

No. 752,933.

PATENTED FEB. 23, 1904.

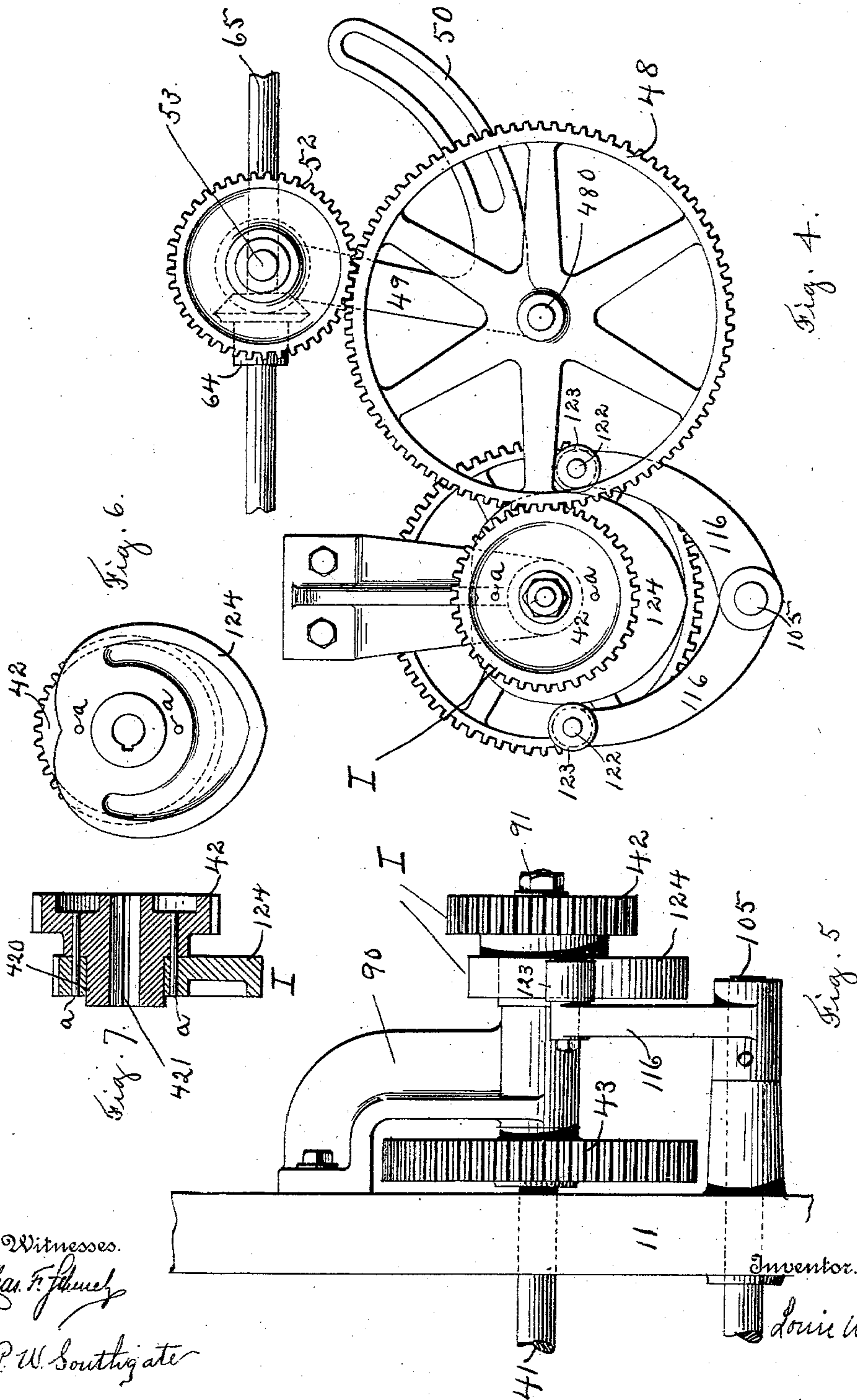
L. W. SOUTHGATE.

WEB MANIPULATING MECHANISM.

APPLICATION FILED AUG. 14, 1893. RENEWED JULY 16, 1903.

NO MODEL.

5 SHEETS—SHEET 3.



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Fig. 8.

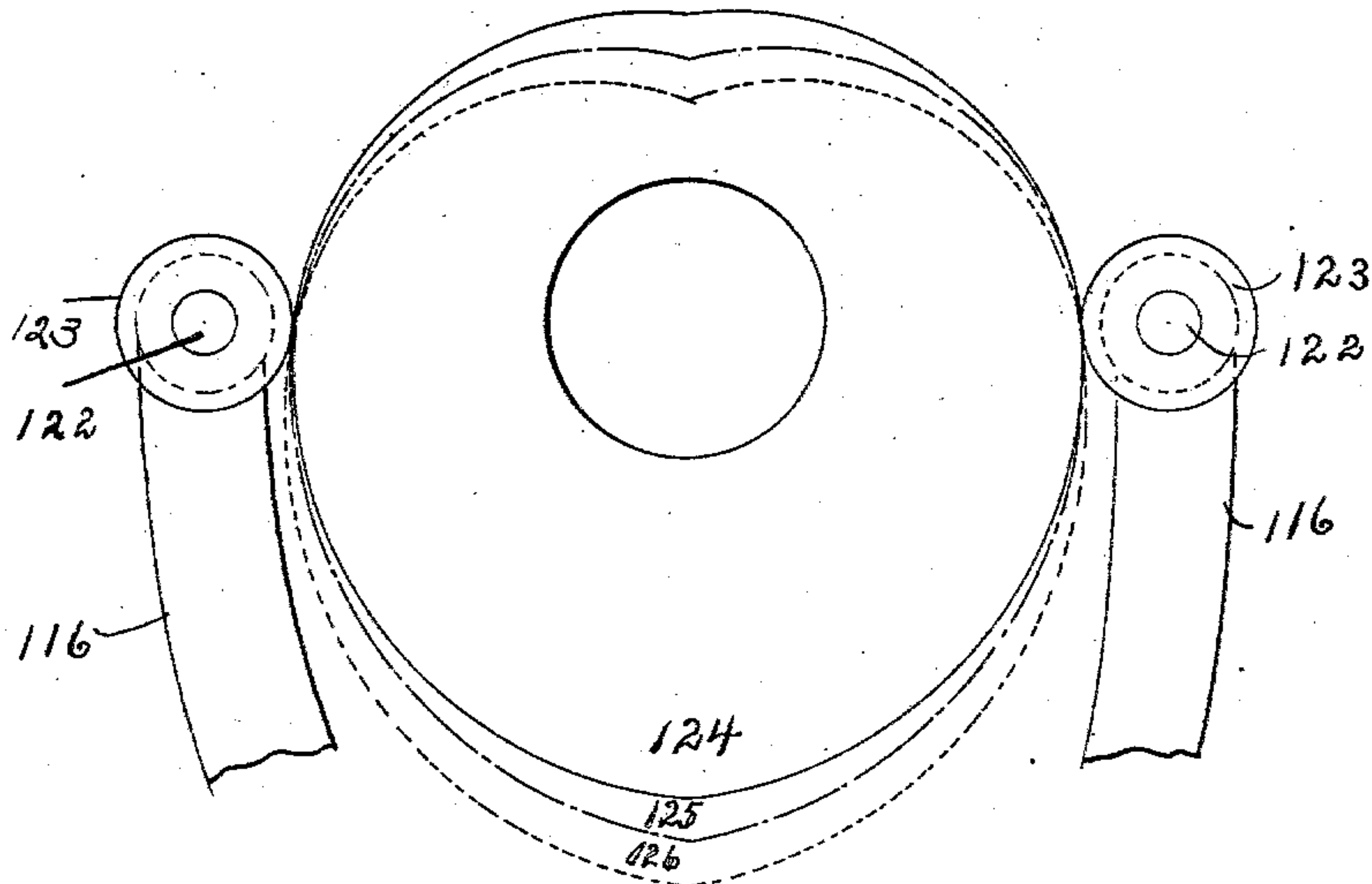


Fig. 9.

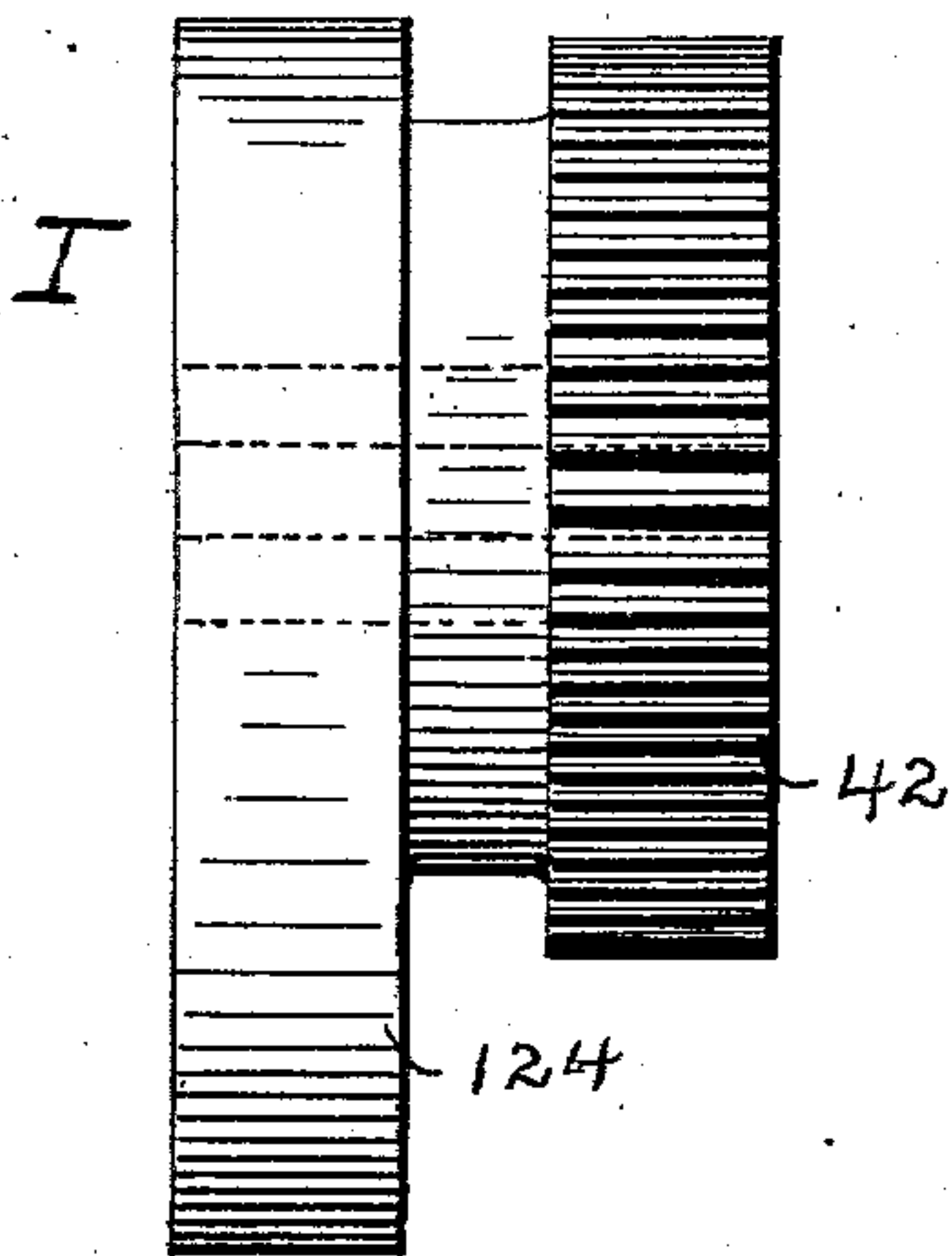


Fig. 10.

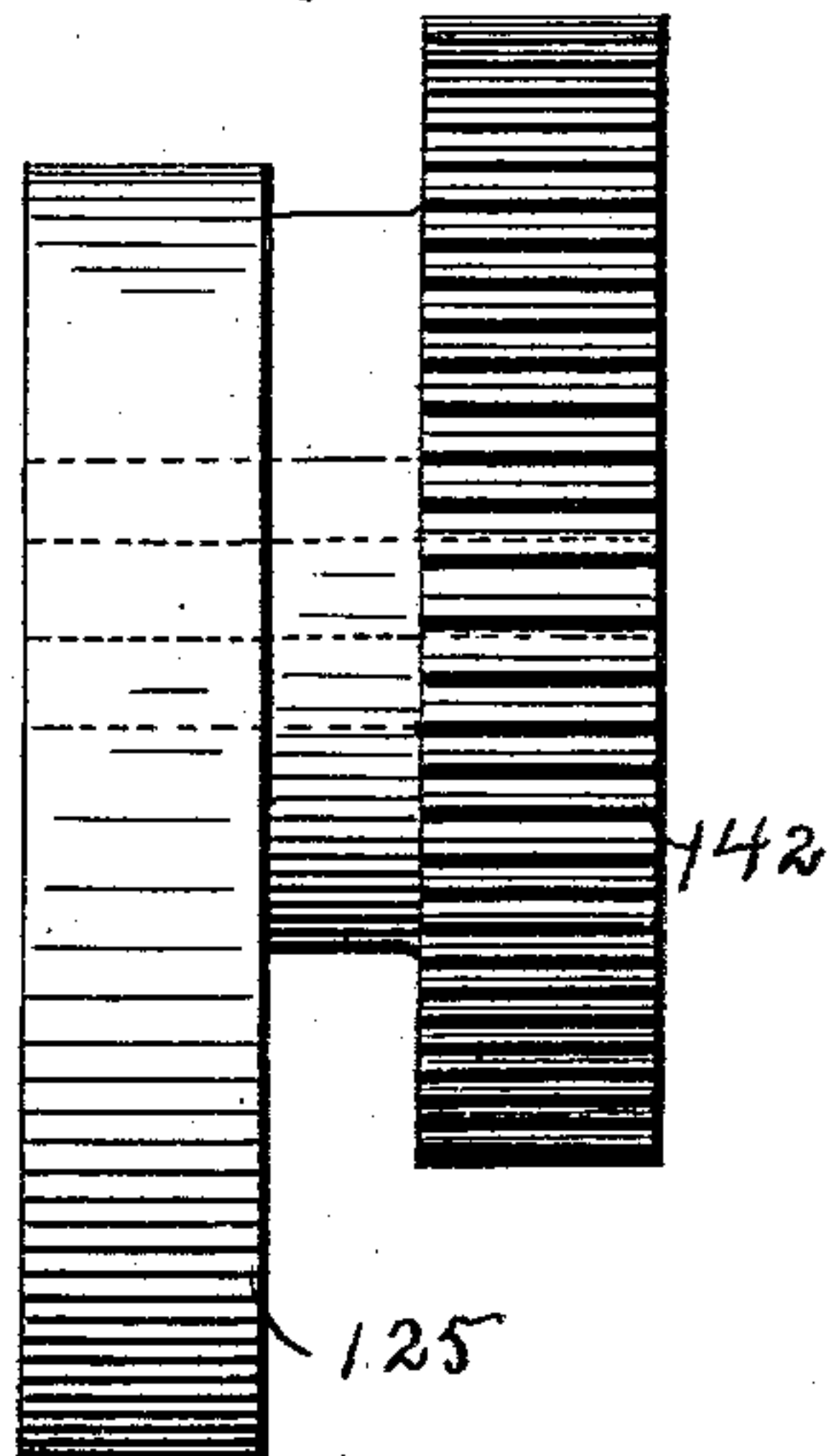
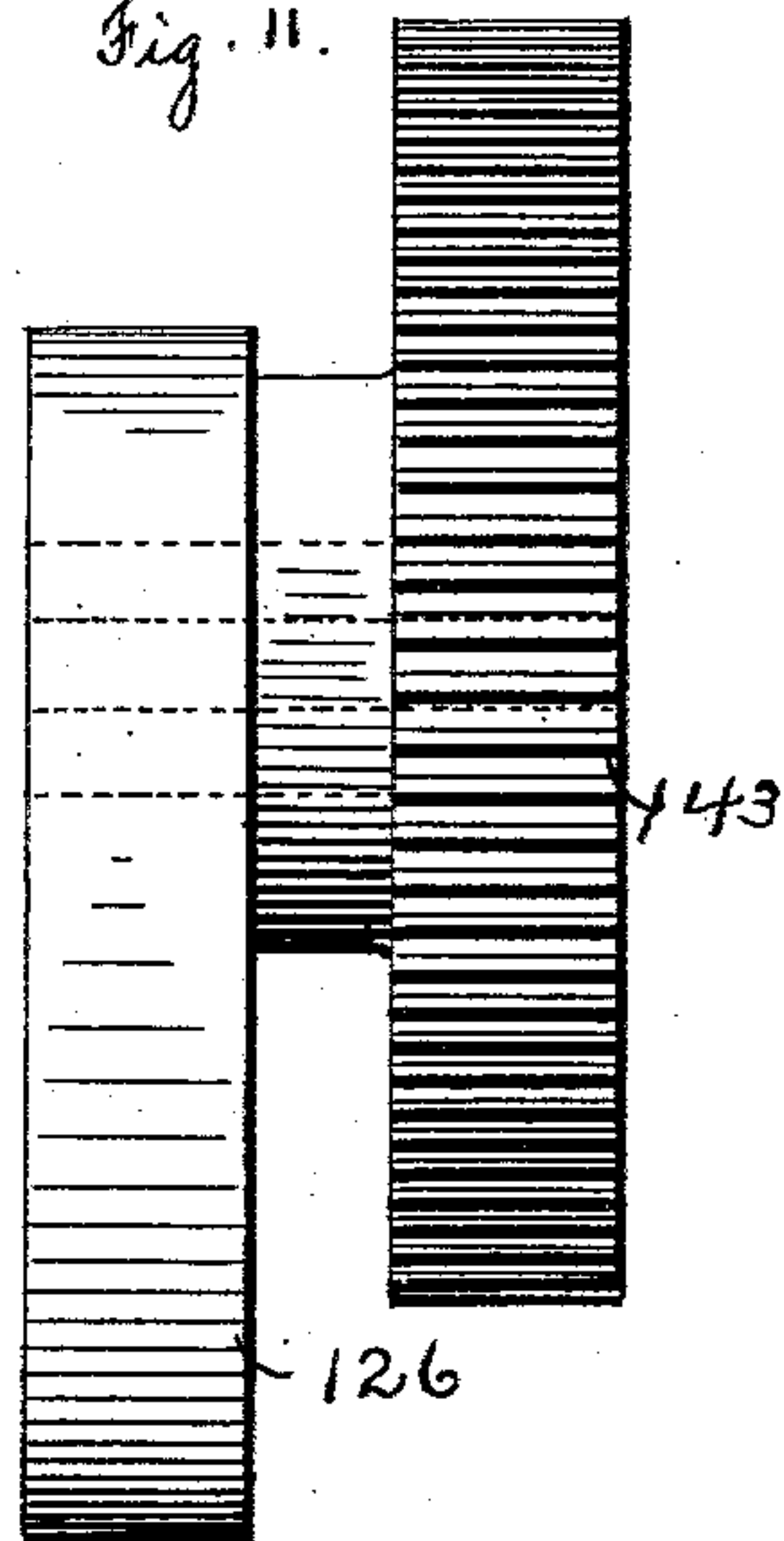


Fig. 11.



Witnesses.
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5 SHEETS—SHEET 5.

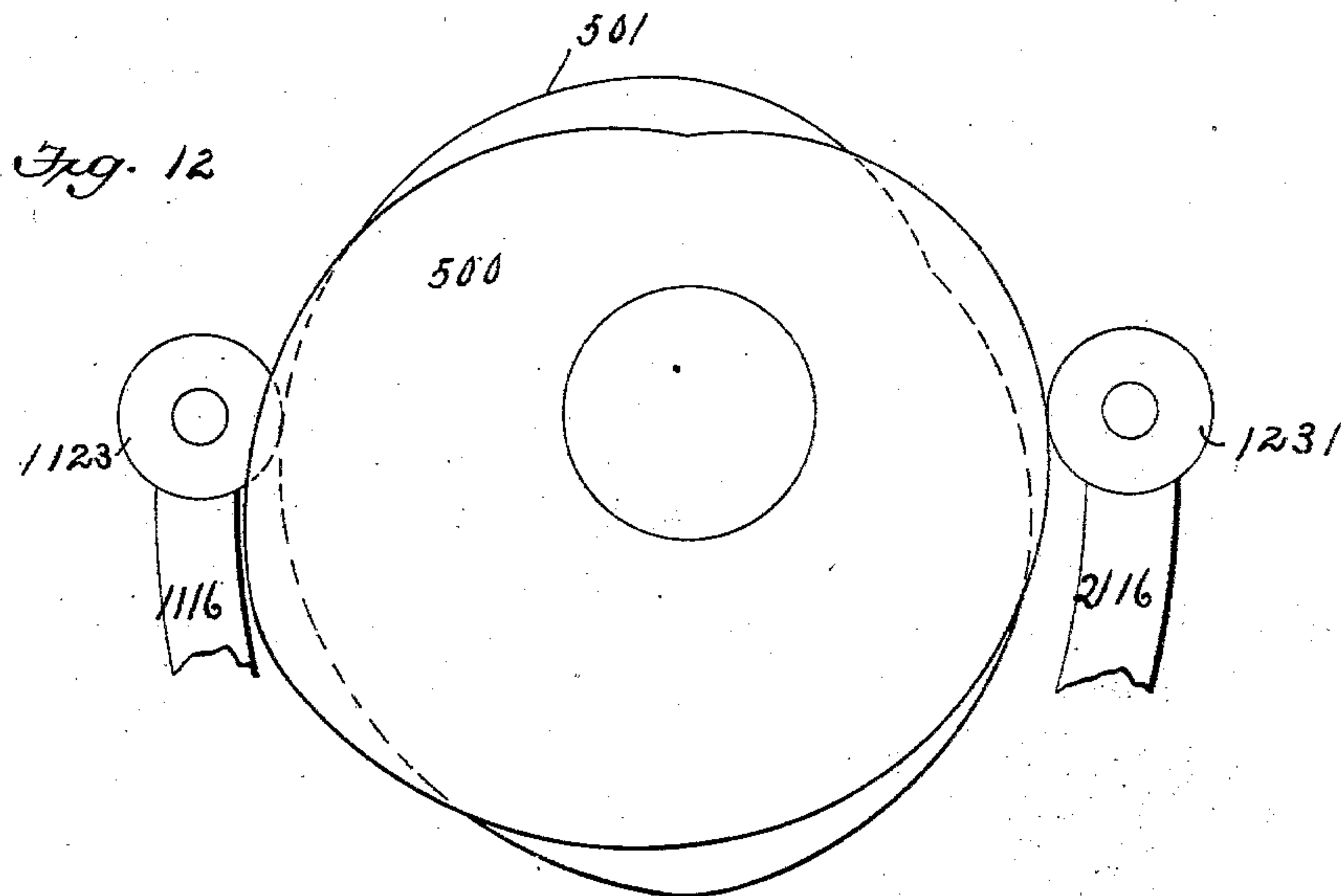


Fig. 13

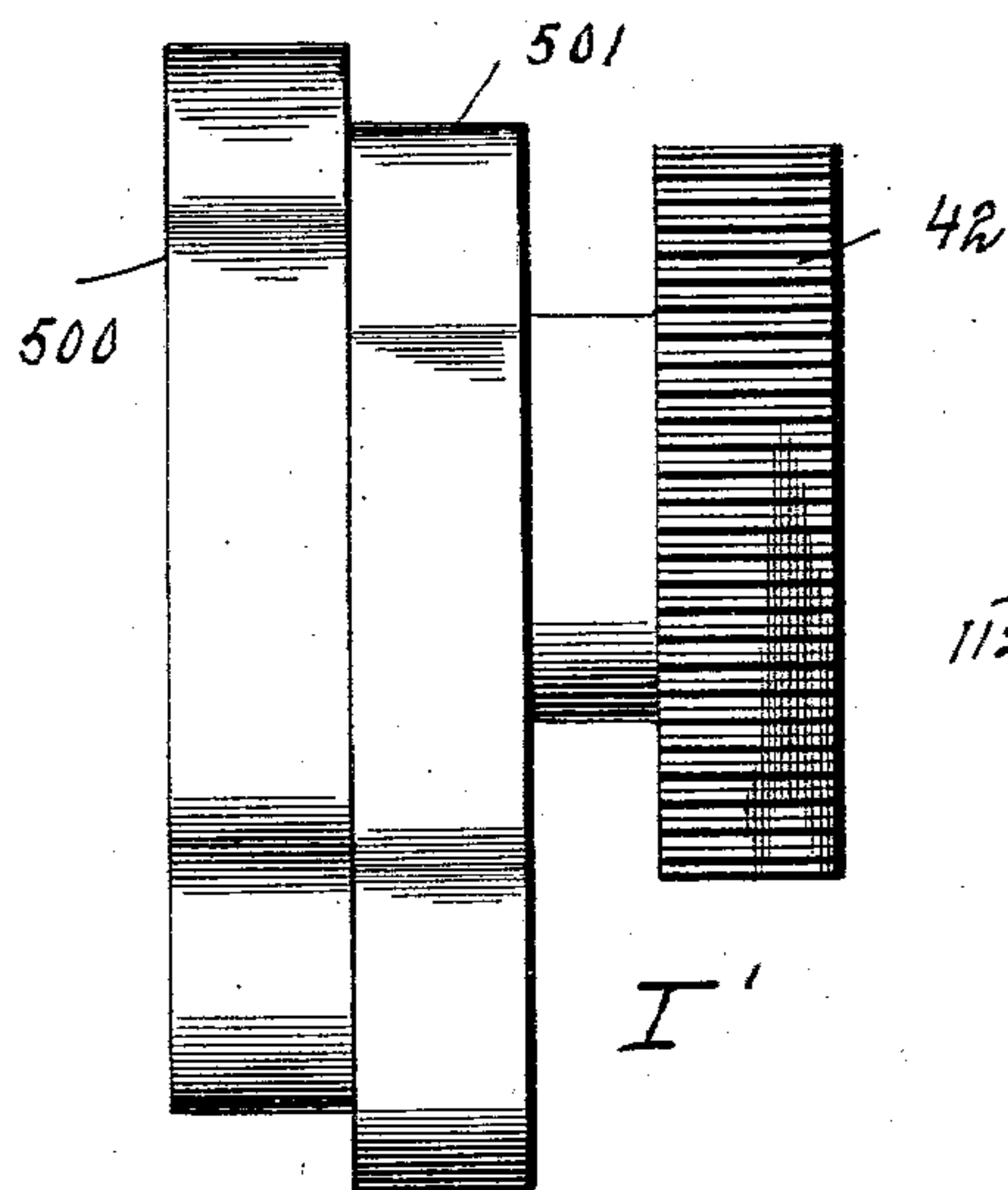
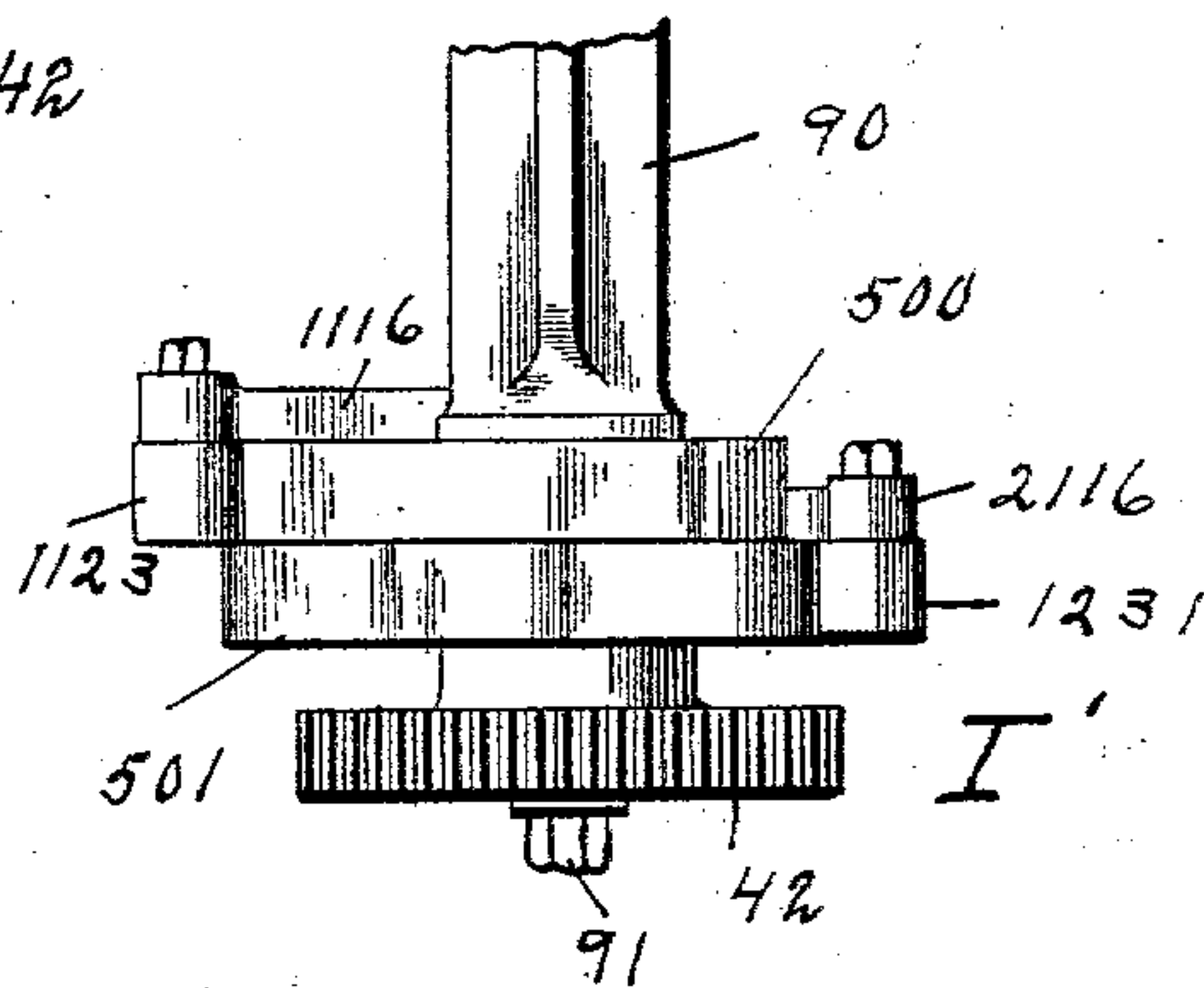


Fig. 14



Witnesses

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WEB-MANIPULATING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 752,933, dated February 23, 1904.

Application filed August 14, 1893. Renewed July 16, 1903. Serial No. 165,872. (No model.)

To all whom it may concern:

Be it known that I, LOUIS W. SOUTHGATE, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Improvement in Web-Manipulating Mechanisms, of which the following is a specification.

The aim of this invention is to provide a new mechanism by which the length of a sheet printed in a web-printing press can be adjusted or varied by a single mechanism.

The invention especially relates to web-printing presses which are known as "traveling-cylinder printing-presses" or "traveling-cylinder web-printing presses;" and it consists of a peculiar mechanism in which by the change of one piece of gearing the length of the sheet printed and manipulated is varied or adjusted.

I have shown in the drawings one particular form of a traveling-cylinder web-perfecting press of this character; but it is to be understood, as hereinafter described, that my invention is of general application.

Referring now to the drawings, I will describe my invention as applied to this particular machine.

In the drawings, Figure 1 is a rear elevation of the printing-press. Fig. 2 is a small plan view illustrating the change-gearing. Fig. 3 is a sectional elevation of the printing-press. Fig. 4 is a side elevation, on an enlarged scale, of the change-gearing. Fig. 5 is an end elevation of the parts shown in Fig. 4. Figs. 6 and 7 are an elevation and a longitudinal section, respectively, of the connected cam and gear. Fig. 8 is a diagrammatic view illustrating how various heart-shaped cams can be used. Figs. 9, 10, and 11 are elevations illustrating a number of the connected cams and gears. Figs. 12, 13, and 14 represent a modified connected cam and gear, as hereinafter described.

In the particular press that I have chosen to describe my invention as applied thereto I have shown the stationary beds as arranged in the same horizontal plane end to end, and of course this arrangement of beds can be va-

ried as desired without departing in the least from the scope of my invention.

In detail, 11 11 represent the usual side frames, between which are secured the form-beds C and D.

A represents the first traveling impression-cylinder, and B the second traveling impression-cylinder. These impression-cylinders are mounted in a reciprocating or traveling carriage E, which is reciprocated by any of the usual mechanisms not necessary here to describe at length, so that the impression-cylinders will promptly coact with forms placed upon the stationary beds.

In the particular machine shown the parts are supposed to be so timed that the impression-cylinders will be in impression or in printing contact with the forms the same length of time that they will be out of impression, an arrangement well understood.

H represents the paper-roll from which the web is supplied to the machine. From the paper-roll H the web is led between the continuously-running feeding-in rollers 12, 14, and 15, which serve to continuously slack off and draw the web from the web-roll and continuously feed the same to the machine. From the web-feeding-in roll 15 the web runs around the looping-roller 17, then up over the stationary guide-roll 18, mounted in the frame of the machine, and then to the guide or roll 19, mounted in brackets at the end of the press, as shown. This guide or roll 19 is preferably continuously driven, as by mechanism hereinafter described. From the roll 19 the web passes to the guide or roll 20, carried by the carriage E, then under the impression-cylinder A, then up over the guide or roll 21, also carried by the carriage E. From the guide or roll 21 the web is led around the roll 22, which may be adjustable for the purpose of obtaining register of the web between the two impression-cylinders A and B. From the register-roll the web is led around the roll 23, mounted in the frame of the machine, and this roll 23 may, if desired, be continuously driven from any one of the continuously-running feeding-in rollers, so that the same will tend to continuously coax the web forward.

From the roll 23 the web passes across to the roll 24, mounted in brackets at the left-hand end of the press, and this roll 24 is also preferably continuously driven, as by the mechanism hereinafter described. From the roll 24 the web passes around the guide or roll 25, carried by the carriage E, under the second impression-cylinder B, then up over the guide or roll 26, also carried by the carriage E. From the roll 26 the web passes to the roll 260, mounted in the framing of the machine, then down under the looping feeding-out roller 27, then up over the continuously-running roller 28, down between the same and the continuously-running roller 29, then up between the continuously-running roller 30 and its friction pressure-roller 31. From this point the web is guided between the cutting-cylinders 33 and 34, where the web will be severed into sheets. The lower cutting-cylinder 34 is grooved, and running around the same is a set of tapes 35, which also pass around the pulleys or rollers 36, 37, and 360. These tapes 35 may convey the sheet severed from the web to any suitable delivery apparatus or to any suitable folding-machine, as desired.

Mounted at each side of the two impression-cylinders A and B are the usual form-inking rollers F F F F, and at the ends of the press are mounted two sets of inking apparatus G G, as shown, by which the forms will be properly inked, as is well understood.

The action of the press so far described is well understood, the looping-rollers being moved up and down properly, so that two sheets will be printed and delivered for each complete forward-and-backward movement of the impression-cylinders.

If desired, friction pressure-rollers may be used in connection with the continuously-running feeding-in rollers 12 and 15.

The gearing for driving the apparatus thus described may be arranged as follows: 41 represents a driving-shaft, to which power may be applied in any of the usual manners not necessary here to describe. Also secured on this shaft 41 is a gear 43, which meshes with and drives a gear 44, which runs on a stud secured to the side frame. This gear 44 meshes with and drives an intermediate 45, also running on a stud secured to the frame, and this gear 45 meshes with the gear 46, secured on the lower cutting-cylinder 34, and intermeshed with this gear 46 is a gear 47, secured upon the upper cutting-cylinder 33. This gearing for driving the cutting-cylinders is so proportioned that the peripheral speed of the cutting-cylinders will be faster than the maximum speed of the continuously-running delivery-rollers, whereby the cutting-cylinders will tend to coax or draw forward the end of the web. These cutting-cylinders are also so geared and proportioned as to bear the relation of four to five, whereby the upper

cutting-cylinders will have to make five revolutions to sever a sheet and the lower cutting-cylinder will have to make four revolutions to sever a sheet. This arrangement, though not necessary, is preferable, as it allows the use of small cutting-cylinders.

By the gearing before described it will be seen that the cutting-cylinders always turn at a constant speed relatively to the cylinder-driving mechanism, whereby they are always properly timed to cut off two sheets for each completed forward-and-backward movement of the impression-cylinders no matter what length of sheet is manipulated by the press.

To adjust the length of the sheet, it is necessary to adjust the speed of the continuously-running feeding-in rollers, the speed of the continuously-running delivery-rollers, the speed of the continuously-driven coaxing-rollers; also, preferably, to adjust the speed at which the inking apparatus is driven, and it is also necessary to adjust the stroke of the looping-rollers. It is the aim of this invention to produce a mechanism in which by changing a single piece all these adjustments will be made, whereby the press can be almost instantly set to any desired length of sheet, and the services of a skilled mechanic are not necessary to vary the length of the sheet.

One form of gearing by which this invention may be carried out is illustrated in the drawings. The end of the shaft 41 has a suitable keyway cut in the end of the same, and fitted on the end of the shaft is a piece I, and by using different pieces I the entire press is adjusted to print and manipulate different lengths of sheets. This piece I consists in the machine organized, as shown in the first three sheets of the drawings, of a gear 42, which has an extending hub 420, upon which hub is fitted a cam 124, which is adapted to operate the looping-rollers. This extending hub 420 has a keyway 421 cut in the same, by which the same is fitted to the shaft 41, and suitable pins α are driven through these parts, so that they constitute one connected piece. The piece I may be held in place on the end of the shaft 41 by means of a suitable nut and washer, as 91. From the cam 124, constituting part of the piece I, the looping-rollers are actuated, and from the gear 42, also constituting part of the piece I, all the various mechanisms whose speed has to be adjusted to adjust the length of the sheet are operated. This can be arranged as follows: The end of the shaft 41 is preferably supported in a suitable bracket 90, extending from the frame 11, as shown, so that the part I can be steadied and evenly rotated. Extending out from the side frame 11 is a suitable bracket 54, in which is mounted a short shaft 53. Hung on this bracket or shaft, as desired, is a sweep 49, which carries a stud 480, on which a suitable intermediate 48 is journaled. This sweep 49 has an ex-

tending arm 50, and engaging this extending arm 50 is a nut 51, which is tapped on a suitable screw-threaded stud, secured in the frame of the machine, by which means the sweep can be adjusted and set in any desired position, and the gear 48 can be set to engage whatever gear is secured on the end of the shaft 41. Also mounted on the shaft 53 is a gear 52, which meshes with the intermediate 48, and this mesh is constant no matter in what position the gear 48 is secured, because the sweep is adjustable around the center of the gear 52. On the inside end of the shaft 53 is secured a bevel-gear 55, which meshes with and drives a bevel-gear 64, mounted on a shaft 65, which is journaled in suitable brackets secured to the side frame 11, as shown, and which shaft extends nearly the entire length of the press. From this shaft 65 all the various mechanisms that need adjusting when the length of the sheet is adjusted are driven. Thus the continuously-running feeding-in rollers are driven from a bevel-gear 740, mounted on the shaft 65. This bevel-gear 740 meshes with and drives a bevel-gear 75, secured upon the end of a vertical shaft 76, and on the other end of this vertical shaft 76 is mounted a bevel-gear 77, which meshes with and drives a bevel-gear 78, secured on the end of the continuously-running feeding-in roller 15. The feeding-in rollers are geared together, as by means of a gear on the roller 15, a gear 81 on the shaft of the roller 14, and a gear 82 on the shaft of the roller 12, and, if desired, friction pressure-rollers arranged to cooperate with the feeding-in rollers 12 and 15 may be also continuously driven, as by means of gears 80 and 83. Also from this shaft 65 the continuously-running delivery-rollers are driven. This can be done by securing a bevel-gear 66 on the shaft 65, which meshes with and engages a bevel-gear 67, mounted on the lower end of a vertical shaft 68, which is journaled in suitable brackets secured to the side frame 11, and on the upper end of this shaft 68 is secured a bevel-gear 69, which engages with a bevel-gear 70, secured on the end of the continuously-running delivery-roller 29.

The continuously-running delivery-rollers may be geared together, as by means of the gear 72 on the roller 29, which meshes with a gear 71 on the roll 28 and a gear 73 on the roll 30, which meshes with the gear 72, before referred to, and this gear 73 meshes with a gear 74 on the shaft of the friction pressure-roll 31. By this gearing the speed of the continuously-running delivery-rollers will also be determined by the speed of the shaft 65.

This shaft 65 is also preferably used to drive the two sets of inking apparatus. This gearing consists of bevel-gears 84, mounted on the ends of the shaft 65, which mesh with bevel-gears 85, and by means of gears turning with the bevel-gears 85, and by means of gears 86,

87, 88, and 89 the various drums and cylinders of the ink-distributing apparatus are driven. Also on the same shafts as the gears 89 I arrange band-wheels 90, around which suitable bands 91 pass, which bands 91 engage small band-wheels 92, secured on the ends of continuously-running coaxing-rollers 19 or 24, as the case may be. Suitable belt-tighteners 93 may be also used in connection with these bands. By this means it will be seen that the speed of the inking apparatus is determined from the speed of the shaft 65 and also that the speed of the continuously-running coaxing-rollers is also determined from the speed of the shaft 65. I may, as before stated, if desired, drive the roller 23 continuously, and I preferably do this from one of the continuously-running feeding-in rollers, whereby the speed of all the continuously-running coaxing-rollers in the press will be determined by the speed of the shaft 65. The looping feeding-in roller 17 is mounted in suitable arms 107, which are suitably guided, and the looping feeding-out roller 27 is mounted in similar arms 110, which are suitably guided. Mounted below the shaft 41 is a shaft 105, and on this shaft 105 are mounted suitable levers 106, to which the arms 107 and 110 are connected. By this means it will be seen that both looping-rollers are controlled from the shaft 105.

I preferably use two levers near each side frame of the press, each of the levers 106 being rigidly secured to the shaft 105. On the rear end of the shaft 105 is mounted a suitable yoke 116, which carries two studs 122 122, on which studs are mounted rollers 123 123. These rollers are so positioned that they will bear nicely on the face of the cam 124. By this means the looping-rollers will be properly moved up and down to properly shift the web around the impression-cylinders when the impression-cylinders are out of impression. As thus organized, the press will properly manipulate and print the web.

If, as before described, the press is so arranged that the time of the feed and the time of the printing is a constant, a heart-shaped cam may be used.

A heart-shaped cam is a cam whose diameters are all equal or a cam in which the rate of increase is constant for one hundred and eighty degrees and the rate of decrease is constant for one hundred and eighty degrees. Therefore a number of heart-shaped cams whose diameters are equal but whose rate of increase is more or less, as desired, can be inserted between the two rollers 123, as indicated in diagram in Fig. 8. By this means any desired throw can be given to the looping-rollers to handle any desired length of sheet.

Now when it is desired to handle a different length of sheet all that is necessary is to loosen the nut 51, swing the gear 48 to one

side, remove the piece I on the end of the shaft 41 and substitute another piece I, and properly adjust the gear 48, so that the same will mesh with the new gear secured on the end of the shaft 41. Each of the pieces I consists of a cam and a gear, and the parts constituting this piece I are so proportioned that the proper gear and proper cam will be used—that is, just as much as the new gear will change the speed of the machine, just so much will the new cam change the action of the looping-rollers.

In Figs. 9, 10, and 11 I have shown three different pieces I, these pieces being proportioned so that the press can manipulate a twenty, a twenty-two, or a twenty-four inch sheet. Thus by making one change any desired length of sheet can be obtained and no thought or study is necessary, and a skilled mechanic is not necessary to adjust the press. Also it will be seen that the length of the sheet to be manipulated by the press can be almost instantly changed.

This invention greatly simplifies the work of adjusting the press to handle different lengths of sheets, and as many interchangeable pieces I can be provided as desired.

In some cases the time of the feed and the time of the printing is not the same, the time of the feed being either greater or less than the time of the printing. In this instance, if it is so desired, or in other cases, when it is desired to use a cam whose various diameters are not the same, I can use a double cam and still obtain the same result. This construction is shown in the last sheet of the drawings. In this construction the interchangeable part, which is marked I', consists of a gear, as before described, and also of two cams, as 500 and 501, these three pieces being made integral or to constitute one part, and these three pieces constituting one part are adapted to be secured to the end of the shaft 41, as before described. When this construction is used, the arms of the yoke are arranged so that one of the two rollers will engage each cam. Thus the arms 1116 and 2116 are arranged in different vertical planes, the roller 1123 of the arm 1116 bearing on the face of the cam 501 and the roller 1231 of the arm 2116 bearing on the face of the cam 500. These cams 500 and 501 are so proportioned that the shaft 105 will be rocked to obtain any desired time between the feed and the printing, the cam being so designed and set that the rollers will always bear on the faces of the same. By this means I can make the time of the feed either faster or slower than the time of the printing. It is also understood, of course, that where this construction is desired I provide a number of pieces I', constructed as before described, and each one proportioned and designed so that when the same is used the press will manipulate and handle the length of sheet desired. Thus it will be seen

that I have provided a very simple and neat adjusting mechanism for a press of this character. Of course this gearing can be applied to other forms of presses, and I consider that such is the scope of my invention, and of course the arrangement and gearing in the parts can be varied or designed to suit the exigencies of the special arrangement used.

The scope of my invention contemplates the adjusting of a web-printing press in which the web is intermittently shifted by a cam-controlled or equivalent positively-operated shifting mechanism to print different lengths of sheets by changing a single part or single piece of gearing.

Of course my invention is applicable to a press in which a single cylinder and bed is used, and, indeed, the press shown may be arranged so as to act in this manner by leading the web directly from the roll 24 to the roll 260. Therefore the application and design of my invention can be greatly varied by a skilled mechanic without departing from the scope of my invention as expressed in the claims.

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

1. The combination in a web-printing press, of a device for continuously feeding the web into the press, a web-shifting device, a single changeable part or piece, and gearing and connections from the same to actuate both said devices.

2. In a web-printing press the combination of a printing mechanism, a web-manipulating mechanism consisting of devices arranged to feed the web to and from the printing mechanism, and an intermediate intermittently-acting web-shifting device, a single changeable part or piece, gearing from the same to drive the feeding-in and feeding-out devices, and connections from the same to operate the intermediate web-shifting device.

3. The combination in a web-printing press of means for continuously feeding the web into the machine, means for continuously drawing the web from the machine, an intermediate intermittently acting web-shifting device, and means whereby these three mechanisms may be adjusted simultaneously.

4. The combination in a web-printing press of a feeding-in mechanism, a feeding-out mechanism, an intermediate looping mechanism, and means for varying the action of all three devices by changing a single part.

5. The combination in a web-printing press of a feeding-in mechanism, a looping mechanism for intermittently shifting the web, gearing for driving the feeding-in mechanism, connections for actuating the looping device, and a single piece controlling both the action of the feeding-in device and the looping mechanism, which piece may be changed.

6. The combination in a web-printing press

of a feeding-in mechanism, a feeding-out mechanism, a looping mechanism, web coaxing or combing mechanism, a single piece or part for controlling the action or speed of these
5 various mechanisms, which single piece or part may be changed.

7. The combination in a web-printing press of the feeding-in mechanism, the feeding-out mechanism, an intermediate looping mechanism, and an inking mechanism, a single
10 piece or part for driving or actuating all these various mechanisms, which single piece or part may be changed.

8. The combination in a web-printing press
15 of the feed-in mechanism, a looping mechanism, gearing for driving the feeding-in mechanism, and connections for actuating the looping mechanism, and a series of interchangeable cams and gears, the cams and gears being
20 made in integral pieces, whereby, by one change, both the action of the looping device and the feeding-in mechanism can be varied.

9. The combination in a web-printing press of a form-bed, a traveling impression-cylinder coacting therewith, a continuously-running feeding-in device, and a looping device
25 for manipulating the web, with means whereby the action of the looping device and the feeding-in device can be varied by changing
30 a single piece.

10. The combination in a web-printing press of two form-beds, an impression-cylinder coacting with each form-bed, a continuously-running feeding-in device and a looping device,
35 vice, with means whereby the action of the

continuously-running feeding-in device and the looping device can be varied by changing a single piece of mechanism.

11. The combination in a web-printing press of two form-beds, a traveling impression-cylinder coacting with each form-bed, a feeding-in device and a feeding-out device, two intermediate loopers for shifting the web around the impression-cylinders, gearing for driving the feeding-in and feeding-out devices, connections including a yoke for actuating the looping-rollers, and a change-gearing for varying the speed of the feeding-in and feeding-out devices and the action of the looping-rollers, consisting of a cam adapted to engage the yoke, and a gear, the cam and gear being made integral.

12. The combination in a feed-changing mechanism for the purpose described of a yoke and a series of interchangeable cams adapted to engage the yoke, each cam having a gear formed or made integral therewith, a suitable sweep carrying a gear which may be adjusted to engage the various interchangeable gears, and connections from the yoke and gearing driven from said gear to actuate the feed.

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

LOUIS W. SOUTHGATE.

Witnesses:

PHIL W. SOUTHGATE,
E. M. HEALY.