

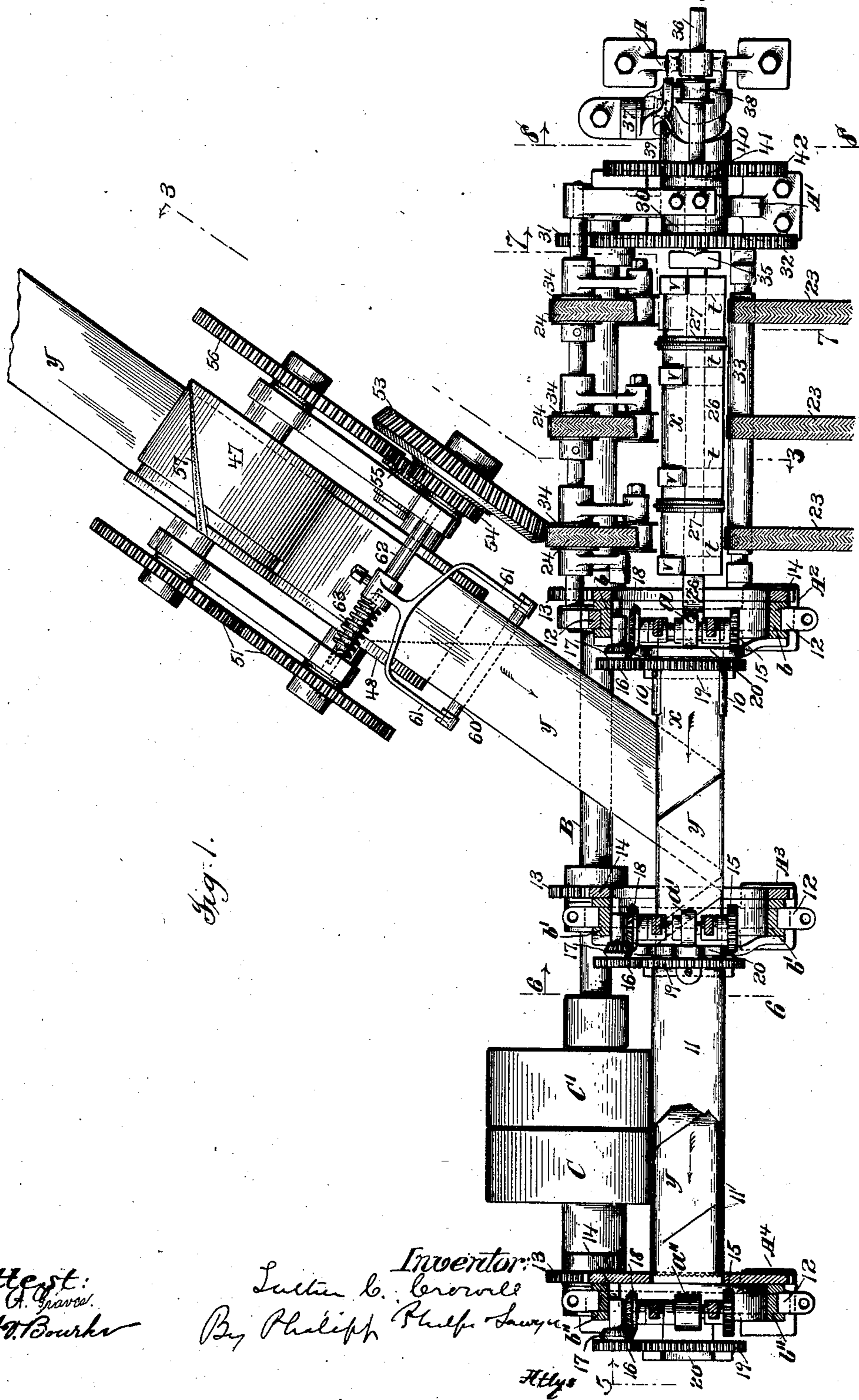
(No Model.)

5 Sheets—Sheet 1.

L. C. CROWELL.
WRAPPING MACHINE.

No. 603,602

Patented May 3, 1898.



Attest:
J. A. Crowell
J. W. Bourke

Inventor:
Lester C. Crowell
By Philip Phelps Sawyer

(No Model.)

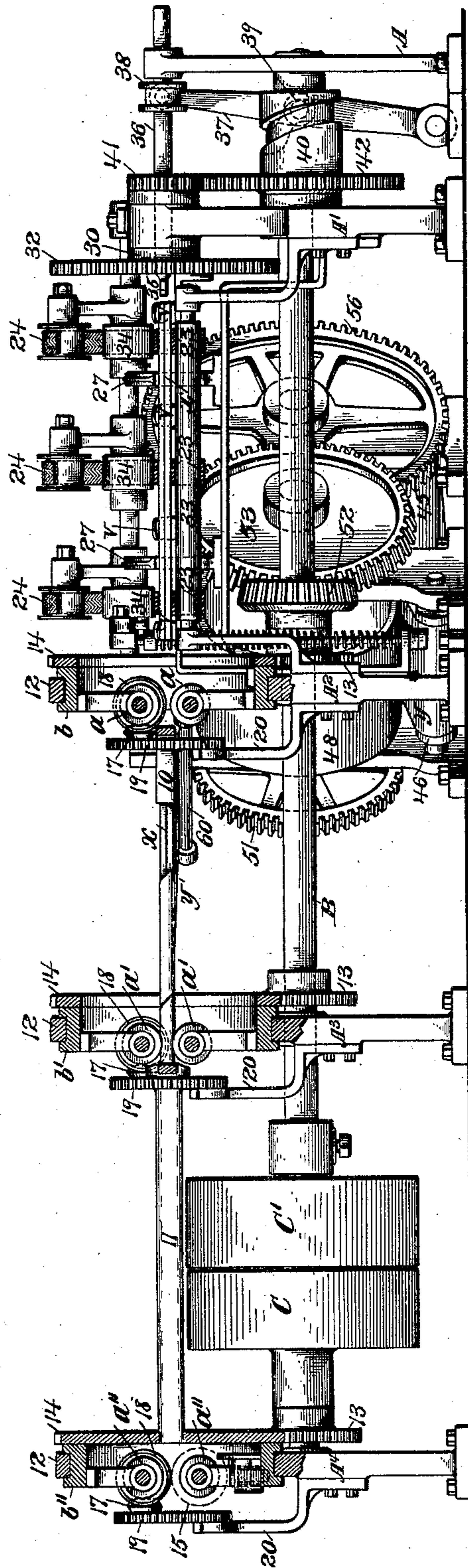
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L. C. CROWELL.
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Patented May 3, 1898.

Fig. 2.



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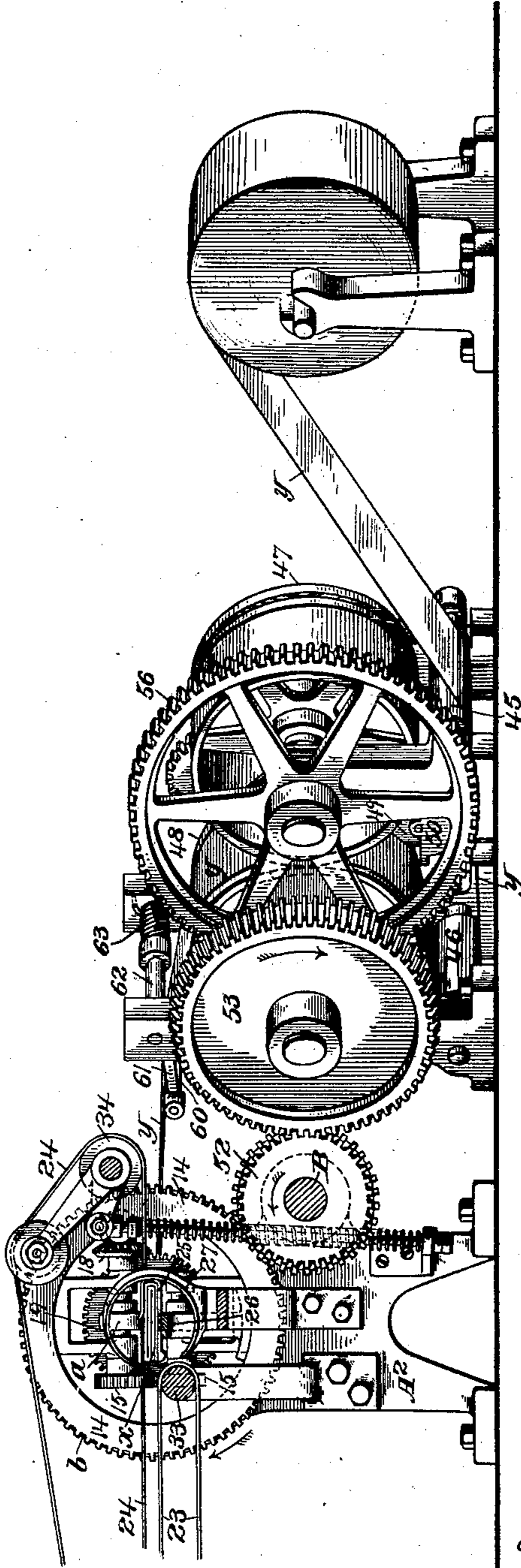
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Fig. 3.



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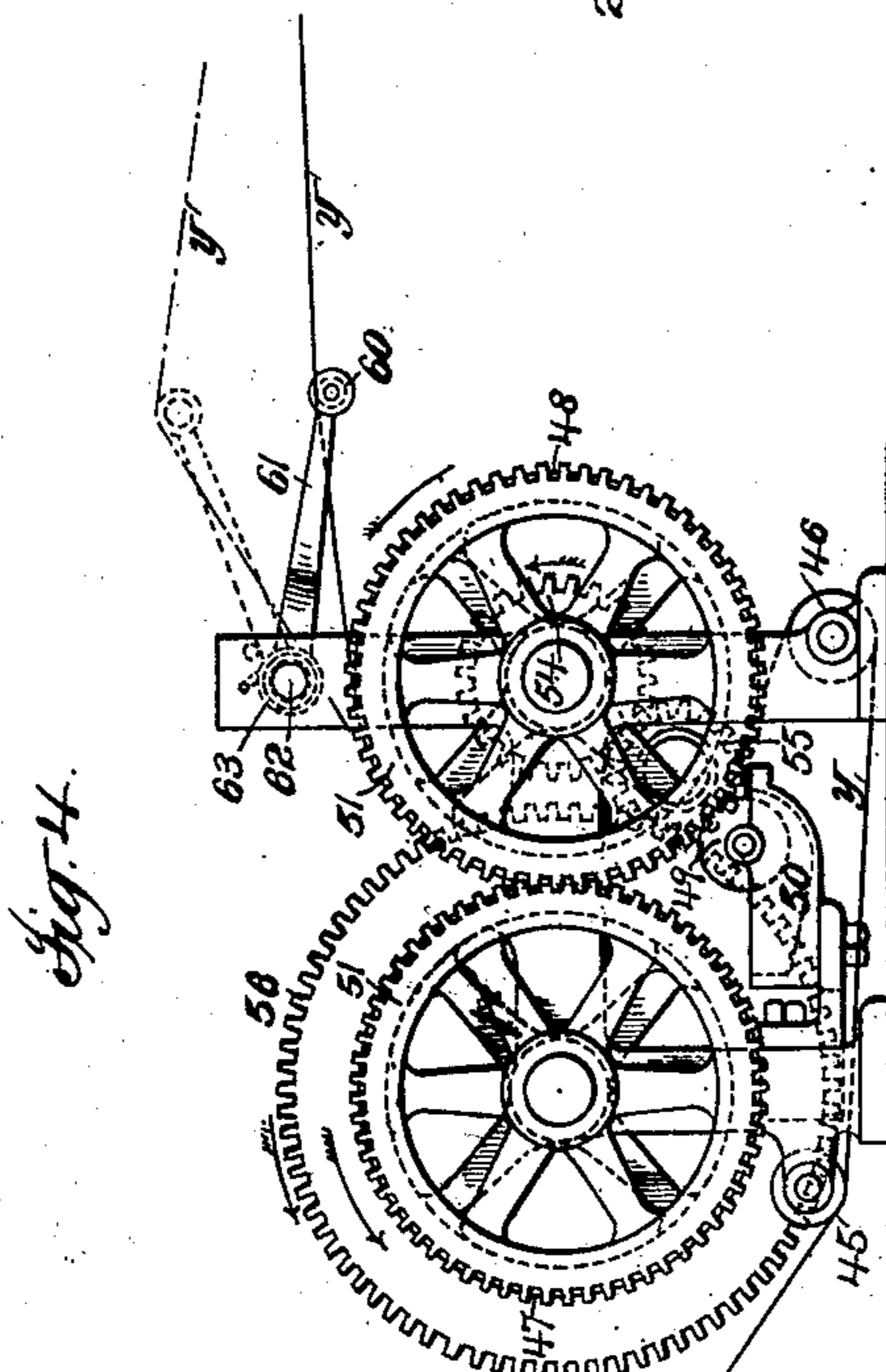
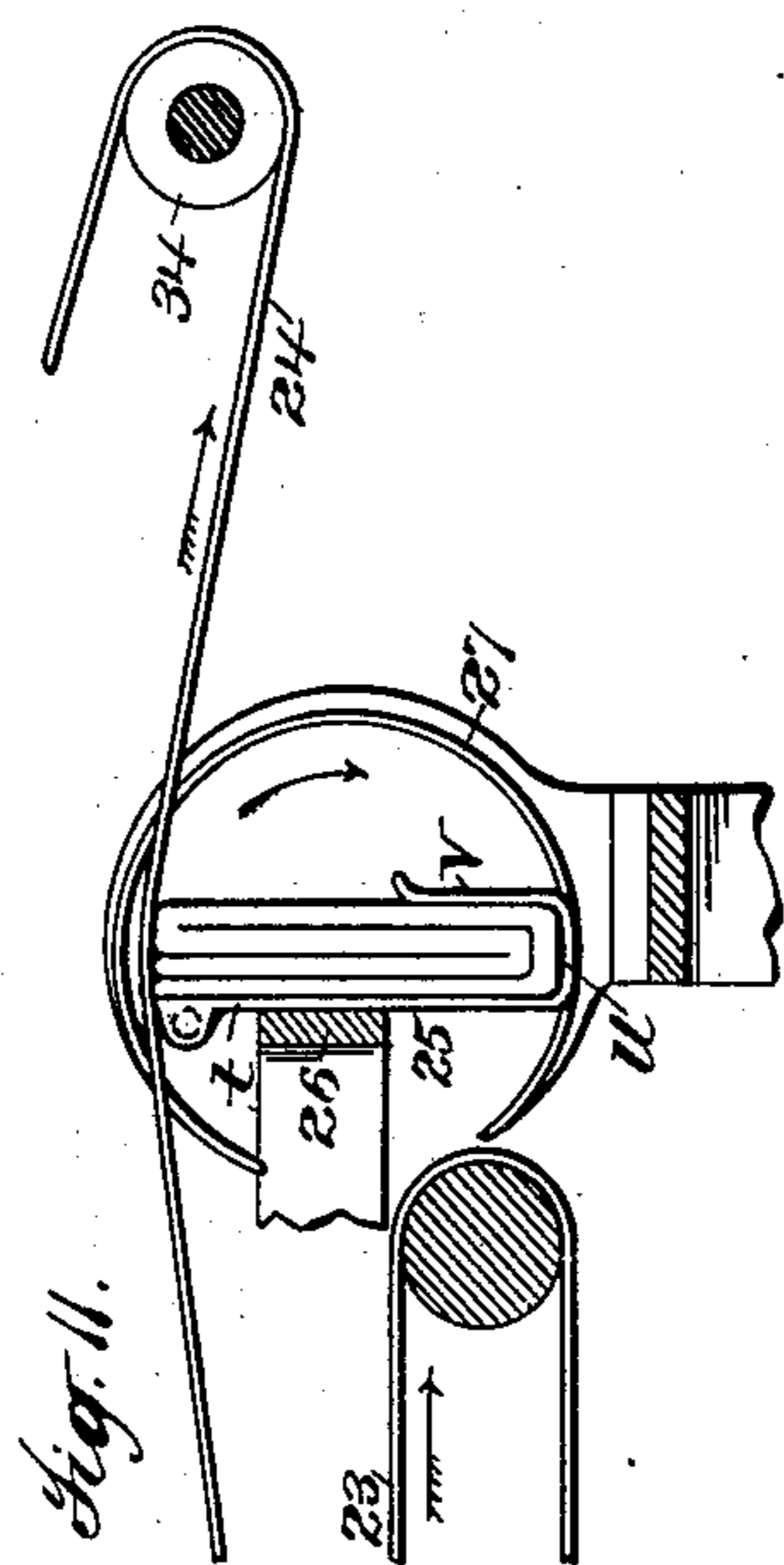
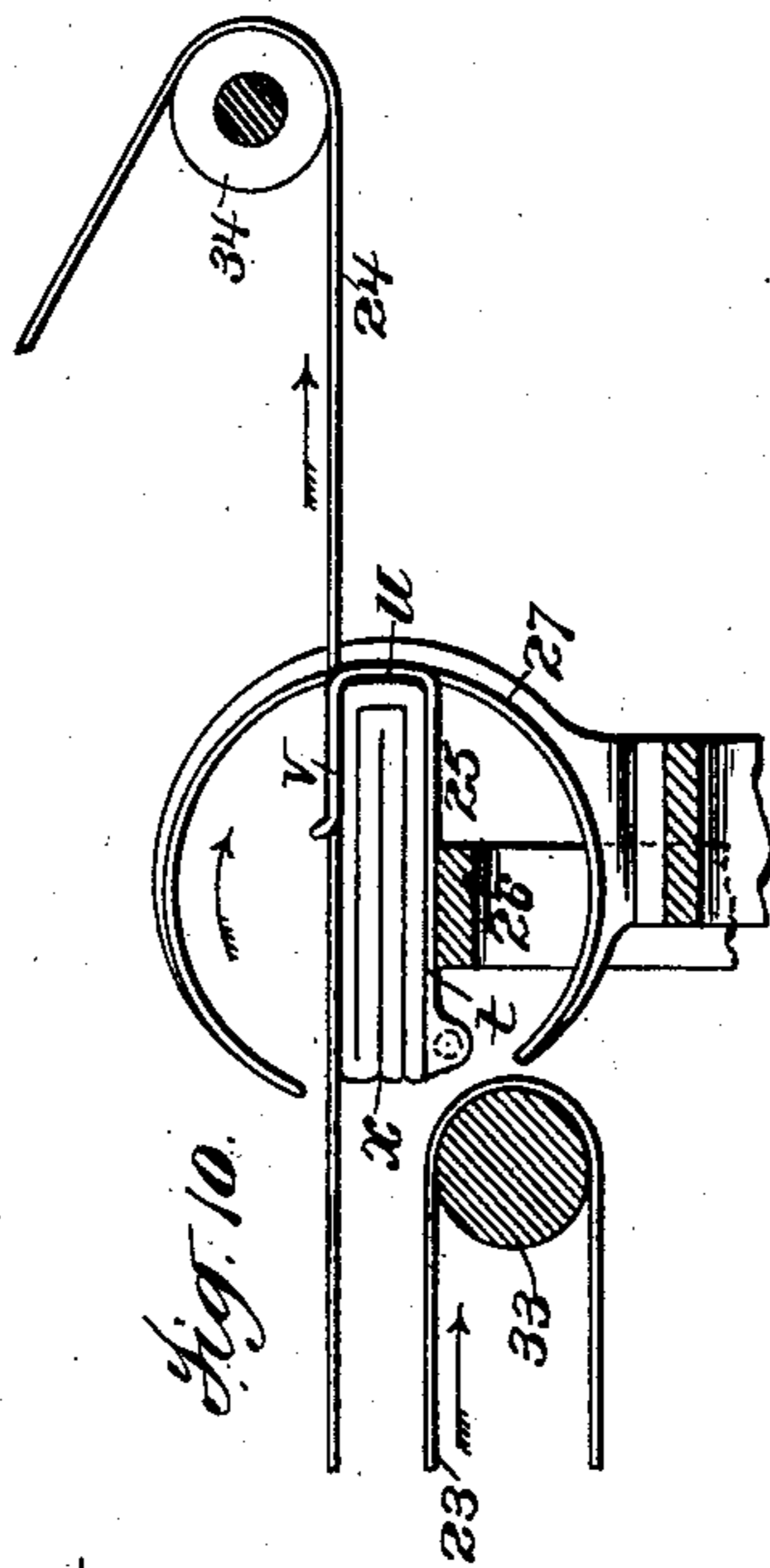
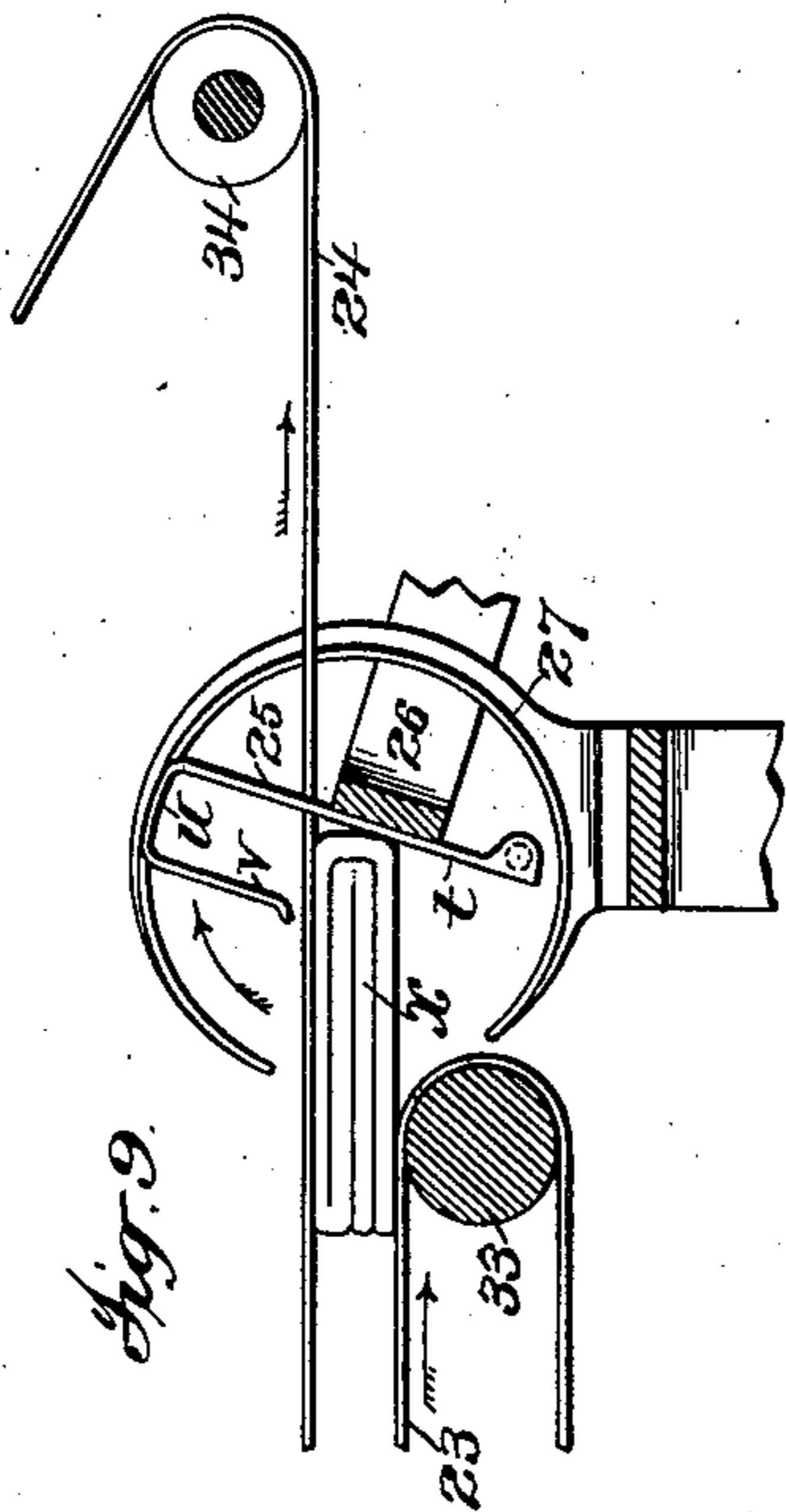
(No Model.)

5 Sheets—Sheet 4.

L. C. CROWELL.
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(No Model.)

5 Sheets—Sheet 5.

L. C. CROWELL.
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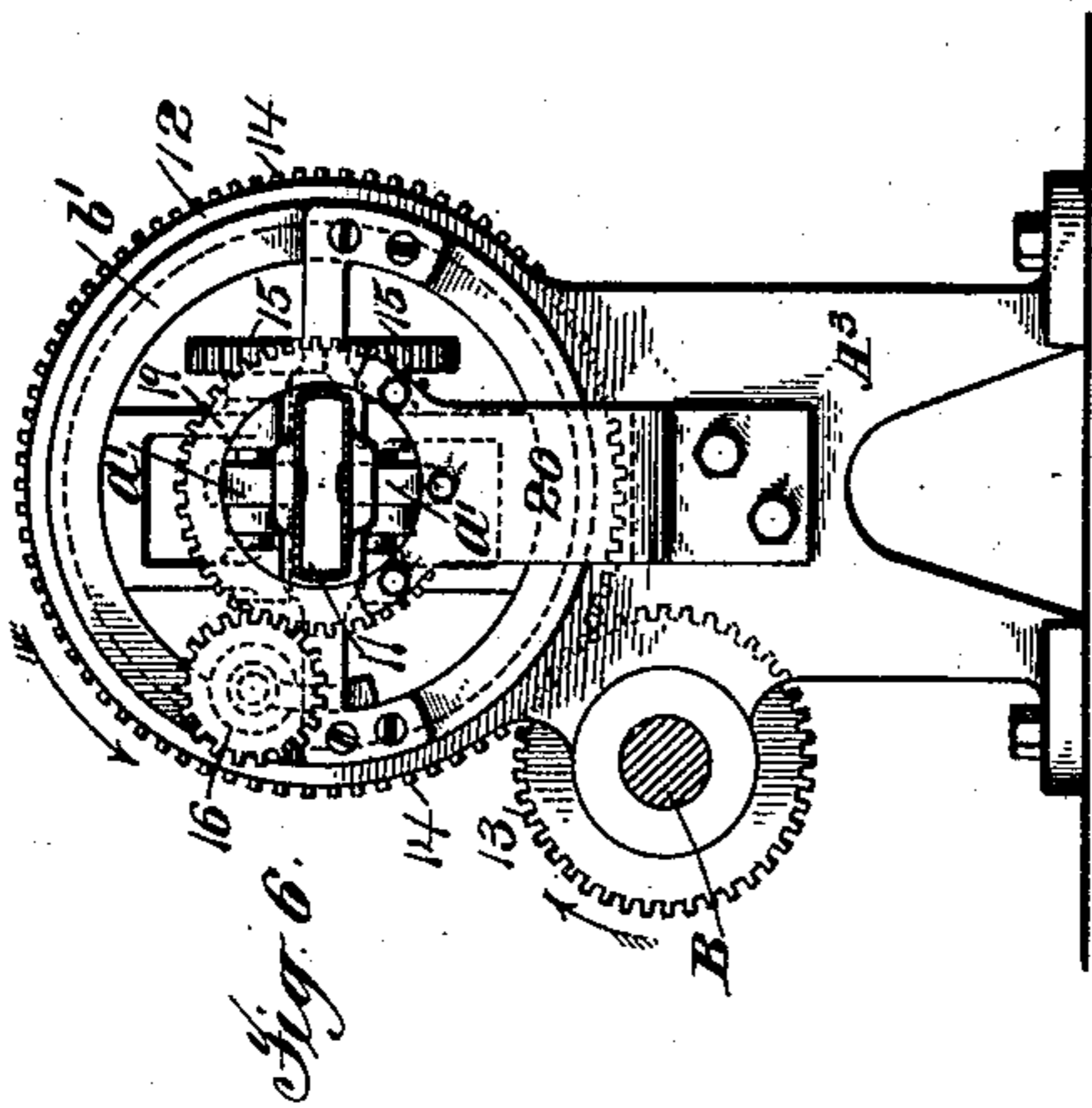


Fig. 6.

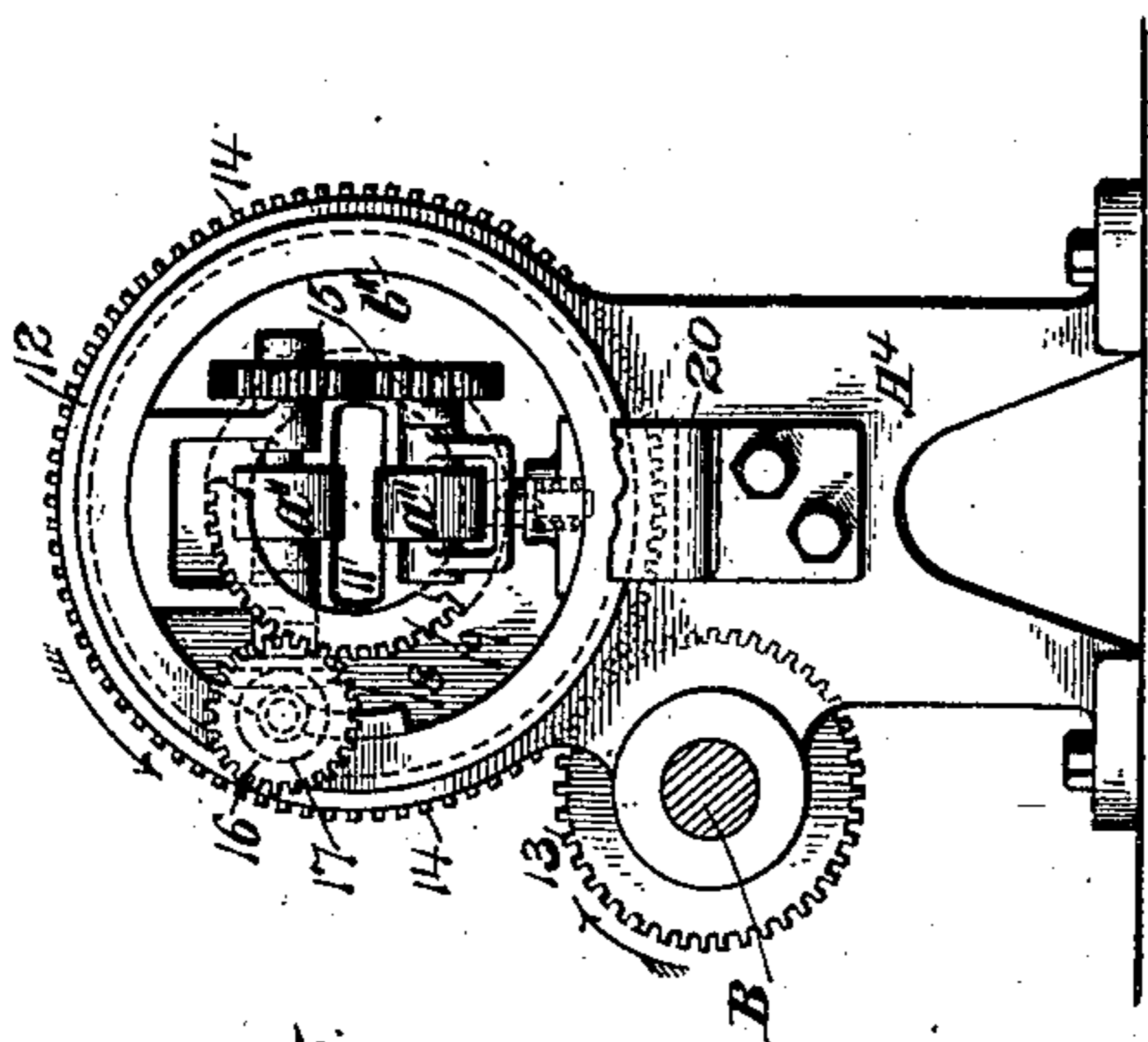
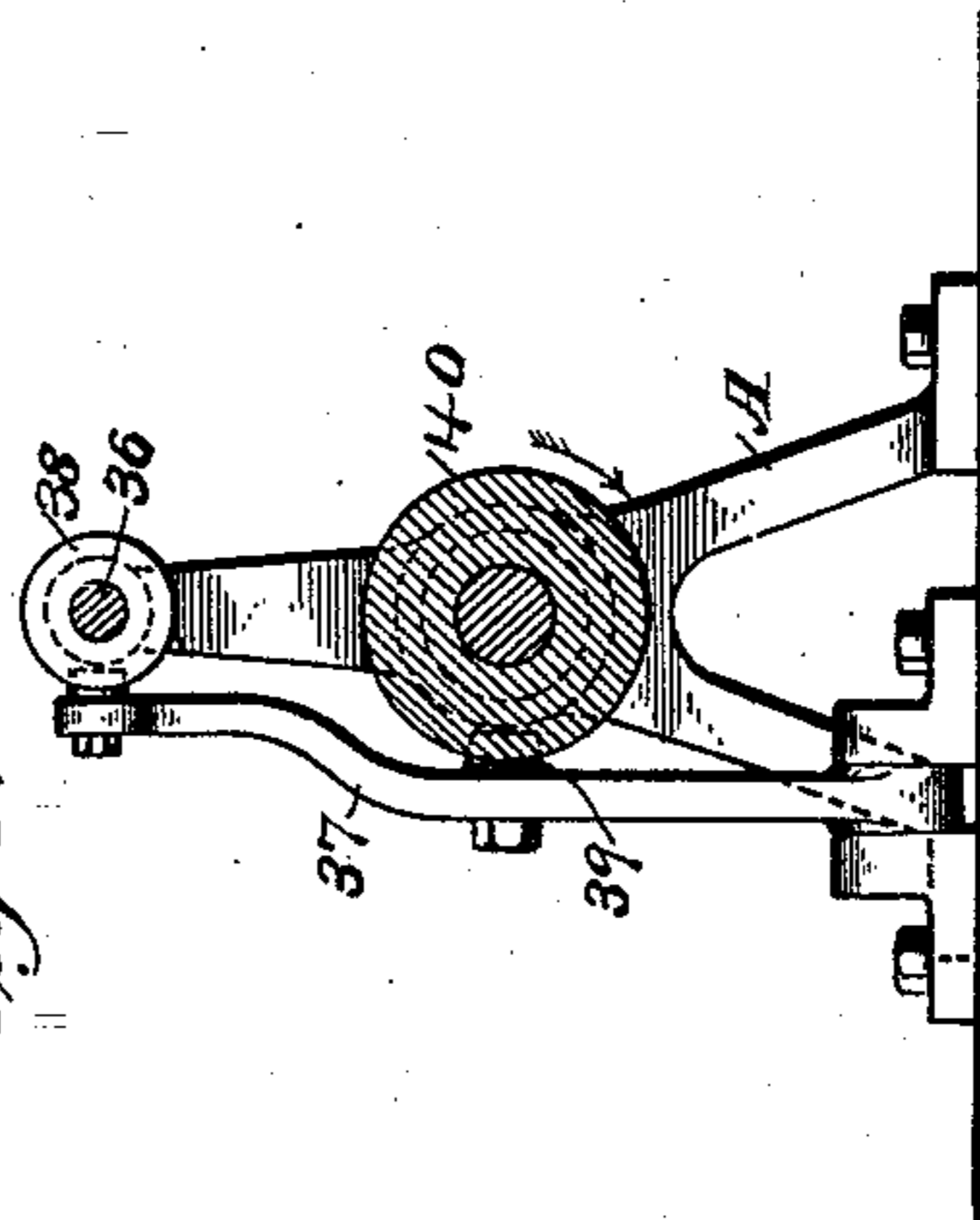


Fig. 5.

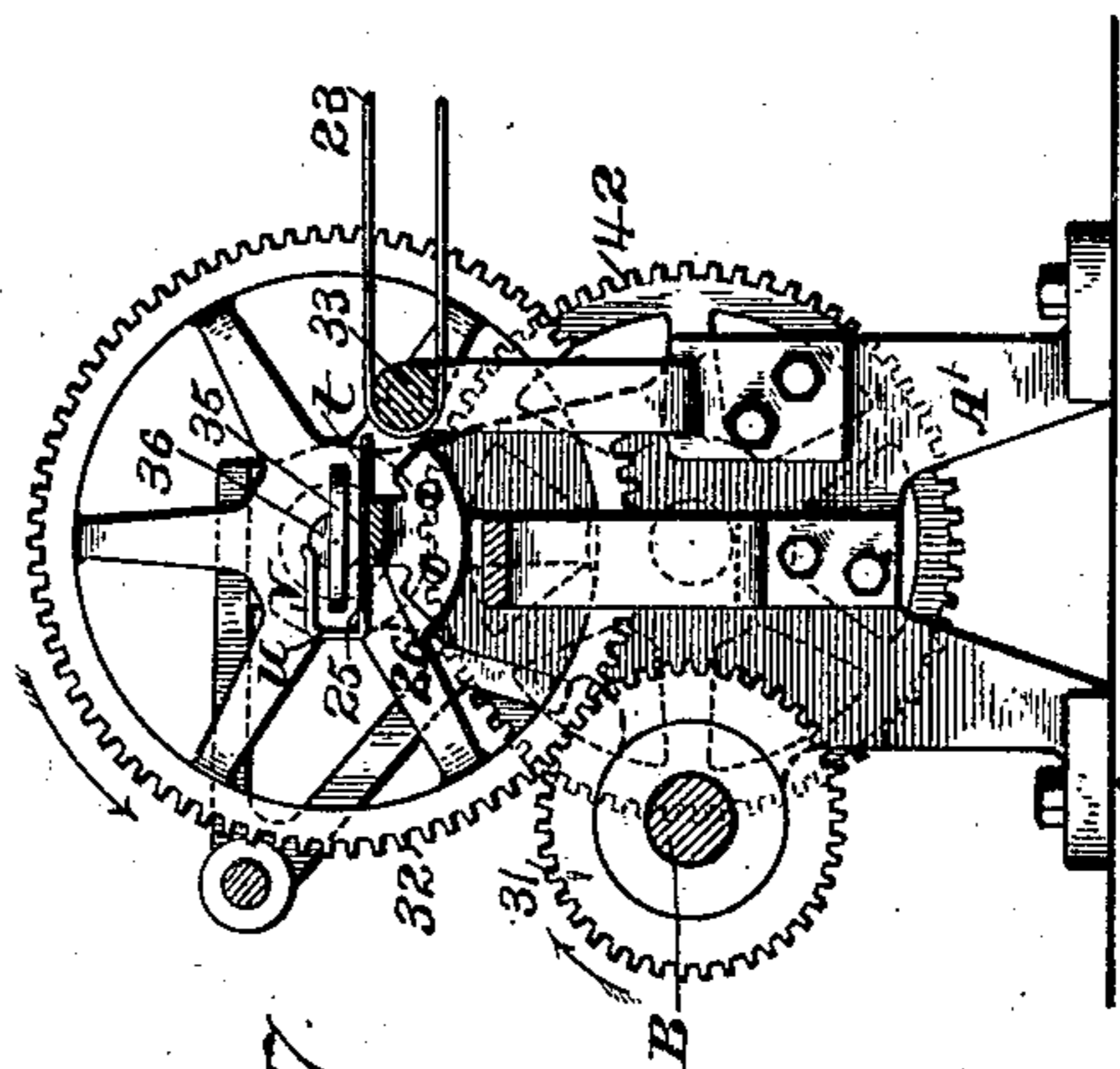


Fig. 7.

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UNITED STATES PATENT OFFICE.

LUTHER C. CROWELL, OF BROOKLYN, NEW-YORK, ASSIGNOR TO ROBERT HOE, THEODORE H. MEAD, AND CHARLES W. CARPENTER, OF NEW YORK, N. Y.

WRAPPING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 603,602, dated May 3, 1898.

Application filed August 13, 1897. Serial No. 648,089. (No model.)

To all whom it may concern:

Be it known that I, LUTHER C. CROWELL, a citizen of the United States, residing at Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Wrapping-Machines, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to machines of that class employed in wrapping newspapers and other publications or similar articles.

In a machine constructed in accordance with the invention a succession of independent papers or other articles to be wrapped are advanced and enveloped in wrappers wound spirally about the papers as they are advanced, the wrappers preferably being applied in the form of a continuous wrapper-web, so as to form a continuous spirally-wound wrapper-tube about the successive papers, which tube is afterward severed at or near the junction between successive papers and the wrapped papers delivered separately from the machine.

I preferably provide means whereby the papers as they are fed longitudinally forward will be rotated, so that a wrapper-web, being guided to the papers at an angle to the line in which the papers are being advanced, will be drawn forward by the rotary and longitudinal movements of the papers and wound spirally thereon, the edges of successive layers or windings of wrapper overlapping and being secured together by a line of paste applied by suitable pasting devices to one edge of the wrapper-web. I preferably employ feeding devices engaging the outside of the papers or of the wrapper-tube inclosing the papers, and such exterior feeding devices are preferably mounted to rotate so as to form paper feeding and rotating devices. Any suitable mechanism may be employed for feeding the papers successively to the feeding and rotating devices; but I preferably employ feeding devices whereby the papers are advanced to the feeding and rotating devices transversely to the direction in which they are advanced by the feeding and rotating devices, and I preferably provide a rotary

pocket in line with and rotating in time with the feeding and rotating devices, into which the papers are fed and from which as they rotate therewith they are advanced by suitable means to the feeding and rotating devices. The pocket is preferably open on one side to receive the papers as they are successively advanced transversely to the axis of rotation of the pocket, as the papers may thus be fed into the pocket without its rotation being interrupted for receiving them. For advancing the papers from the pocket I preferably provide a reciprocating rotary pusher engaging the outer end of the paper and advancing the paper at the proper time from the pocket. I thus provide means whereby papers folded to the usual flat form may be successively fed to the feeding devices of the wrapping mechanism proper at the desired intervals without the necessity of stopping any part of said wrapping mechanism for the purpose of receiving the papers.

Means are preferably provided for severing the continuous wrapper-tube inclosing the papers into paper lengths, so that the papers may be delivered from the machine completely wrapped and separated one from another. Any suitable means may be provided for this purpose; but I prefer to provide means for perforating the wrapper-web before it is wound about the papers, and then to separate, by means of a pair of accelerated breaking-rolls, the wrapper-tube on these lines of perforations, the web being perforated on the proper diagonal lines, so that the lines of perforations in the wrapper-tube will be at right angles to the length of the tube and at or near the junctions between successive papers. By severing the wrapper-tube into paper lengths in this manner all danger of cutting or otherwise injuring the papers is avoided and the papers may be wrapped with their meeting ends as close together as desired.

In being wound spirally onto a flat paper the wrapper-web will be taken up unevenly. I therefore preferably provide a tension and take-up device acting on the wrapper-web as it advances to the papers which will compensate for this uneven taking up of the wrapper-

web and maintain an even tension on the wrapper as it is advanced to the papers.

A full understanding of the invention can best be given by a detailed description of a preferred construction embodying the various features of the invention, and such a description will now be given in connection with the accompanying drawings, showing such a preferred construction embodying the invention, and the features forming the invention will then be specifically pointed out in the claims.

In the drawings, Figure 1 is a plan view of the machine. Fig. 2 is a longitudinal sectional view. Fig. 3 is a view taken on line 3 of Fig. 1 and showing the wrapper-feeding mechanism in perspective. Fig. 4 is an elevation of the wrapper-feeding mechanism. Fig. 5 is an end view of the wrapping mechanism from the left in Fig. 1. Fig. 6 is a section on line 6 of Fig. 1. Fig. 7 is a section on line 7 of Fig. 1. Fig. 8 is a section on line 8 of Fig. 1. Figs. 9, 10, and 11 are diagrammatic sectional views showing the paper-receiving mechanism in different positions.

The various parts of the machine may be supported in any suitable manner, but are shown as supported by standards $A A' A^2 A^3 A^4$. Extending longitudinally of the machine and journaled in the standards $A' A^2 A^3 A^4$ is a main driving-shaft B , having fast and loose pulleys $C C'$, and from which the various moving parts of the machine are driven.

The papers having been fed successively to receiving mechanism hereinafter described are advanced to a pair of feeding-rolls $a a$, journaled in a rotary frame b , by which rolls they are advanced between guides 10, carried by the frame b , after leaving which they are enveloped by the wrapper and then entered between feeding-rolls $a' a'$, journaled in a rotary frame b' , by which they are advanced through a guide 11 to a third pair of feeding-rolls $a'' a''$, journaled in a rotary frame b'' . The guide 11 is carried by and rotates with the frames b' and b'' .

The rotary frames $b b' b''$ are preferably of circular form and rotatably supported by circular guides or bearings 12, carried by or formed by the upper part of the standards $A^2 A^3 A^4$, and said circular frames are rotated from the driving-shaft B by gears 13, meshing with gears 14, carried by said frames. Each pair of feeding-rolls $a a$ and $a' a'$ and $a'' a''$ carry intermeshing gears 15 and are driven from a gear 16, journaled in the rotary frames and carrying a beveled gear 17, meshing with a beveled gear 18 on the shaft of one of the said rolls, the gear 16 meshing with a stationary gear or circular rack 19, carried by a bracket 20, extending upward from the standards $A^2 A^3 A^4$, as the case may be, so that as the rotary frames rotate about their centers the gears 16 will be caused, through their engagement with the racks 19, to rotate about their centers, thus causing the feeding-rolls $a a' a'' a'' a''$ to rotate. The circular racks

19 are formed on the edges of rings which extend about and leave free the path of the paper.

The papers x are fed into the machine by feeding-tapes 23 and 24, which advance the papers successively to a rotary pocket 25, formed, preferably, in sections carried by a bar 26. The pocket, or each of the sections thereof when it is of the sectional form shown, is open on one side and is formed, preferably, with a wide side about equal in width to the width of the papers to be wrapped, a closed side or bottom u , and a short side v , somewhat less than half the width of the side t , the inside distance between the sides t and v being about equal to the thickness of the papers to be wrapped. The bar 26 is supported at one end by the rotary frame b , as shown in Fig. 2, and at the other end by a rotary sleeve 30, as shown in Figs. 2 and 7, the sleeve 30 being journaled in the standard A' and rotated in time with the frames $b b' b''$ from the shaft B by a gear 31, meshing with a gear 32, carried by the sleeve.

The operation of receiving a paper in the pocket 25 will be understood from Figs. 9, 10, and 11. Fig. 9 shows the parts in position just as the paper has been fed to the pocket 25 by the tapes 23 and 24 against the long side of the pocket and beneath the short side and bottom of the pocket, which is uppermost. Then as the pocket continues to rotate in the direction of the arrow the paper is further fed, so as to enter its forward edge between the sides t and v of the pocket, this further feeding being accomplished by the tapes 23 and 24 as before until the rear end of the paper passes beyond the roll 33, around which the tapes 23 turn.

After the paper has been advanced so that its rear end is no longer engaged by the tapes 23 it is further advanced into the pocket to bring its front edge against the side or bottom u of the pocket by the feeding-tapes 24, which, as shown, are extended to rolls 34 on the other side of the pocket, the tapes passing between the sections of the pocket. The tapes 24 thus continue to bear on the paper and feed it into the pocket after it has passed beyond the tapes 23 and continue to bear on the rear edge of the paper as the pocket continues its rotation from the horizontal position shown in Fig. 10 until it reaches the vertical position shown in Fig. 11, thereby insuring the paper being properly entered into the pocket. One or more circular guides 27 are preferably provided to hold the papers in place in the pocket as the rotation of the pocket continues.

After a paper has been entered into the pocket its rear end is engaged by a pusher 35, carried by a rod 36, mounted to rotate with, but free to reciprocate longitudinally in, the sleeve 30 and having its rear end mounted free to rotate and reciprocate in the upper end of the standard A . The rod 36 is reciprocated by means of a rocking arm 37, hav-

ing a pin entering between the flanges of a spool 38 on the rod and having a bowl 39 entering a cam-groove in a cam-cylinder 40, rotatably mounted between the standards A and A' and formed to rock the arm 37 to advance the pusher 35 at the proper time to engage the paper after it has been fed into the pocket and advance it longitudinally of the pocket to enter its front end between the feeding-rolls α , by which it is then advanced, as before stated, between the guides 10. The cam-cylinder 40 is driven by a gear 41 on the sleeve 30, which meshes with a gear 42 on the cam-cylinder. The feeding of the papers into the pocket and the reciprocating of the pusher 35 are so timed that successive papers will be fed to the feeding-rolls α and then advanced by the rolls α end to end and with their meeting ends touching or with a desired space between them.

Since the feeding of a paper into the pocket 25 cannot be begun until the preceding paper has been advanced by the rolls α to carry its rear end entirely clear of the path of the papers as they are fed transversely into the pocket, and since a short interval of time must then elapse before the paper can be entered fully into the pocket in position to be advanced by the pusher 35, it is evident that there will be a considerable space between the front end of a paper when fed into the pocket 25 and the rear end of the preceding paper. In order to shorten this distance and cause the papers to be advanced from the feeding-rolls α with their meeting ends touching or at a desired short distance apart, the pusher 35 is reciprocated at a speed greater than that at which the papers are fed by the rolls α , so as to cause the front end of a paper as it is advanced by the pusher to catch up with the rear end of the preceding paper as desired.

After leaving the guides 10 the papers are associated with a wrapper-web, which in the machine shown in the drawings is wound about the papers as a continuous or unbroken web to form a continuous wrapper-tube about the papers, being guided to the rotating and longitudinally-advancing papers at an angle to the direction of movement of the papers by any suitable means, but preferably by feeding and pasting mechanism constructed substantially as follows: The wrapper-web γ , coming from the web-roll, passes beneath guide-rolls 45 and 46, then back and up between feeding-rolls 47 and 48, turning on the roll 48, and passing over a spring-tension device to be associated with the paper. As the web passes about the roll 48 it is engaged by and receives a line of paste at one edge from a paste-roll 49, rotating in a fountain 50, the roll 47 being cut away, as shown in Fig. 1, so as not to contact with the paper at the edge where the paste is applied. It will be noticed that the paste is applied to that side and edge of the wrapper which, when the wrapper is wound about the paper, forms the inner side

of the forward edge of the wrapper. The feeding-rolls 47 and 48 carry intermeshing gears 51 and are driven from a bevel-gear 52 on the driving-shaft B, which drives a bevel-gear 53, mounted free to rotate on the shaft of the roll 48, said gear carrying also a smaller gear 54, which, through an intermediate 55, drives a large gear 56, fast on the shaft of the roll 47. This wrapper-feeding mechanism is arranged so that the wrapper-web is advanced to the papers at an angle as they are fed between the feeding-rolls α and the feeding-rolls α' , so that as the papers advance and rotate the wrapper will be wound about the papers with its edges overlapping, so as to be secured by the paste which has been applied to the edge of the wrapper. The papers as they are advanced by the rolls α' and into the guide 11 will thus be inclosed in a continuous spirally-wound wrapper forming a continuous wrapper-tube inclosing the successive papers.

It will be seen that the papers may be advanced for wrapping with the ends of successive papers separated a short distance, so that when the wrapper-tube is severed into paper lengths each paper will be inclosed in a wrapper-tube projecting beyond the ends of the paper to protect the paper, or the papers may be advanced for wrapping with the ends of successive papers meeting or substantially so, so that when the wrapper-tube is severed into paper lengths each paper will be inclosed in a wrapper of substantially the length of the paper.

For the purpose of perforating the wrapper-web for severing the wrapper-tube into paper lengths the roll 47 is provided with a diagonal perforating-strip 57, whereby as the web passes between the rolls 47 and 48 and at each rotation of the roll 47 it will receive a line of perforations diagonal to the length of the web and at right angles to the direction of movement of the papers, as shown in Fig. 1. The roll 47 is of such diameter, according to the size of the papers to be wrapped, that for each rotation of the roll a length of the wrapper-web will be advanced sufficient to form a length of the wrapper-tube equal to the length of a paper, or a little more if it be desired to deliver the papers with wrappers projecting beyond their ends. The feeding-rolls α'' are driven at a slightly greater speed than the rolls α and the rolls α' , so that when the papers inclosed in the continuous but perforated wrapper-tube enter between the rolls α'' after passing through the guide-tube 11 the wrapper-tube will be separated on the perforated lines and the papers delivered from the rolls α'' each with its portion of the wrapper-tube separated from that of the next succeeding paper. One of the rolls α'' is preferably spring-pressed, as shown, so as to insure the wrapper and inclosed papers being tightly gripped for breaking the wrapper-tube. By thus perforating the wrapper-web before it is wound about the papers and then breaking the

wrapper-tube on such perforated lines the wrapper-tube is severed into paper lengths without danger of injuring the papers however close together they are.

5 The wrapper-web, as it is wound onto papers folded in the usual manner for wrapping, will, on account of the flat form of the papers, be taken up unevenly, and as the wrapper-web is advanced from the feeding-rolls 47 and 10 48 at a uniform rate I provide between said feeding-rolls and the point where the wrapper is associated with the papers a spring-tension and take-up device, preferably a tension-roll 60, which is shown as carried by a forked 15 arm 61, extending from a pivot-shaft 62, and under light tension by the coil-spring 63 to bear against and take up any slack in the wrapper-web and thus to maintain a constant even tension on the web.

20 It will be understood that the invention as claimed is not limited to the construction shown in the drawings as embodying the invention and to which the foregoing description has been mainly confined, but that it 25 includes such changes and modifications in the construction shown as are within the claims.

While the invention is especially intended for wrapping newspapers and other publications, yet it is to be understood that it is not to be limited to such use, but that wrapping-machines embodying the invention or features thereof as claimed may be employed for wrapping other articles for which they may be 30 found suitable, the term "paper" being used in the claims to include all such articles.

What I claim is—

1. The combination of means for supporting and advancing a succession of independent papers, and means for winding a succession of wrappers spirally about the successive papers as they are advanced, substantially as described. 35

2. The combination of means for supporting and advancing a succession of independent papers, means for delivering the papers successively to said supporting and advancing means, and means for winding a succession of wrappers spirally about the successive 45 papers as they are advanced, substantially as described.

3. The combination of means for supporting and advancing a succession of independent papers, means for winding a succession of wrappers spirally about the successive papers as they are advanced, and pasting devices for applying a line of paste to one edge of the wrappers for securing together the successive windings of the wrappers, substantially 50 as described.

4. The combination of means for supporting and advancing a succession of independent papers, means for winding a continuous wrapper-web about the papers as they are advanced to form a continuous spirally-wound wrapper-tube inclosing the papers, and means 55 for severing the wrapper-tube at or near the

junction between successive papers, substantially as described.

5. The combination of means for supporting, rotating and advancing a succession of independent papers, and means for guiding a succession of wrappers to the rotating and longitudinally-advancing papers at an angle to spirally wind the wrappers about the papers, substantially as described. 70 75

6. The combination of means for supporting, rotating and advancing a succession of independent papers, means for guiding a continuous wrapper-web to the rotating and longitudinally-advancing papers at an angle to form a continuous spirally-wound wrapper-tube about the papers, and means for severing the wrapper-tube at or near the junction between successive papers, substantially as described. 80 85

7. The combination of means for supporting, rotating and advancing a succession of independent papers, means for delivering the papers successively to said supporting, rotating and advancing means, and means for guiding a succession of wrappers to the rotating and longitudinally-advancing papers at an angle to spirally wind the wrappers about the papers, substantially as described. 90 95

8. The combination of means for supporting, rotating and advancing a succession of independent papers, means for delivering the papers successively to said supporting, rotating and advancing means, means for guiding a succession of wrappers to the rotating and longitudinally-advancing papers at an angle to spirally wind the wrappers about the papers, and pasting devices for applying a line of paste to one edge of the wrappers for securing together the successive windings of the wrappers, substantially as described. 100 105

9. The combination of means for supporting, rotating and advancing a succession of independent papers, devices for advancing the papers in a direction transverse to the direction in which they are fed by said supporting, rotating and advancing means and delivering the papers successively to said supporting, rotating and advancing means, and means for guiding a succession of wrappers to the rotating and longitudinally-advancing papers at an angle to spirally wind the wrappers about the papers, substantially as described. 110 115 120

10. The combination of means for supporting, rotating and advancing a succession of independent papers, a rotary pocket from which the papers are delivered longitudinally to said supporting, rotating and advancing means, and means for guiding a succession of wrappers to the rotating and longitudinally-advancing papers at an angle to spirally wind the wrappers about the papers, substantially as described. 125 130

11. The combination of means for supporting, rotating and advancing a succession of independent papers, a rotary pocket, feeding devices for advancing the papers successively

into said pocket transversely to the axis of rotation of the pocket, means for advancing the papers longitudinally of said axis from the pocket to said paper supporting, rotating and advancing means, and means for guiding a succession of wrappers to the rotating and longitudinally-advancing papers at an angle to spirally wind the wrappers about the papers, substantially as described.

12. The combination of means for supporting, rotating and advancing a succession of independent papers, a rotary pocket, feeding devices for advancing the papers successively into the pocket transversely to the axis of rotation of the pocket, a pusher for advancing the papers longitudinally of said axis from the pocket to said paper supporting, rotating and advancing means, and means for guiding a succession of wrappers to the rotating and longitudinally-advancing papers at an angle to spirally wind the wrappers about the papers, substantially as described.

13. The combination of means for supporting, rotating and advancing a succession of independent papers, a rotary pocket, feeding devices for advancing the papers successively into the pocket transversely to the axis of rotation of the pocket, a pusher for advancing the papers longitudinally of said axis from the pocket to said paper supporting, rotating and advancing means and advancing the papers faster than they are advanced by said paper supporting, rotating and advancing means, and means for guiding a succession of wrappers to the rotating and longitudinally-advancing papers at an angle to spirally wind the wrappers about the papers, substantially as described.

14. The combination of means for supporting, rotating and advancing a succession of independent papers, a rotary pocket from which the papers are delivered to said supporting, rotating and advancing means, feeding devices for advancing the papers successively to the pocket transversely to the axis of rotation of the pocket, feeding-tapes for completing the feeding of the papers into the pocket, and means for guiding a succession of wrappers to the rotating and longitudinally-advancing papers at an angle to spirally wind the wrappers about the papers, substantially as described.

15. The combination of a rotary pocket, feeding devices for advancing papers successively into the pocket transversely to the axis of rotation of the pocket, and means for advancing the papers longitudinally of said axis from the pocket, substantially as described.

16. The combination of a rotary pocket having a long side l and a short side v , feeding devices for advancing the papers successively into the pocket transversely to the axis of rotation of the pocket, and feeding-tapes 24 engaging the paper on the side of the pocket having the short side v to complete the feeding of the papers into the pocket, substantially as described.

17. The combination with a pair of feeding-rolls a mounted in a rotating frame, of a rotary pocket whose axis of rotation coincides with the axis of rotation of said frame, and a rotary pusher for advancing a paper longitudinally of said axis from the pocket to said feeding-rolls, substantially as described.

18. The combination of the rotary pocket 25, feeding-tapes 23 and 24 running transversely to the axis of rotation of the pocket, the feeding-tapes 24 being extended beyond the pocket to complete the feeding of papers into the pocket, and means for advancing the papers longitudinally of said axis from the pocket, substantially as described.

19. The combination of the rotary pocket 25 formed in sections, feeding devices for advancing papers into the pocket transversely to the axis of rotation of the pocket, feeding-tapes 24 extending between the sections of the pocket to complete the feeding of the papers into the pocket, and means for advancing the papers longitudinally of said axis from the pocket, substantially as described.

20. The combination of the rotary pocket 25, feeding devices for advancing papers into the pocket transversely to the axis of rotation of the pocket, a guide 27, and means for advancing the papers longitudinally of said axis from the pocket, substantially as described.

21. In a machine for wrapping newspapers and similar articles, the combination of exterior paper-feeding devices for advancing a succession of independent papers, and means for winding a succession of wrappers spirally about the successive papers as they are advanced, substantially as described.

22. In a machine for wrapping newspapers and similar articles, the combination of exterior paper-feeding devices for advancing a succession of independent papers, means for winding a continuous wrapper-web about the papers as they are advanced to form a continuous spirally-wound wrapper-tube inclosing the papers, and means for severing the wrapper-tube at or near the junction between successive papers, substantially as described.

23. In a machine for wrapping newspapers and similar articles, the combination of rotating exterior paper-feeding devices for advancing a succession of independent papers, and means for guiding a succession of wrappers to the rotating and longitudinally-advancing papers at an angle to spirally wind the wrappers about the papers, substantially as described.

24. In a machine for wrapping newspapers and similar articles, the combination of a set of rotating exterior feeding devices for advancing a succession of independent papers to the wrapping-point, a set of rotating exterior feeding devices for advancing the wrapped papers from the wrapping-point, and means for guiding a succession of wrappers to the rotating and longitudinally-advancing papers between said feeding devices and at

an angle to spirally wind the wrappers about the papers, substantially as described.

25. The combination of paper-feeding devices for advancing a succession of independent papers, means for winding a continuous wrapper-web about the papers as they are advanced to form a continuous spirally-wound wrapper-tube inclosing the papers, and means for perforating the wrapper-web on lines diagonal to the length of the web and at right angles to the line of movement of the papers to form perforated lines in the wrapper-tube at or near the junction between successive papers, substantially as described.

26. The combination of paper-feeding devices for advancing a succession of independent papers, means for winding a continuous wrapper-web about the papers as they are advanced to form a continuous spirally-wound wrapper-tube inclosing the papers, means for perforating the wrapper-web on lines diagonal to the length of the web and at right angles to the line of movement of the papers to form perforated lines in the wrapper-tube at or near the junction between successive papers, and means for severing the wrapper-tube on said perforated lines, substantially as described.

27. The combination of paper-feeding devices for advancing a succession of independent papers, means for winding a continuous wrapper-web about the papers as they are advanced to form a continuous spirally-wound wrapper-tube inclosing the papers, pasting devices for applying a line of paste to one edge of the wrapper-web for securing together the successive windings of wrapper forming the wrapper-tube, means for perforating the wrapper-web on lines diagonal to the length of the web and at right angles to the line of movement of the papers to form perforated lines in the wrapper-tube at or near the junction between successive papers, and means for severing the wrapper-tube on said perforated lines, substantially as described.

28. The combination of paper-feeding de-

vices for advancing a succession of independent papers, means for winding a continuous wrapper-web about the papers as they are advanced to form a continuous spirally-wound wrapper-tube inclosing the papers, means for perforating the wrapper-web on lines diagonal to the length of the web and at right angles to the line of movement of the papers to form perforated lines in the wrapper-tube at or near the junction between successive papers, and feeding devices feeding the wrapped papers at an increased speed to break the wrapper-tube on the perforated lines, substantially as described.

29. The combination of paper feeding and rotating devices for advancing a succession of independent papers, and feeding-rolls 47 and 48 for advancing a continuous wrapper-web to the rotating and longitudinally-advancing papers at an angle to form a continuous spirally-wound wrapper-tube about the papers, one of said rolls being provided with a diagonal perforating-strip for perforating the wrapper-web in a line at right angles to the line of feed of the papers to form perforated lines in the wrapper-tube at or near the junction between successive papers, substantially as described.

30. The combination of paper feeding and rotating devices for advancing a succession of independent papers, means for guiding a continuous wrapper-web to the rotating and longitudinally-advancing papers at an angle to form a continuous spirally-wound wrapper-tube about the papers, and a tension and take-up device engaging the wrapper-web as it advances to the papers, substantially as described.

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

LUTHER C. CROWELL.

Witnesses:

THOMAS KEMP,
G. F. READ.