

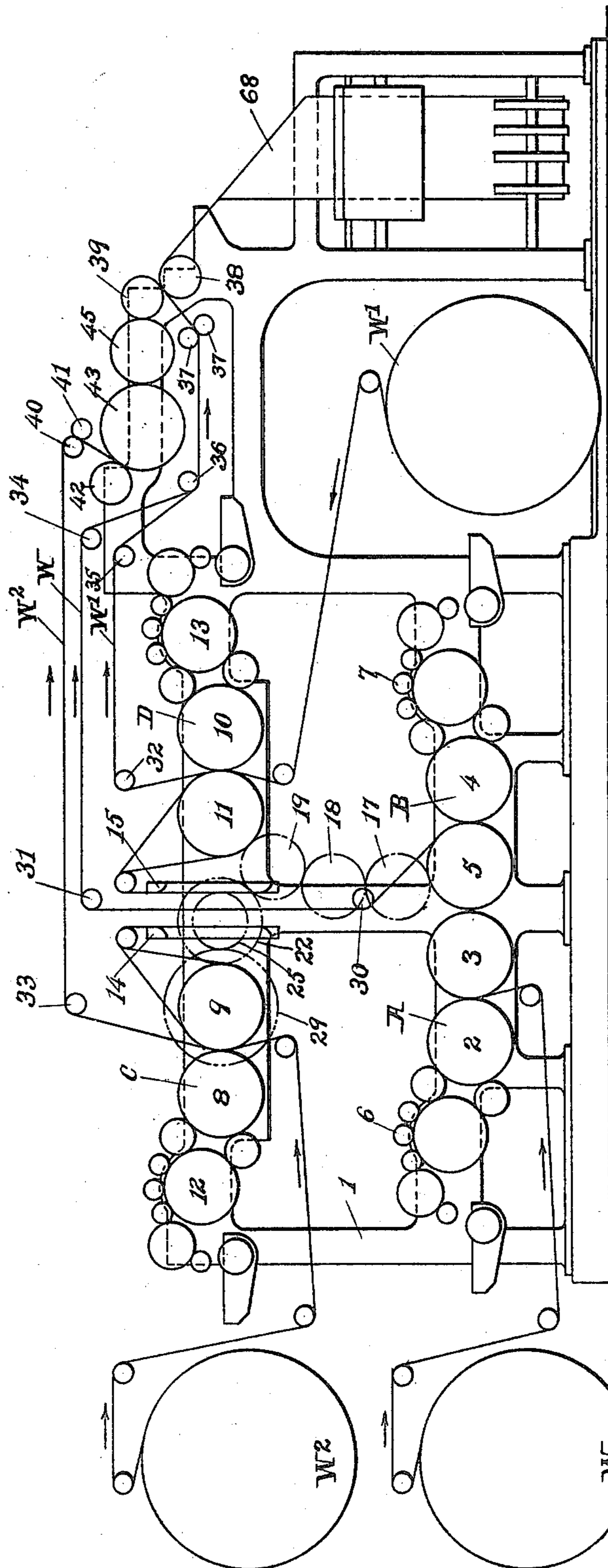
Patented July 23, 1901.

(Application filed Nov. 12, 1900.)

(No Model.)

7 Sheets—Sheet 1.

Fig-1-



ATTEST.
T. F. Chase
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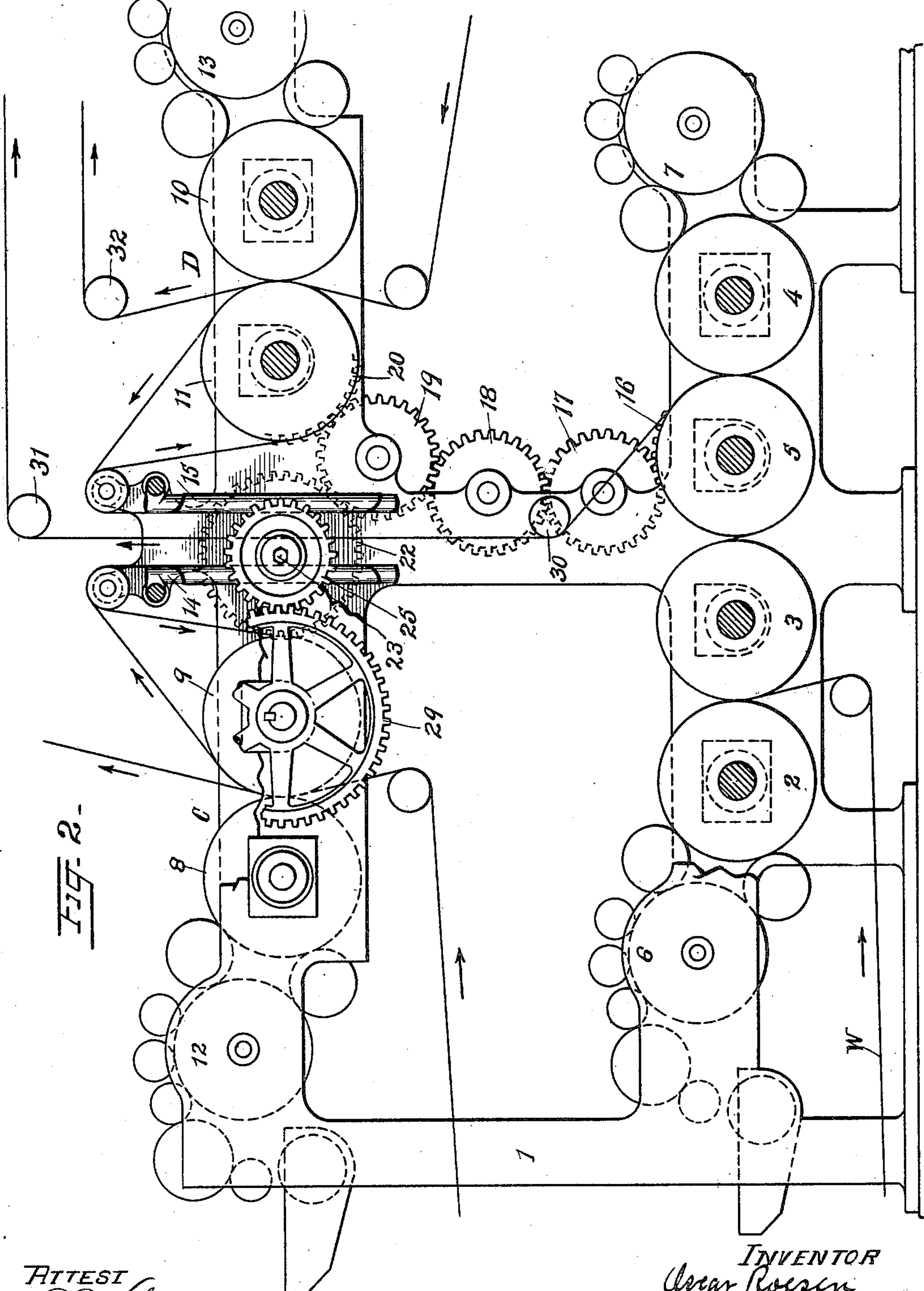
Patented July 23, 1901.

O. ROESEN.
ROTARY PRINTING MACHINE.

(Application filed Nov. 12, 1900.)

7 Sheets—Sheet 2.

(No Model.)



ATTEST
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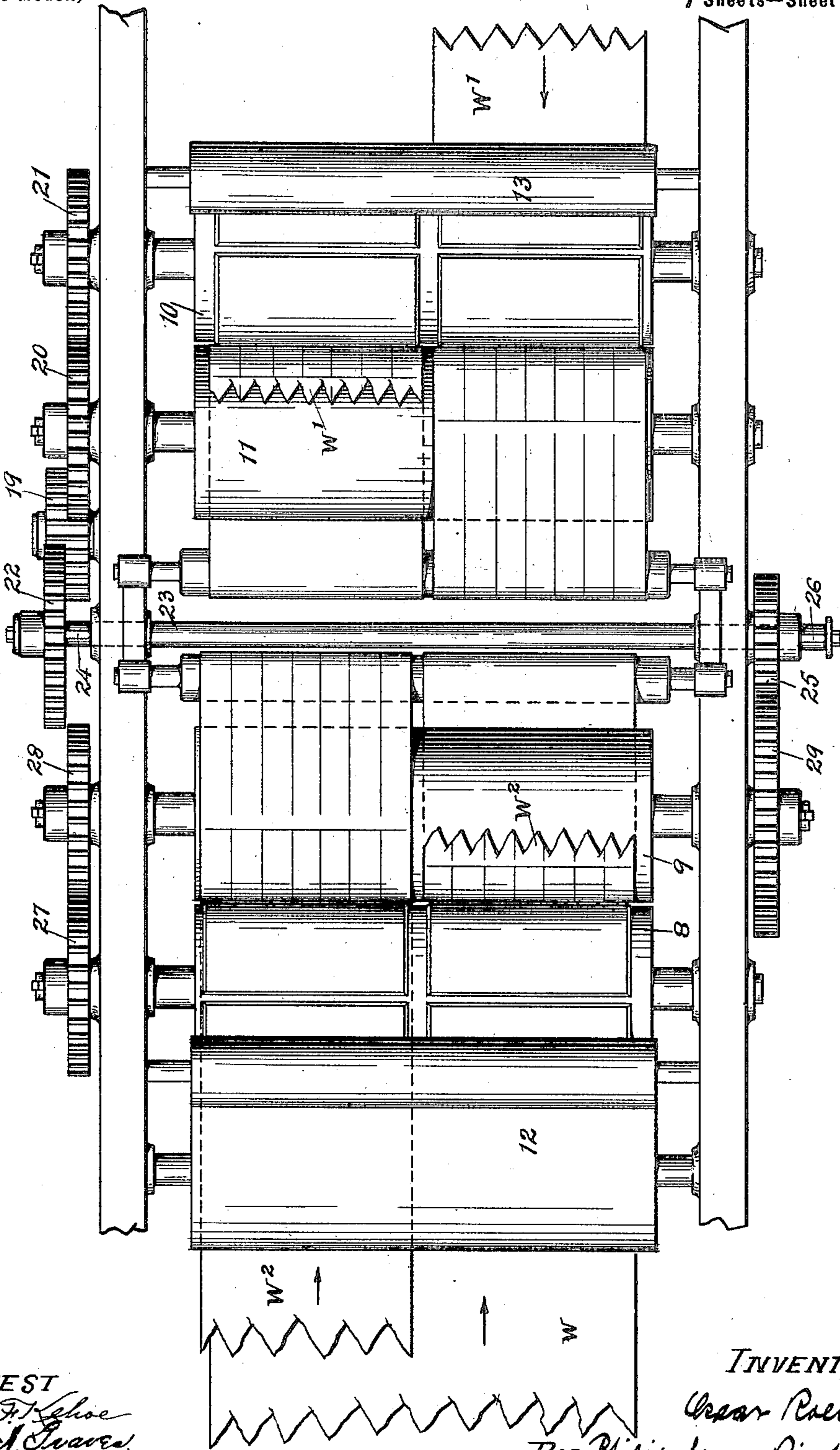
O. ROESEN.
ROTARY PRINTING MACHINE.

(Application filed Nov. 12, 1900.)

(No Model.)

7 Sheets—Sheet 3.

FIG. 3.



ATTEST
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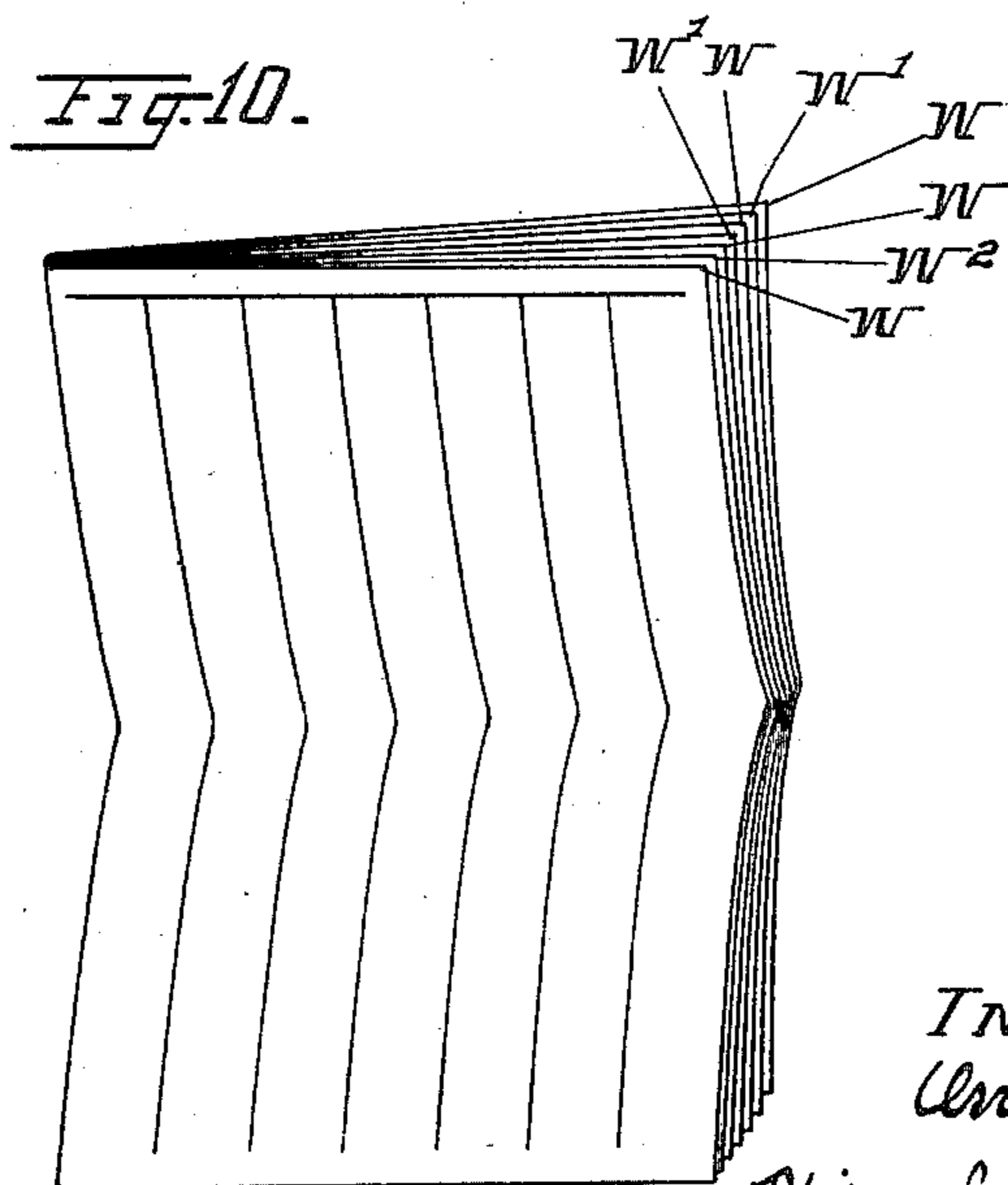
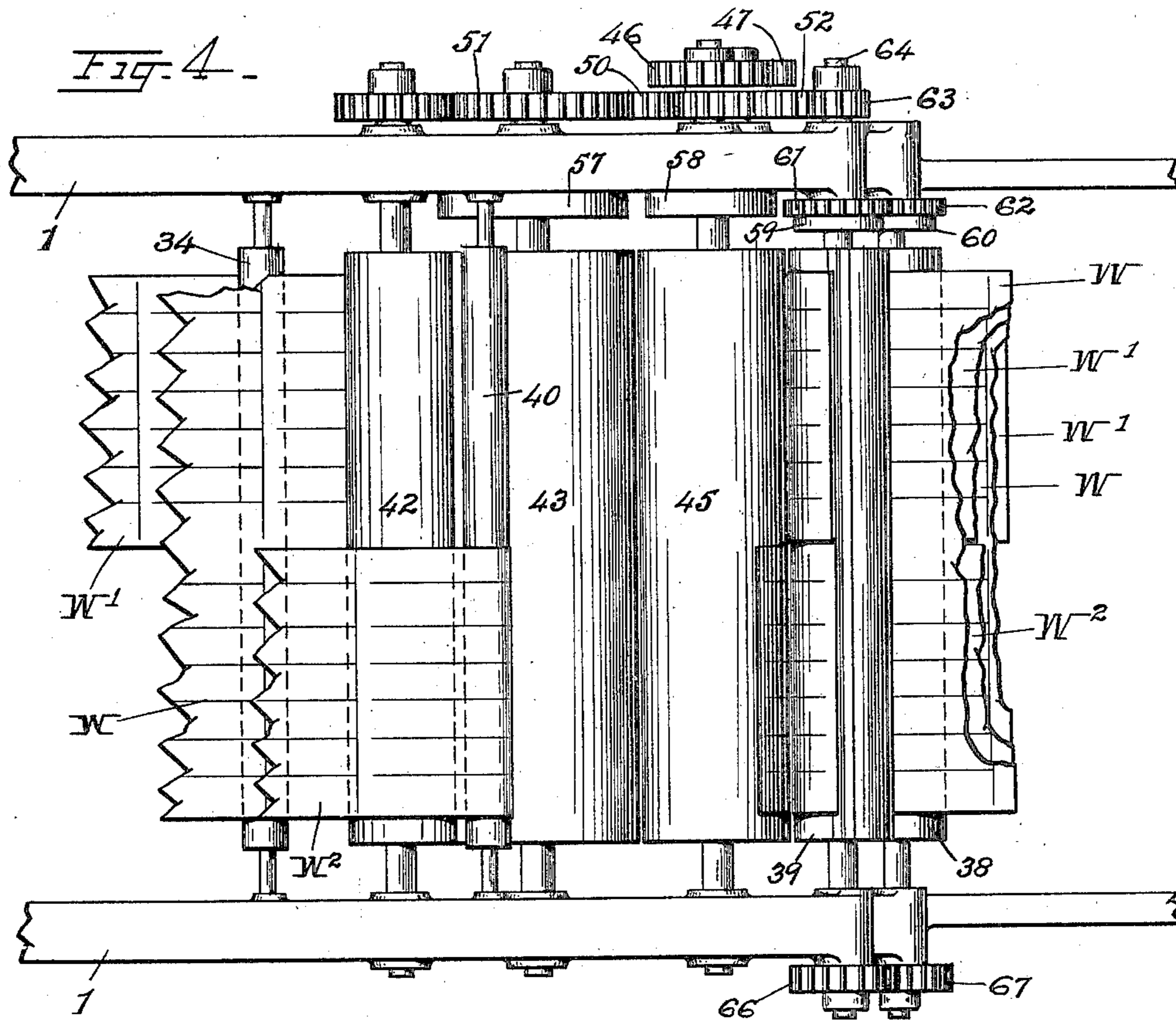
Patented July 23, 1901.

O. ROESEN.
ROTARY PRINTING MACHINE.

(Application filed Nov. 12, 1900.)

(No Model.)

7 Sheets—Sheet 4.



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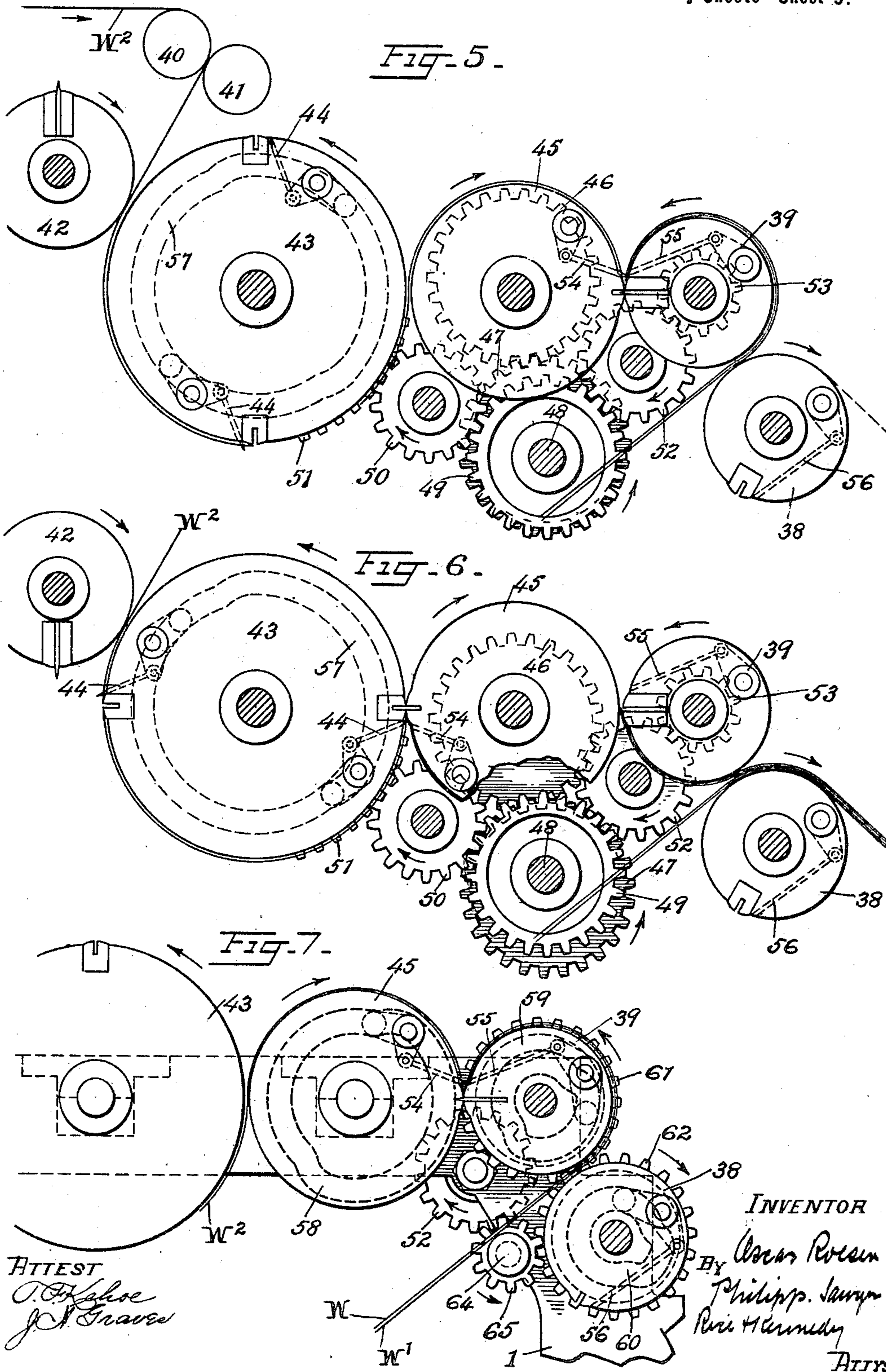
O. ROESEN.

ROTARY PRINTING MACHINE.

(Application filed Nov. 12, 1900.)

7 Sheets—Sheet 5.

(No Model.)



THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 679,266.

Patented July 23, 1901.

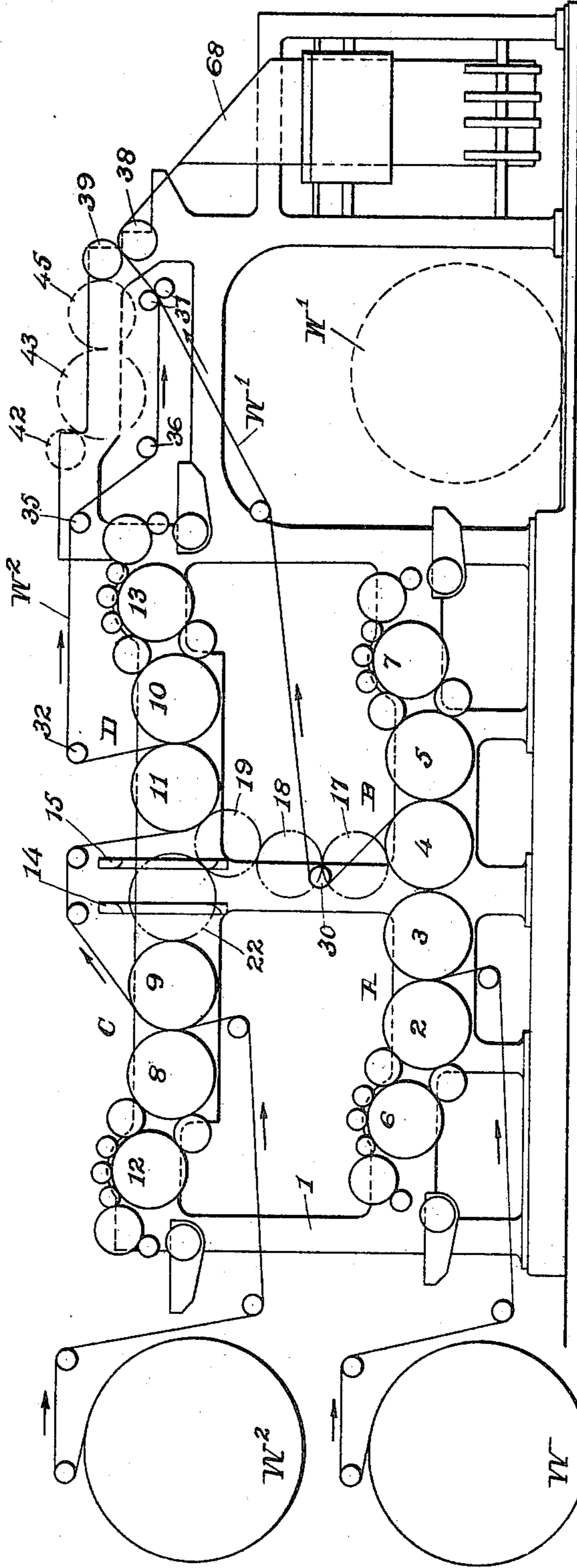
O. ROESEN.
ROTARY PRINTING MACHINE.

(Application filed Nov. 12, 1900.)

(No Model.)

7 Sheets—Sheet 6.

FIG-8-



ATTEST.
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J. A. K. Schae

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Patented July 23, 1901.

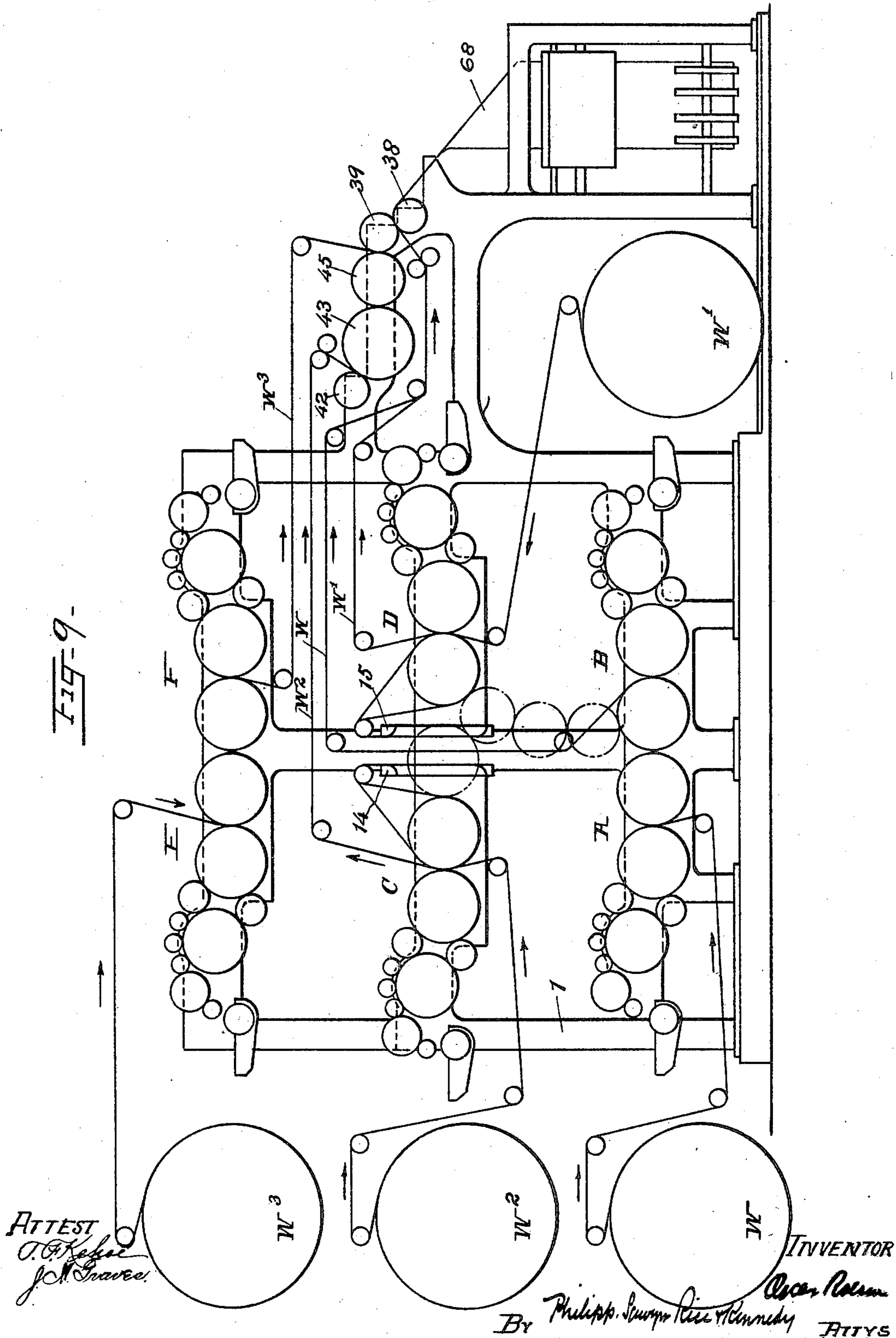
O. ROESEN.
ROTARY PRINTING MACHINE.

(Application filed Nov. 12, 1900.)

(No Model.)

7 Sheets—Sheet 7.

Fig-9-



UNITED STATES PATENT OFFICE.

OSCAR ROESEN, OF NEW YORK, N. Y., ASSIGNOR TO ROBERT HOE, OF
SAME PLACE.

ROTARY PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 679,266, dated July 23, 1901.

Application filed November 12, 1900. Serial No. 36,209. (No model.)

To all whom it may concern:

Be it known that I, OSCAR ROESEN, a citizen of the United States, residing at New York, county of New York, and State of New York, have invented certain new and useful Improvements in Rotary Printing-Machines, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to improvements in rotary printing-machines.

There is an extensive demand among publishers, and more particularly among newspaper publishers, for fast rotary printing-machines which are capable of producing products which vary widely as to the number of sheets they contain. Attempts have been made to meet this demand by increasing the width of the cylinders and by increasing the number of couples. Thus a perfecting-machine which printed upon a web two pages wide, (the ordinary newspaper page being used as the unit of measurement,) such machines being known to the trade as a "single-wide" machine, had its capacity doubled by adding two additional pairs of cylinders. A machine constructed in this manner and with its couples arranged to run at the same speed is capacitated to print a product consisting of four, six, eight, twelve, and sixteen pages, respectively, it being assumed that it is provided with the usual collecting or associating mechanism. A machine of this description, however, cannot produce either a ten or a fourteen page product; but by arranging it so that the additional sets of couples can be run either at full or half speed it can produce a ten-page product. It cannot, however, produce a fourteen-page product. In machines employing a plurality of couples of the same width, the form-carrying member of which carries a plurality of forms arranged side by side, a fourteen-page product has only been attainable where the machine was arranged so that the form-carrying members were double wide—that is, they carried four plates abreast on the cylinder—such a machine being known to the trade as a "double-wide," (the ordinary newspaper page being again employed as the unit of measurement,) and the machine employed at least four sets of

couples, such a machine being known to the trade as a "quadruple." Theoretically speaking, a press such as has been described is capacitated by using only a part of the effective surface of the couples to produce products varying in size from two pages to sixteen pages, the products being varied by twos, and after sixteen pages to produce twenty, twenty-four, twenty-eight, and thirty-two page papers, the usual associating and collecting mechanisms being presumed. As a matter of fact, however, such a press is very large, requiring a very large press-room, is expensive to install, and is not economical for use on products of less than eight pages. Furthermore, such a machine is not capacitated to vary its product by two from sixteen to thirty-two pages.

In order to meet the demand for products varying by twos, manufacturers have added to the single-wide, double-wide, and quadruple presses before referred to a single-wide couple which printed a half-width web on one end, after which the web was transferred laterally and perfected on the other end of the couple, such a couple being ordinarily termed in the art a "double-ender." The product of this couple has been cut into sheets which have been collected with the product of the couples of the machine to which it was added. While this construction has some advantages, it is objectionable in that it cannot be used except when the machine is running on a product which consists of the special number of pages which the double-ender was introduced to produce. When, therefore, a machine with this attached double-ender couple is not running on the special product the double-ender was introduced to produce, this part of the machine has to remain idle.

One object of this invention is to produce a printing-machine which by employing a proper number of couples of the proper diameter is capacitated to produce a product varying by twos up to the full capacity of the machine and in which the utility of any couple or couples is not limited to the production of any particular product.

A further object of the invention is to produce a single-wide printing-machine employing four couples, in which the product may be varied from two to sixteen pages by two, the

couple which is used to enable the machine to produce the ten and fourteen page combinations being also available for use in other combinations.

5 With these and other objects in view the invention consists in certain constructions and in certain parts, improvements, and combinations, as will be hereinafter fully described and then specifically pointed out in
10 the claims hereunto appended.

Referring to the drawings which form a part of this specification, and in which like characters of reference indicate the same parts, Figure 1 is a diagrammatic side elevation of a printing-machine constructed in accordance with the invention. Fig. 2 is a sectional elevation, on an enlarged scale, of the printing-couples employed in the machine and illustrating the driving-gearing and transferring mechanism. Fig. 3 is a top plan view of the construction shown in Fig. 2. Fig. 4 is a plan view of the cutting, sheet-accelerating, and associating mechanisms. Figs. 5 and 6 are side elevations, on an enlarged
25 scale, illustrating the gearing for driving the sheet-accelerating mechanism, the parts being shown in different positions in the two views. Fig. 7 is a detail view illustrating more particularly the gearing for operating the sheet-taking pins on the transferring and collecting cylinders. Fig. 8 is a diagrammatic side elevation illustrating the machine shown in Fig. 1 arranged to produce a different product. Fig. 9 is a diagrammatic side elevation of a modified form of machine. Fig.
30 10 is a perspective view of one of the products produced by the machine.

Referring to the drawings, which illustrate one embodiment of the invention, 1 indicates
40 a frame, which may be of any usual or desired construction. In the lower part of the frame are mounted two couples A and B, the outer couple A consisting of a form-cylinder 2 and an impression-cylinder 3 and the couple
45 D consisting of a form-cylinder 4 and an impression-cylinder 5. These form and impression cylinders may be of any usual construction and will be provided with the usual plate-holding and tympan-securing devices.
50 In the construction of the machine shown the plates are arranged so that the columns of the printed pages run around the cylinder or transversely to the axis thereof, and the couples are of the description known in the
55 art as "single-wide"—that is to say, the plates carried by them are arranged in pairs abreast, the ordinary newspaper page being used as the unit of measurement. It is to be understood that the invention is not confined to machines having plates thus disposed
60 nor to couples having single-wide cylinders. The cylinders may be driven by any suitable or desired form of gearing; but inasmuch as this gearing has no relation to the invention it is omitted in the interests of clearness and
65 brevity. An inking mechanism 6 is indicated as operating in connection with the form-cyl-

inder 2, and an inking mechanism 7 is indicated as operating in connection with the form-cylinder 4. Inasmuch, however, as this
70 inking mechanism may be of any usual or desired character, an extended description of it is unnecessary. In the upper part of the frame 1 are located two other printing-couples C D, the couple C being preferably located substantially over the couple A and
75 the couple D located substantially over the couple B. The couple C consists of a form-cylinder 8 and an impression-cylinder 9, and the couple D consists of a form-cylinder 10
80 and an impression-cylinder 11. Any suitable form of inking apparatus for these couples may be used, the same being indicated at 12 and 13, respectively.

The couples C and D are so constructed
85 and arranged that they may be run as double-enders—that is to say, each of these couples is so arranged that a web may be run through it and receive a printing from one end of the couple and then again run through
90 and receive a printing from the other end of the couple. To this end a suitable transferring mechanism is provided for use with each couple. These transferring mechanisms may be of any suitable form and construction.
95 When the second printing which the web receives is to be the perfecting impression, these transferring mechanisms will also preferably act to reverse the web. In the construction shown these transferring and reversing mechanisms consist of the usual tri-
100 angles 14 and 15, the triangle 14 being arranged to operate in connection with the couple C and the triangle 15 in connection with the couple D.

Any suitable means may be used for driving the couples C and D; but these means should be of such a character as to enable at least one of the couples to be driven at varying speeds—that is to say, the driving mechanism should be so arranged as to drive the
110 couples C and D at the same speed as the couples A and B and should also be arranged so that at least one of the couples can be driven at lesser speed than the couples A and B. This lesser speed will vary according to the product to be produced and to the particular folding mechanism which is employed. In the construction shown, however, this lesser speed will be half the speed of the
120 couples A and B.

While, as has been indicated, any suitable driving mechanism may be employed, in the construction shown the impression-cylinder 5 is provided with a gear 16, which meshes
125 with two intermediates 17 and 18, these intermediates being suitably mounted on studs supported on the frame. The intermediate 18 meshes with a gear 19, which in the present instance is a broad-faced gear. The impression-cylinder 11 is provided with a gear
130 20, which is in mesh with the gear 19, and this gear 20 will also be in mesh with the gear 21, mounted on the shaft of the form-cyl-

der 10. The broad-faced gear 19 is also in mesh with a gear 22, which is mounted on a shaft 23, extending across the machine from side to side. The gear 22 is preferably slid-
 5 ingly mounted on this shaft, being secured to the shaft by means of a feather 24 or in any other suitable manner. The other end of the shaft 23 carries a gear 25, which is also
 10 slidably mounted on the shaft, being secured to it when desired by means of a feather 26 or in any other suitable manner.

The shafts of the form and impression cylinders 8 and 9 of the couple C are provided on the same side of the machine as the slid-
 15 ing gear 22 with intermeshing gears 27 and 28, and the gear 28 is so located that the gear 22 may be caused to mesh with it when in its inner position. The shaft of the im-
 20 pression-cylinder 9 is further provided on the same side of the machine as the gear 25 with a gear 29, with which the gear 25 may be caused to mesh when desired. The gears 22
 25 and 28 are so related to each other and the driving-gearing that when they are in mesh the cylinders 8 and 9 will be driven at a speed
 30 which is uniform with that of the lower couples A and B, and the gears 25 and 29 are so related with respect to each other and the driving-gearing that when they are in mesh
 35 the couple C will be driven at half the speed of the couples A and B. With the construction as described, therefore, it will be seen that the couples A, B, and D are always driven
 at a uniform speed, and the couple C may be driven either at a speed which is uniform
 with that of the other couples or at one-half that speed.

The web-supplies for the couples will vary somewhat in accordance with the product to
 40 be produced. When the machine is arranged as shown in Fig. 1, three web-rolls W, W', and W² are employed. The web-roll W furnishes a single-wide web—that is to say, the web is
 45 two pages wide (using the ordinary newspaper page as the unit of measurement) and the web-rolls W' and W² furnish half-width webs. The web from the roll W is led to and through the
 50 couples A and B, by which it is printed and perfected, these couples preferably always running as a perfecting-machine. The web W after being printed by the couples A and B
 (when the machine is arranged as in Fig. 1) is led over guides 30 and 31 and then onward to mechanism which will be hereinafter re-
 55 ferred to. The web W' is led between one end of the cylinders 10 and 11 of the couple D, is then transferred laterally and turned over by the triangle 15, after which it is led
 60 between the other end of the couple and over a guide 32 and then onward, its subsequent course being hereinafter described. In this arrangement, therefore, the couple D is oper-
 65 ating as a double-ender. The web W² is led between one end of the cylinders 8 and 9 of the couple C, is then transferred laterally and turned over by means of the triangle 14,
 after which it is led between the other end

of the couple 8 and 9 to receive its perfecting impression and then onward over a suitable
 guide, as 33. In this arrangement the couple
 C is also operating as a double-ender.

As illustrated in Fig. 1, the machine is shown as producing fourteen-page papers. In
 this arrangement the couples A and B are run-
 75 ning as a perfecting-machine at full speed on a single-wide web, and the couple D is also
 running at full speed on a half-width web and working as a double-ender. The couple C is
 arranged to run at half the speed of the cou-
 80 ples A, B, and D, is printing on a half-width web, and is also operating as a double-ender.
 At each complete revolution the couples A and B produce eight pages of the paper, the
 couple D four pages, and the couple C, mak-
 85 ing a half-revolution in the same time, produces two pages. The webs W W' after leav-
 ing the guides 31 and 32, respectively, are brought together by means of guides, herein
 marked 34, 35, 36, and 37, and are then led
 90 between suitable cutting and collecting cyl-
 inders 38 and 39, the cylinder 39 being shown as the collecting-cylinder. Each cut section
 of the web W will afford four pages of the
 fourteen-page product and each cut section
 95 of the web W' will afford two pages of the
 product. The collection of two cut sections from each of these webs therefore will pro-
 vide twelve pages of the product. The other
 two pages are provided by the web W². In-
 100 asmuch, however, as the web W² is running
 at only half the speed of the other webs, suit-
 able mechanism must be provided not only
 to cut the sheets therefrom, but also to accel-
 105 erate them, so that they may be properly
 united with the cut and collected sections
 from the webs W and W'.

While any suitable form of accelerating mechanism may be employed, the form which
 is preferred is that shown in United States
 Patent to Thomas M. North, No. 650,543,
 110 dated May 29, 1900. Reference is made to said patent for a full description of the con-
 struction and operation of said accelerating mechanism. For the purposes of this appli-
 115 cation, however, it is sufficient to say that
 after the web W² leaves the guide 33 it is
 passed between suitable guides or rollers 40
 41 and is delivered to a pair of cutting-cyl-
 42 43, by which it is severed into sheets. The cylinder 43 is provided with the usual
 120 cam-operated pins 44, which take the sheet and deliver it to pins on a cylinder 45. The
 shaft of the cylinder 45 is provided with an
 elliptical gear 46, which meshes with an ellip-
 125 tical gear 47, mounted on a stud 48, suitably
 supported in the frame. This stud also sup-
 ports a gear 49, which forms one of a driving-
 train and is in mesh with an intermediate 50,
 which meshes with a gear 51 on the cylinder
 43. The gear 49 is driven at a constant rate
 130 of speed through suitable connections (not
 shown, as they may be of any ordinary de-
 scription) from the power mechanism of the machine. The gear 49 is also in mesh with

an intermediate 52, which meshes with a gear 53 on the shaft of the collecting-cylinder 39. The gear 49 serves, therefore, to drive the cylinders 43 and 39 at a constant rate of speed; but the gearing is so related that the circumferential speed of the cylinder 43 is only half that of the cylinder 39. By reason of the elliptical gearing the cylinder 45 at the time it takes a sheet from the cylinder 43 is driven at the speed of the cylinder 43 and at the time it delivers a sheet to the pins on the cylinder 39 is driven at the speed of the cylinder 39. The cylinder 45, as before stated, is provided with the usual cam-operated pins 54, the cylinder 39 with similar pins 55, and the cylinder 38 with similar pins 56. The cam for operating the pins 44 on the cylinder 43 is a stationary cam 57 and is shown in dotted lines in Fig. 5 and in full lines in Fig. 4. The cam for operating the pins 54 is a stationary cam and is marked 58. The cams for operating the pins 55 and 56 are rotating cams and are marked 59 and 60. The rotating cams 59 and 60 are driven by intermeshing gears 61 and 62, which are loose on the shaft of the cutting and collecting cylinders 38 and 39. The gear 52, before referred to, is in mesh with a pinion 63, mounted on a stud 64, (see Fig. 4,) which extends through the frame of the machine. This stud carries on its inner end a pinion 65, (see Fig. 7,) which is in mesh with the gear 62, the relation of this train of gearing being such as to drive the cams at half the speed of the cylinder. The shafts of the cylinders 38 and 39 are provided with intermeshing gears 66 67. (See Fig. 4.) With this construction it is obvious that a sheet may be cut from the half-speed web W^2 , brought up to full speed, and associated with the cut product from the webs W and W' . The sheet-accelerating mechanism will preferably be arranged so as to deliver its sheet, as shown in Fig. 5, to the cylinder 39 after it has received its first set of sheets, so that the single sheet will be folded between the two sets of sheets received by the collecting-cylinder. The pins will be operated through their cams at the proper times, and the collecting-cylinder after having received two sets of sheets cut from the webs W and W' and a sheet cut from the web W^2 will deliver the sheets, which are then forwarded to any suitable delivery mechanism—as, for instance, a longitudinal folder 68. The product is clearly shown in Fig. 10, the sheets being marked with the reference letters of the webs from which they are cut.

In addition to the fourteen-page arrangement, which has just been described, the machine is also capable of producing any number of products up to its full capacity—that is, sixteen pages—varying by two pages.

Should a four-page paper be desired, the couples A and B will be run at full speed on a single wide web, the couples C and D being cut out and the web led directly to the cutting and collecting cylinders, as shown in Fig. 8. The collecting mechanism will also

be thrown out, so that the cylinders 38 and 39 act simply as cutting-cylinders.

Should a six-page paper be desired, the couples A and B will be run at full speed on a single wide web. The couples C and D will be arranged to act as a single machine running at full speed on a half-width web. To effect this result, the triangles, which act as transferrers and reversers, are thrown out and the web led, as indicated in Fig. 8, directly from the couple C to the couple D, suitable guides being used. The webs will be led together through the guides 37, and the collecting mechanism will be thrown out, so that the cylinders 38 39 act simply as cutting-cylinders.

To make an eight-page paper, all the couples will be run as before, but the web which is run through the couples C and D will be a single wide web. This arrangement of the couples will also make a sixteen-page paper, when the cylinders 38 and 39 are arranged to collect.

To make a ten-page paper, the couples A and B are run, as before, at full speed on a single wide web, the couple D is cut out, and the couple C is run as a double-ender on a half-width web at half speed, the web passing through the accelerating mechanism and having sheets cut therefrom, as described. In this construction the cylinders 38 39 act as collecting-cylinders and the web from the couples A and B furnish eight pages of the product, the other two pages being furnished by the web from the couple C.

To make a twelve-page paper, the couples A and B are run at full speed on a single wide web, as before, and the couples B and C are arranged as a single machine, operating on a half-width web at full speed. The sheets cut from the web in this combination are collected. In other words, the combination for a twelve-page paper is the same as that for a six-page paper, except that for a six-page paper there is no collection.

The arrangement of the machine for the fourteen and sixteen page combinations has already been described.

Should a machine of greater capacity be desired, it can readily be obtained by adding to the machine an additional pair of couples, running at full speed as a single machine, said couples being counterparts of the couples A and B and printed upon a single wide web, (marked W^3 .) Such a machine is diagrammatically illustrated in Fig. 9, the additional couples being marked E and F. The addition of the two couples E and F enables a product to be produced which varies by two pages up to twenty-four pages. As it is evident, however, from the foregoing description how the machine should be arranged to produce the various combinations a specific description thereof is believed to be unnecessary.

While the mechanical devices which have been described are effective for the purposes

set forth, it is to be understood that the invention may be carried into effect by other devices which vary widely from those which have been described. The invention is not, therefore, to be limited to the specific mechanisms shown and described.

What is claimed is—

1. The combination with a pair of printing-couples arranged to operate as a single machine, of a second pair of couples, means whereby said second pair of couples may be operated as a single machine, means whereby one couple of said second pair may be operated independently of the other, and a transferring mechanism so located with respect to the independently-operated couple as to enable it to be used as a double-ender, substantially as described.

2. The combination with a pair of printing-couples arranged to operate as a single machine, of a second pair of couples, means whereby said second pair of couples may be operated as a single machine, means whereby one couple of said second pair may be operated independently of the other, a transferring mechanism so located with respect to the independently-operated couple as to enable it to be used as a double-ender, means for driving the independently-operated couple at either full or half speed, suitable cutting mechanism, and an accelerating mechanism, substantially as described.

3. The combination with a pair of printing-couples arranged to operate as a single machine, of a second pair of couples, means whereby said second pair of couples may be operated as a single machine, means whereby one couple of said second pair may be operated independently of the other, a transferring mechanism so located with respect to the independently-operated couple as to enable it to be used as a double-ender, means for driving the independently-operated couple at either full or lesser speed, suitable cutting mechanism, an accelerating mechanism, and a collecting mechanism, substantially as described.

4. The combination with a pair of printing-couples arranged to operate as a single machine, of a second pair of couples, means whereby said second pair of couples may be operated as a single machine, means whereby one couple of said second pair of couples may be operated independently, means whereby the other couple of said second pair of couples may be independently operated at either full or lesser speed, and a transferring mechanism so located with respect to this couple that the couple may be used as a double-ender, substantially as described.

5. The combination with a pair of printing-couples arranged to operate as a single machine, of a second pair of couples, means whereby said second pair of couples may be operated as a single machine, means whereby one couple of said second pair of couples may be operated independently, means whereby

the other couple of said second pair of couples may be independently operated at either full or lesser speed, a transferring mechanism so located with respect to this couple that the couple may be used as a double-ender, and a sheet-accelerating mechanism operating on the product of the last-named couple, substantially as described.

6. The combination with a pair of printing-couples arranged to operate as a single machine, of a second pair of couples, means whereby said second pair of couples may be operated as a single machine, means whereby one couple of said second pair of couples may be operated independently at full speed, means whereby the other couple of said second pair of couples may be independently operated at either full or lesser speed, a transferring mechanism so located with respect to this couple that the couple may be used as a double-ender, a sheet-accelerating mechanism operating on the product of the last-named couple, and a collecting mechanism, substantially as described.

7. The combination with a pair of printing-couples arranged to operate as a single machine, of a second pair of couples, means whereby said second pair of couples may be operated as a single machine, means whereby one couple of said second pair of couples may be operated independently at full speed, a transferring mechanism so arranged with respect to this couple that the couple may be used as a double-ender, means whereby the other couple of said second pair of couples may be independently operated at either full or lesser speed, a transferring mechanism so located with respect to this couple that the couple may be used as a double-ender, a sheet-accelerating mechanism operating on the product of the last-named couple, and a collecting mechanism, substantially as described.

8. The combination with a pair of printing-couples arranged to operate as a single machine, the form-carrying members of said couples having their plates arranged thereon so that the columns run around the cylinders, of a second pair of couples, the form-carrying members of which have similarly-disposed plates, means whereby said second pair of couples may be operated as a single machine, means whereby one couple of said second pair may be operated independently of the other couple, a transferring mechanism so located with respect to the independently-operated couple as to enable it to be used as a double-ender, means for cutting the product of said double-ender couple into sheets, and means for associating said sheets with the product of the other couples, substantially as described.

9. The combination with a pair of printing-couples arranged to operate as a single machine, the form-carrying members of said couples having their plates arranged thereon so that the columns run around the cylinders, of a second pair of couples, the form-carry-

ing members of which have similarly-disposed plates, means whereby said second pair of couples may be operated as a single machine, means whereby one couple of said second pair
 5 may be operated independently of the other couple, a transferring mechanism so located with respect to the independently-operated couple as to enable it to be used as a double-ender, means for cutting the product of said
 10 double-ender couple into sheets, a longitudinal folder, and means for directing the cut sheets and the product of the first pair of couples to said folder, substantially as described.

15 10. The combination with a pair of printing-couples arranged to operate as a single machine, the form-carrying members of said couples having their plates arranged thereon so that the columns run around the cylinders,
 20 of a second pair of couples, the form-carrying members of which have similarly-disposed plates, means whereby said second pair of couples may be operated as a single machine, means whereby one couple of said second pair
 25 may be operated independently of the other couple, a transferring mechanism so located with respect to the independently-operated couple as to enable it to be used as a double-ender, means for cutting the product of said
 30 double-ender couple into sheets, a sheet-accelerating mechanism, cutting and collecting mechanism, and a longitudinal folder, substantially as described.

11. The combination with a printing-couple,
 35 of a second couple, means whereby said couples may be operated together to effect two printings on a web, and means whereby each of said couples may be independently operated to effect two printings on a web, sub-
 40 stantially as described.

12. The combination with a printing-couple, of a second printing-couple, means whereby the couples may be operated together to produce a printed product, and two transferring
 45 mechanisms, one for each couple, substantially as described.

13. The combination with a pair of printing-couples arranged to operate as a single machine, of a second pair of couples, and two
 50 transferring mechanisms, one for each couple, the arrangement being such that each couple of the second pair may be used as a double-ender, substantially as described.

14. The combination with a pair of printing-
 55 couples arranged to operate as a single machine, of a second pair of couples, and two transferring mechanisms, one for each couple, located between the couples, the arrangement being such that each couple of the second
 60 pair may be used as a double-ender, substantially as described.

15. The combination with a pair of printing-couples arranged to operate as a single ma-

chine, of a second couple, a train of gearing leading from the first couples to the second 65 couple and arranged to drive the same at a speed which is uniform with that of the first couples, a third couple, and connections from said couple to the train whereby said couple
 70 may be driven at a speed which is uniform with the speed of the other couples or at a lesser speed, substantially as described.

16. The combination with a pair of printing-couples arranged to operate as a single machine, of a second couple, a train of gearing 75 leading from the first couples to the second couple and arranged to drive the same at a speed which is uniform with that of the first couple, a third couple, connections from said couple to the train whereby said couple may
 80 be driven at a speed which is uniform with the speed of the other couples or at a lesser speed, and a transferring mechanism for the third couple whereby it may be run as a double-ender, substantially as described. 85

17. The combination with a pair of printing-couples arranged to operate as a single machine, of a second couple, a train of gearing leading from the first couples to the second couple and arranged to drive the same at a 90 speed which is uniform with that of the first couples, a third couple, connections from said couple to the train whereby said couple may be driven at a speed which is uniform with the speed of the other couples or at a 95 lesser speed, and transferring mechanisms operating in connection with the second and third couples, whereby each of them may be operated as a double-ender, substantially as described. 100

18. The combination with a pair of printing-couples arranged to operate as a single machine, said couples having their plates so arranged that the columns run around the cylinder, of a second pair of couples having 105 similarly-disposed plates, gearing for driving one couple of said second pair of couples at a speed uniform with that of the first pair, gearing for driving the other couple of the second pair at a speed uniform with that of 110 the other couples or at a lesser speed, transferring mechanisms, one for each couple, located between the second pair of couples, whereby each of the couples may be used as a double-ender, sheet cutting and accelerating 115 mechanism, a pair of cutting and collecting cylinders, and a suitable folding mechanism, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing 120 witnesses.

OSCAR ROESEN.

Witnesses:

HENRY S. MOUNT,
 OTTO L. RAABE.