon mechanism, a frame movably mounted, a pair of spools provided with ratchets having an aperture through a side thereof carried by said frame, a ribbon provided with contrasting colors secured to said spools, separate pawls coacting with each ratchet, a tension device for said pawls, means for actuating said pawls and a reversing device including bars pass-

ing through said apertures, arms provided with hooks to which said bars are secured, shields pivotally mounted and adapted to throw one or the other of said pawls out of engagement with its respective ratchet, and yielding means for normally maintaining one color of said ribbon in operative position.

24. In a ribbon mechanism, a main frame, guides carried thereby, a ribbon frame movably mounted on said main frame, carrying members supported in said ribbon frame, a ribbon provided with contrasting colors, engaging each member and said guides, a rock shaft carried by the ribbon frame, means carried by said shaft for intermittently actuating one or the other of said carrying members, a driving shaft, a cam carried thereby, levers actuated by said cam for actuating said rock shaft, and means for permitting the relative movement of said levers when the ribbon frame is moved from its normal position.

25. In a ribbon mechanism, a ribbon frame movably mounted, carrying members supported thereby, a ribbon provided with contrasting colors engaging said members, a driving shaft, a cam thereon, levers actuated thereby, a second shaft rocked by said levers, means for permitting the relative movement of said levers, links carried by said shaft, pawls carried by said links, a tension device for said pawls, means for permitting said pawls to actuate one or the other of said members, a tension device for normally maintaining said frame in normal position, and a lever adapted to move said frame to bring a contrasting color into operative position.

26. In a ribbon mechanism, a ribbon frame, carrying members supported thereby and provided with ratchets on one side thereof and an aperture through said side, pawls coacting with said ratchets, means for actuating said pawls, a plurality of connected shields for maintaining one or the other of said pawls out of operative position, and means passing through said aperture controlled by the ribbon and coacting with said members to automatically reverse the ribbon feed.

27. In a ribbon mechanism, ratchet spools, separate means engaging each ratchet for intermittently rotating said spools, means including pivoted shields for normally maintaining one or the other of said actuating means inoperative, and means controlled by the ribbon and coacting with said members to automatically reverse the ribbon feed, said last mentioned means being pivoted at one end of said spools.

28. In a ribbon mechanism, the combination with the spools and their ratchets, and co-acting pawls, of means mounted to be



brought into position between the ratchets and pawls to keep the latter from contact with the former.

29. In a ribbon mechanism, the combination with the spools and their ratchets, and coacting pawls, of means mounted to be brought into position between the ratchets and pawls to keep the latter from contact with the former, and means connecting said interposed means to move them in unison, one into, the other out of, operative position.

30. In a ribbon mechanism, means for feeding the ribbon, and means mounted on a ribbon-spool shaft for interposition between the members of said feeding means and operable when a desired quantity of ribbon is unwound from one of the spools, to automatically reverse the feed.

OLIVER D. JOHANTGEN.

Witnesses:

E. HAYWARD FAIRBANKS,  
HERBERT S. FAIRBANKS.