No. 664,575. Patented Dec. 25, 1900.

T. M. NORTH.

PRINTING MACHINE.

(Application filed Apr. 5, 1900.)

(No Model.) 6 Sheets—Sheet 1.

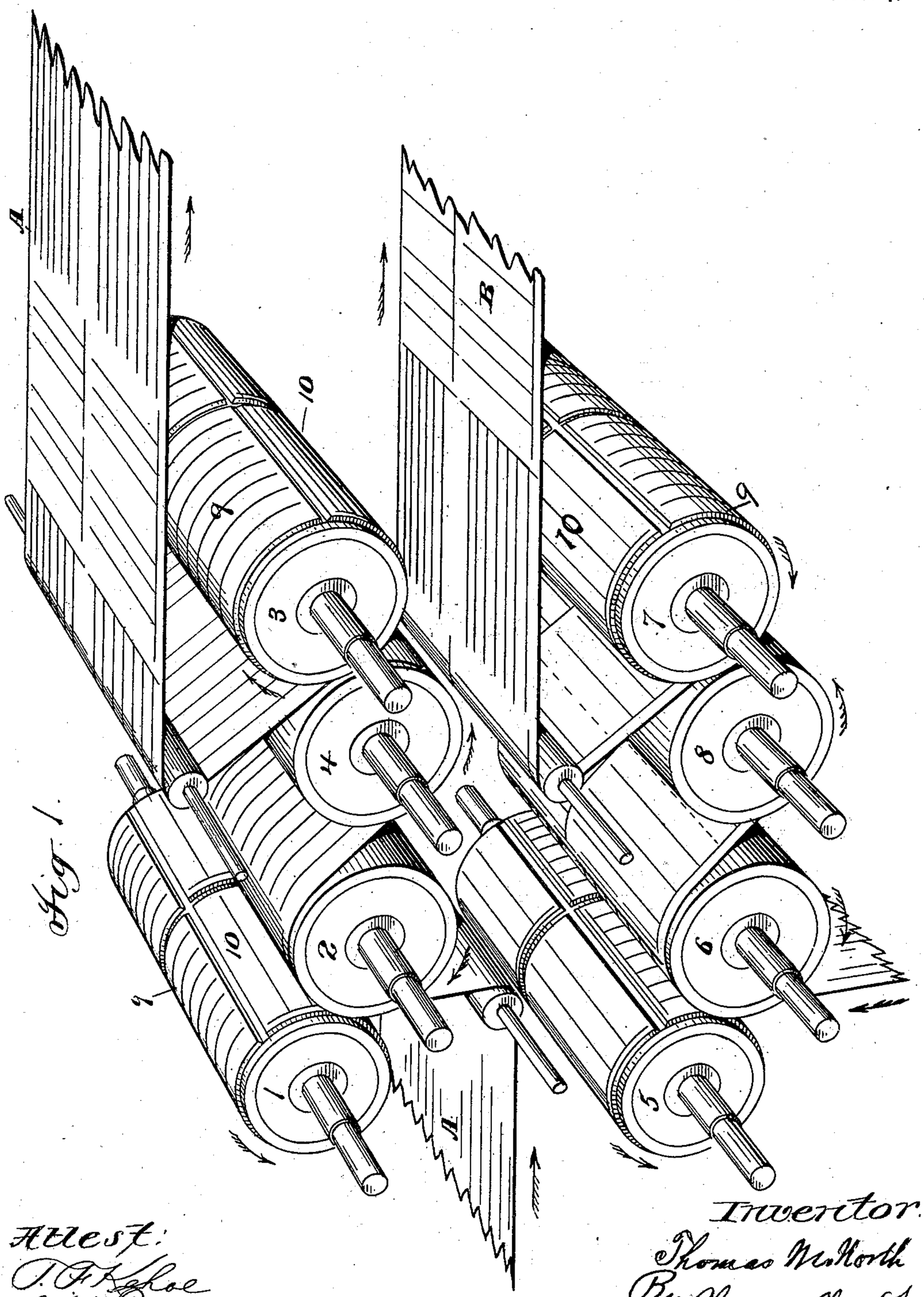

Fig. 1.

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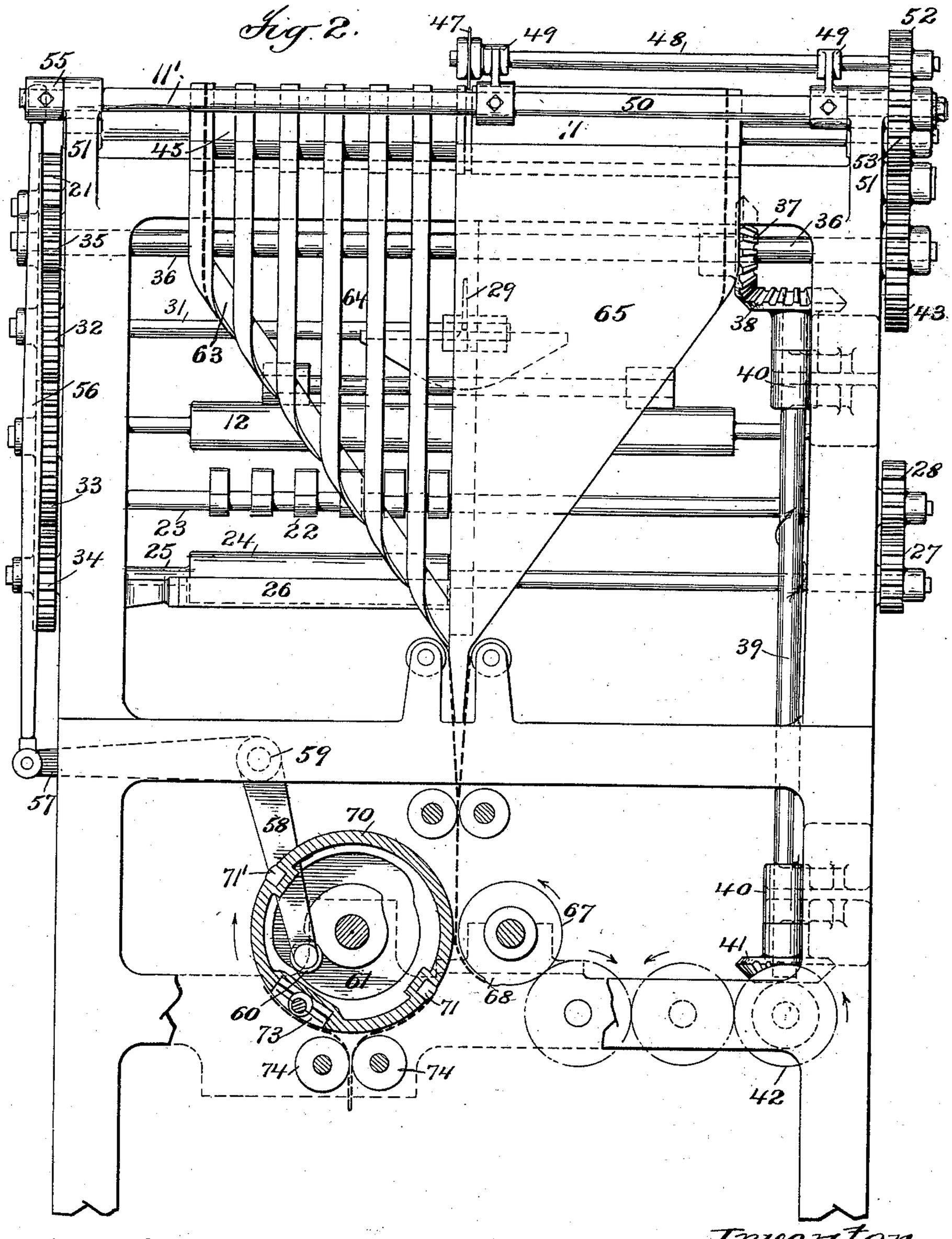
(No Model.) 6 Sheets—Sheet 2.

Fig. 2.



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PRINTING MACHINE.

(Application filed Apr. 5, 1900.)

(No Model.)

6 Sheets—Sheet 3.

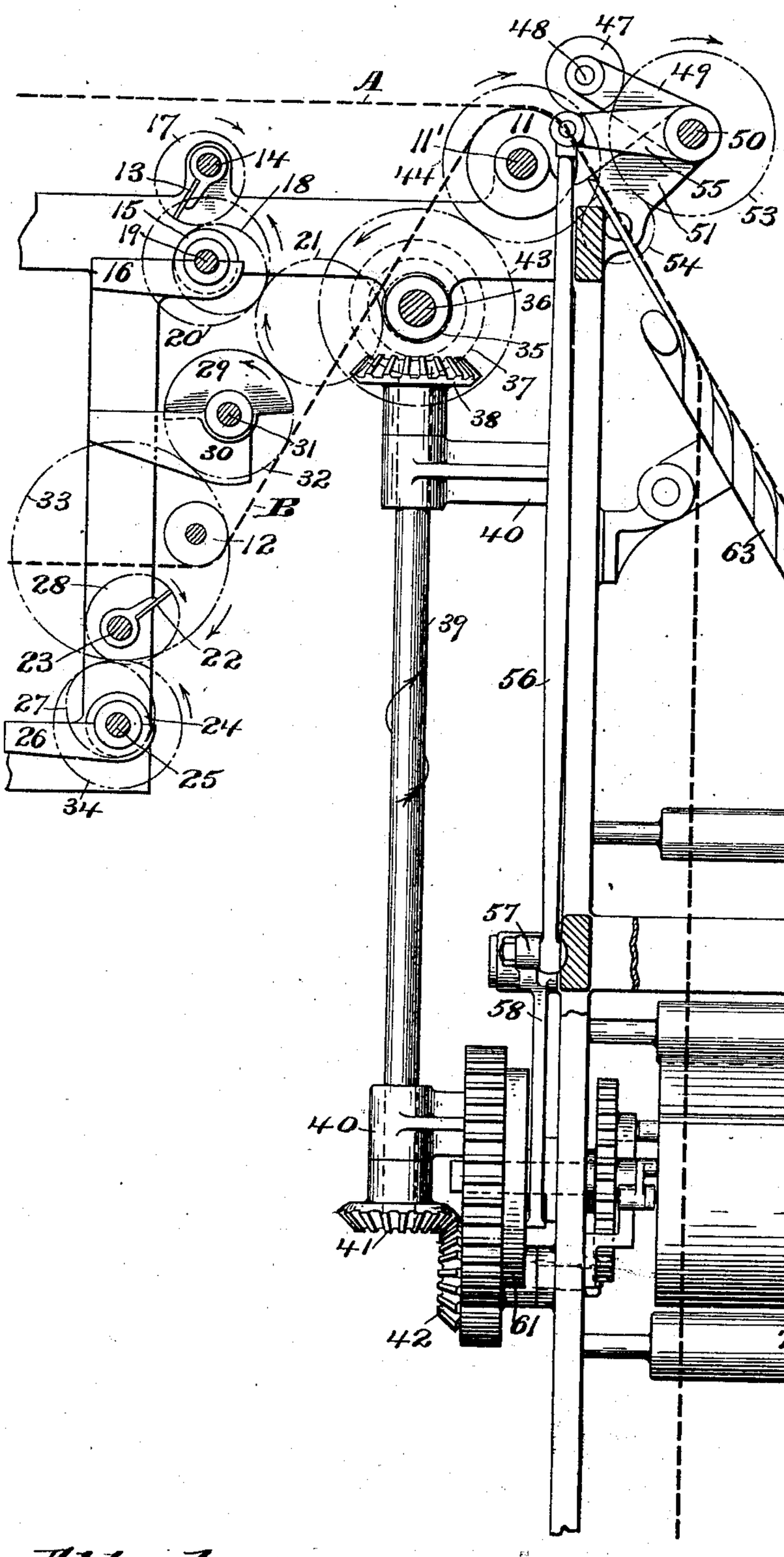

Fig. 3.

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PRINTING MACHINE.

(Application filed Apr. 5, 1900.)

(No Model.)

6 Sheets—Sheet 4.

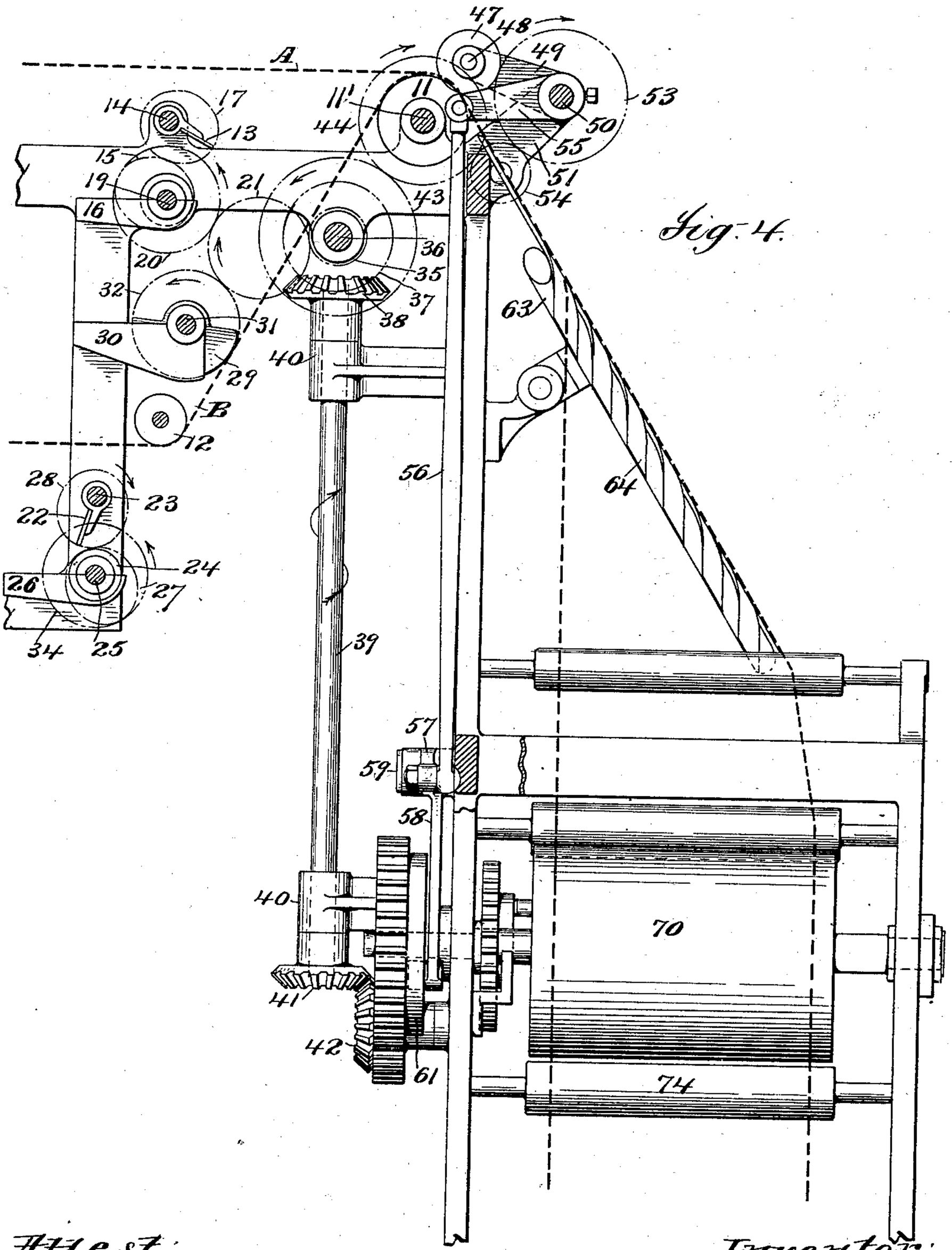

Fig. 4.

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PRINTING MACHINE.

(Application filed Apr. 5, 1900.)

(No Model.)

6 Sheets—Sheet 5.

Fig. 5.

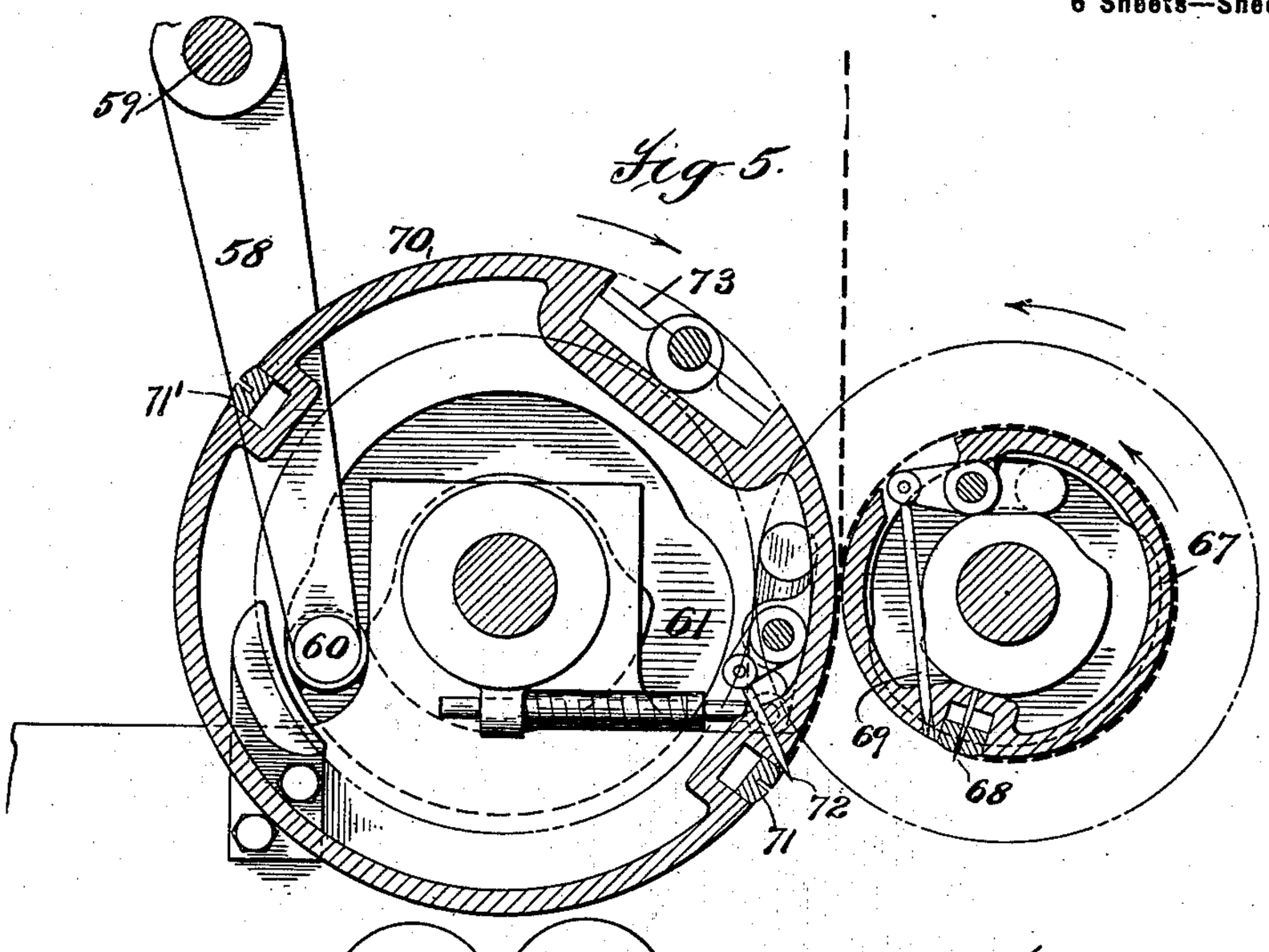


Fig. 6.

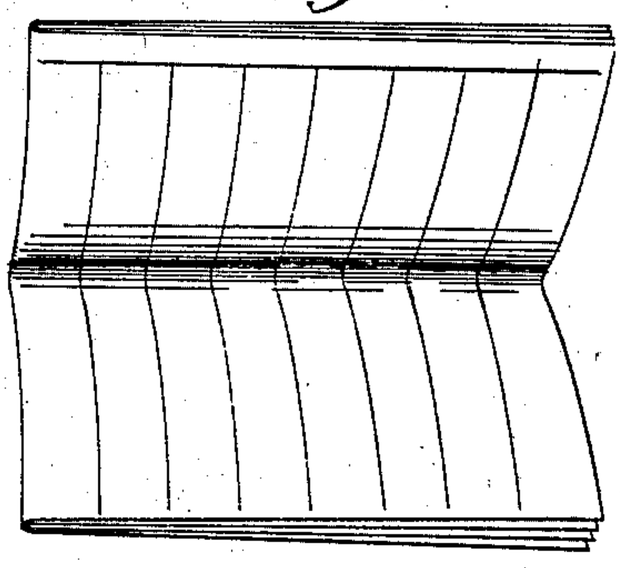


Fig. 8.

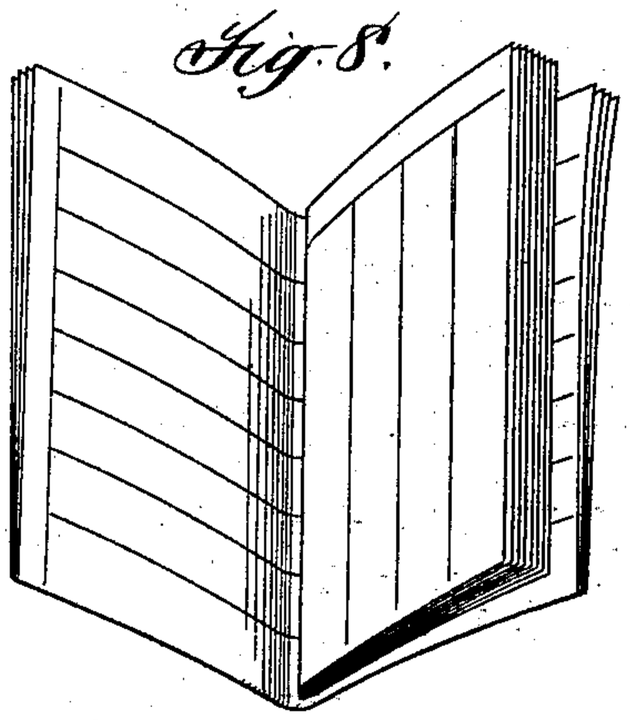
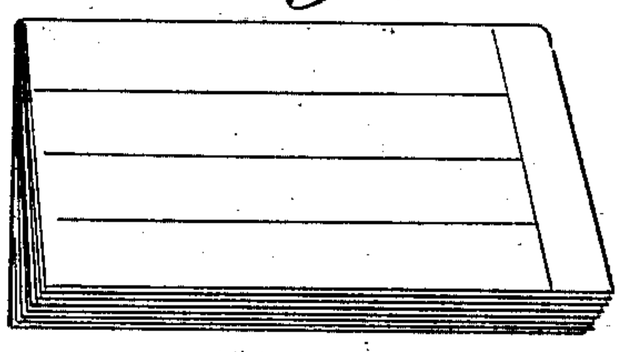


Fig. 7.



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No. 664,575. Patented Dec. 25, 1900.

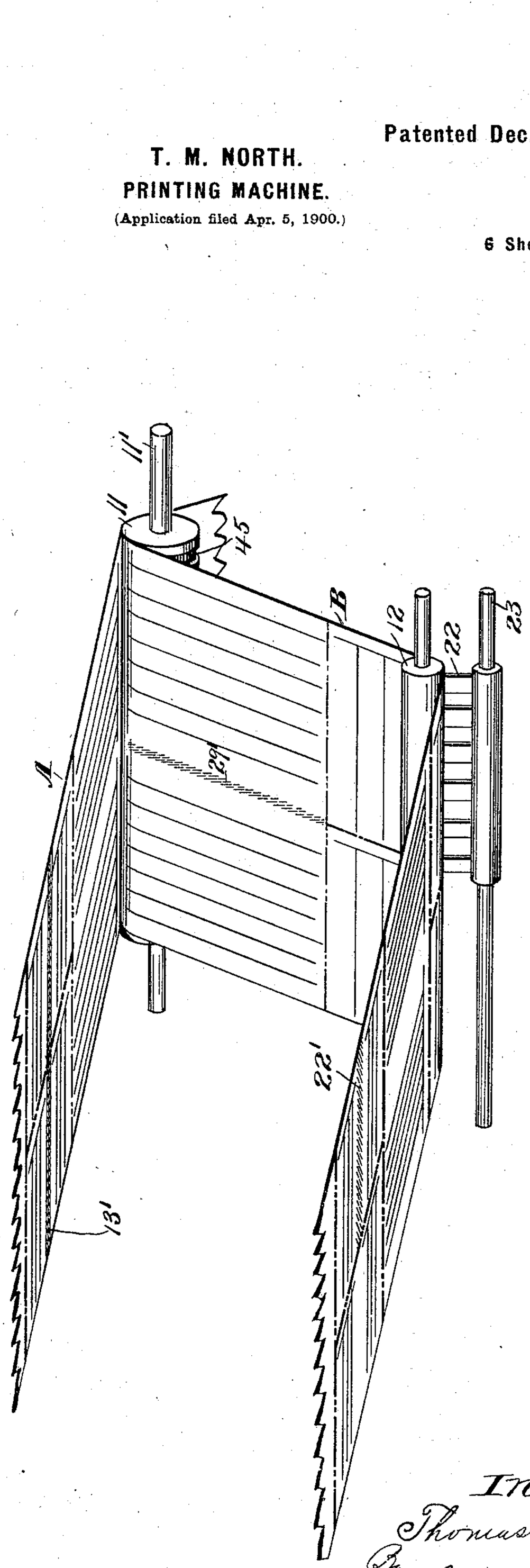
T. M. NORTH.

PRINTING MACHINE.

(Application filed Apr. 5, 1900.)

(No Model.) 6 Sheets—Sheet 6.

Fig. 9.



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UNITED STATES PATENT OFFICE.

THOMAS M. NORTH, OF NEW YORK, N. Y., ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO ROBERT HOE AND CHARLES W. CARPENTER, OF SAME PLACE.

PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 664,575, dated December 25, 1900.

Application filed April 5, 1900. Serial No. 11,693. (No model.)

To all whom it may concern:

Be it known that I, THOMAS M. NORTH, a subject of the Queen of Great Britain and Ireland, residing at New York, county of Kings, and State of New York, have invented certain new and useful Improvements in Printing-Machines, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to certain improvements in printing machinery.

It is the object of this invention to produce a machine which is capacitated to produce a product which includes a newspaper and a magazine section, said sections being associated and folded together, so that they come out of the machine as a single product.

With this and other objects in view the invention consists in certain constructions and in certain parts, improvements, and combinations, as will be hereinafter described, and fully pointed out in 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 view illustrating in perspective the cylinders of a printing-press, said cylinders having plates thereon arranged to print both a newspaper and a magazine. Fig. 2 is a front view of the folding and pasting mechanisms employed. Fig. 3 is a side view of the mechanism shown in Fig. 2. Fig. 4 is a view similar to Fig. 3, but with the parts in a different position. Fig. 5 is a detail sectional view of the cutting and folding cylinders, this view being on a somewhat larger scale. Fig. 6 is a view of the newspaper portion of the product. Fig. 7 is a view of the magazine portion of the product. Fig. 8 is a view of the paper shown in Fig. 6 and the magazine shown in Fig. 7, these two parts being associated. Fig. 9 is a perspective view showing the relation of two single-width webs to each other as they pass to the folder, the webs being arranged to produce an eight-page paper and a sixteen-page magazine.

The machine which is illustrated in the accompanying drawings and which forms one concrete embodiment of the invention is arranged to print and perfect two single wide webs.

Referring to Fig. 1, 1 indicates the form-carrying cylinder, and 2 the impression-cylinder, of the couple for printing on one side of one of the webs, said web being marked A, and 3 and 4 the form-carrying cylinder and impression-cylinder, respectively, for printing on the other side of the web. The web B has one of its sides printed on by a couple the form-cylinder of which is marked 5 and the impression-cylinder 6, and this web is perfected by a couple the form-cylinder of which is marked 7 and the impression-cylinder 8.

The machine which has been selected to illustrate the invention is intended to produce an eight-page newspaper and a sixteen-page magazine. To this end each of the form-cylinders 1 3 5 7 is provided with two sets of plates, (marked 9 and 10.) The plates 9 on the several cylinders are so arranged that the columns run around the cylinder—that is, they deliver impressions on the webs which are parallel to the general direction of movement of the webs. The plates 10 are arranged on the cylinders so that the columns are at right angles to the columns of the plates 9—that is to say, the columns of this second set of plates 10 are parallel to the axis of each cylinder. The plates 10 will therefore deliver sets of impressions on the webs the columns of which are at right angles to the sets of impressions delivered by the plates 9. Furthermore, in the machine shown, while the set of impressions delivered by each set of plates 9 on each cylinder is equal in size to the set of impressions delivered by each set of plates 10 on each cylinder the plates are so arranged that the sets of impressions delivered by each of the plates 9 form two pages of the product, while the sets of impressions delivered by each of the plates 10 form four pages of the product.

After the webs have been printed by the couples they are led forward to an associating and folding mechanism. While this associating and folding mechanism may be va-

ried in construction, it will preferably consist of a longitudinal folder. In the machine shown both webs come together and pass over a guide-roller 11, mounted on a shaft 11′ at the top of the folder. The web A in the machine shown is led directly to this roller 11, while the web B passes around a guide-roller 12, suitably journaled in the frame.

The sheets which compose the newspaper will preferably be folded and pasted together, though, if desired, they may only be folded together, and the sheets which compose the magazine will also preferably be united by paste.

Any suitable pasting mechanism may be employed to apply paste at the proper places on each of the webs in order that the sheets forming the magazine when they are properly associated and folded together in the manner to be hereinafter described will be united by the paste. In the machine shown a pasting-blade 13, mounted on a shaft 14, is located beneath the path of travel of the web A. This pasting-blade 13 extends across the path of the web from side to side and applies a transverse line of paste 13′ thereto, (see Fig. 9,) the blade receiving its paste from a suitably-driven paste-roll 15, located in a fountain 16.

Inasmuch as the paster is to apply paste only to that portion of the web which has the magazine-pages printed thereon and inasmuch as it is desirable that at the time of pasting the pasting-blade be moving at the same speed as the web, the paster is preferably so constructed as to enable it to move at the same speed as the web during the pasting operation, but to apply paste only to alternate sections. Various constructions of paster may be used by which the result above indicated may be accomplished. Preferably, however, the paster will consist of a blade, as before described, provision being made for driving it at varying speeds. The shaft 14, on which in the construction shown the paster is mounted, is provided with an elliptical gear 17, said gear meshing with an elliptical gear 18, mounted on a shaft 19 of the paste-roll 15. The shaft 19 also carries a gear 20, which meshes with an intermediate 21, said intermediate being driven at a constant speed in a manner to be herein described. By properly proportioning the elliptical gears, and thus driving the paster at varying speeds, the pasting-blade 13 can be arranged so that it will make but one revolution while two printed sections of the web are passing, and yet move at the same speed as the web during the time when the paste is being applied thereto.

The web B preferably has a line of paste 22′ applied thereto on the under side thereof, said line lying between the pages of the magazine-section, but extending only half across the web. (See Fig. 9.) In order that this line of plate may not be wiped off by the roller 11, before referred to, and the longitudinal folder, to be hereinafter described, it will preferably be made up of a series of short disconnected lines. To this end the paste is applied by a series of fingers 22, mounted on a shaft 23, said fingers 22 receiving their paste from a paste-roll 24, mounted on a shaft 25, said roll 24 receiving its paste from a fountain 26. The paster, which is composed of the fingers 22, is preferably driven like the pasting-blade 13—that is to say, at varying speeds. To this end, therefore, the shaft 25 is provided with an elliptical gear 27, which meshes with an elliptical gear 28 on the shaft 23.

When it is desired to paste together the sections of the webs A and B which are to form the newspaper portion of the product, a paster will be provided which applies a longitudinal line of paste to the newspaper-section of one of the webs. While this paster may be varied in form and variously located, it will preferably be arranged so as to apply its line of paste 29′ to the upper side of the web B. This paster will preferably consist of a semicircular disk 29, running in a fountain 30, said disk being mounted on a shaft 31. The shaft 31 may be driven in any suitable manner. In the machine shown, however, it is provided with a gear 32, which meshes with the intermediate 21, the relation of the gearing being such that the paste-disk is driven at a slower speed than the speed of the web in the machine shown at half the speed. The gear 32 meshes with a gear 33, said gear meshing in turn with a gear 34 on the shaft 25. By this arrangement of gearing it will be seen that the intermediate 21 drives all the pasting mechanisms.

While the intermediate 21 may be driven in any suitable manner in the machine shown, it is in mesh with and driven by a pinion 35, mounted on a shaft 36, extending across the frame of the machine from side to side. This shaft 36 carries a miter-gear 37, which is in mesh with a miter-gear 38, carried by a vertical shaft 39, which is supported in bearings 40, extending from the frame of the machine. The shaft 39 carries on its lower end a bevel-gear 41, which is in mesh with a similar gear 42, said gear being driven in any suitable manner, as by a train, from the cutting and collecting cylinder, which will be hereinafter described. The shaft 36 is also provided with a gear 43, which meshes with a gear 44 on the shaft 11′ of the roller 11, before described.

In the machine shown the webs A and B, as has been before stated, meet and are superposed on the roller 11, the run of the webs being so arranged that the newspaper-sections of the two webs are in register and the magazine-sections of the two webs are in register. The longitudinal line of paste 29′ deposited on the upper side of the lower web B by the paster 29 secures the newspaper-sections together, and the magazine-sections are secured together by the transverse line of paste 13′ deposited on the under side of the web A by the pasting-blade 13. In order

that the line of paste 22′ applied to the under side of the web B by the fingers 22 may not be wiped off as it passes over the roller 11, the roller is channeled at 45, as shown in Fig. 2.

As has been before stated, the magazine portion of the product is to consist of sixteen pages, and these pages are preferably cut, so that the magazine may be readily opened by the reader. In order to effect this, a suitable slitting mechanism is provided, which may be variously constructed. In the machine shown the slitter consists of a disk 47, mounted on a shaft 48, which is supported in bearings 49, said bearings being secured to a shaft 50, which is mounted in bearings 51, extending from the frame of the machine. The shaft 48 is provided with a gear 52, which is in mesh with a gear 53, mounted on the shaft 50. The gear 53 is in mesh with an intermediate 54, said intermediate being in mesh with the gear 44 on the shaft 11′.

Inasmuch as the slitter is not intended to cut the newspaper portion of the web, it must be thrown out of operation while this part of the web is passing under it. Various constructions may be devised for this purpose. In the machine shown, however, the shaft 50 is provided with an arm 55, to which is connected a rod 56. The rod 56 is connected at its lower end to one arm 57 of a bell-crank 57 58, which is pivoted to the machine at 59. The arm 58 of the bell-crank carries a friction-roll 60, which runs in the groove of a closed cam 61, mounted on the shaft of the folding-cylinder, to be hereinafter described. As the cam rotates, therefore, the slitter will be rocked toward and away from the path of the web, and the cam is timed so that it is rocked into cutting position as the magazine-sections of the web are passing over the roll 11, thus dividing the magazine-sections of the web into two parts. As soon, however, as a magazine-section of the web has passed from under the slitter the slitter is rocked upward, allowing the newspaper-section to pass uncut. It will be understood that this slitter may be omitted when it is desired to produce an uncut magazine.

Any suitable means may be employed to give the web a longitudinal fold. In the machine shown, however, an ordinary longitudinal folder is employed for this purpose, said folder consisting of angle-bars 63, strips 64, and a plate 65, the strips making up one-half of the face of the folder and being spaced apart, so as to avoid wiping the paste on the line 22′ from the under side of the under web. Inasmuch as the web is pasted only half-way across, one-half of the folder is formed by the plate 65.

As the associated webs pass over the folder they get a central fold, and the newspaper-sections are thus folded parallel to their column-lines. The magazine-sections of the associated webs in the construction shown are, however, separated on the line of cut produced by the slitter 47 and are therefore superposed by the folder. It will be remembered that the magazine-sections of the upper web had a line of paste 13′ applied to them. As the webs pass over the roll 11, therefore, the superposed magazine-sections of the two webs are pasted together. As the associated webs leave the folder, therefore, the first sections of the webs are a newspaper having a central line of fold parallel to its column-lines, said newspaper consisting of two plies of four pages each, said plies being pasted together. The second sections of the webs, which are integrally connected to the first sections, are an unfolded magazine consisting of four superposed plies of four pages each, said plies being pasted together.

The webs pass from the longitudinal folder through the usual drawing-off rollers to a pair of cylinders, one of which, 67, is provided with a cutting-blade 68 and a set of sheet-taking pins 69 of ordinary construction. The other cylinder, 70, is provided with cutting-blocks 71 71′, a set of ordinary sheet-taking pins 72, and a folding-blade 73, also of the usual construction. As the webs pass between these cylinders, supposing the newspaper-sections of the associated webs to be leading, the pins 69 on the cylinder 67 are operated to seize the heads of the newspaper portions of the webs, said portions being thus carried around the cylinder 67. As the cylinder completes its rotation the cutting-blade 68 cuts the webs between the newspaper portion and the magazine portion, the leading ends of the newspaper portions of the webs having in the meantime met the leading ends of the oncoming magazine portions. As soon as the cutting operation is performed the pins 69 are withdrawn, and the pins 72 operate to take both the magazine portions of the webs and the newspaper portions, so that the two are superposed and carried onward by the cylinder 70.

It will be remembered that the newspaper portion of the webs has received a central fold parallel to its columns and that the magazine portion is as yet unfolded. As the two sections come together on the cylinder 70 they are, therefore, of the same size; but the columns on one section are arranged at right angles to the columns on the other section—that is to say, the columns on the newspaper portion of the product run around the cylinder 70, while the columns on the magazine portion are parallel to the axis of the cylinder. The two products thus superposed are carried onward by the cylinder 70 until the knife 68 on the cylinder 67 meets the cutting-block 71′ on the cylinder 70. When this occurs the magazine portion is severed from the succeeding newspaper portion, and immediately thereafter the folding-blade 73 is operated to tuck the associated product from the cylinder 70 between suitable folding-rolls 74, from which point they are carried off to any suitable delivery.

The position of the columns on the two prod-

ucts on the cylinder 70 being remembered, it will be seen that the folding-blade 73 operates to give the newspaper portion of the product a fold across its columns and at the same time to give the magazine portion a fold parallel to its columns. The result of the action of this folding-blade is that a product is produced consisting of a newspaper having a half-sheet fold with a magazine inside of it.

The construction by which the invention is carried into effect may be varied widely. The invention is not, therefore, to be limited to the specific details of construction which have been hereinbefore described.

What is claimed is—

1. The combination with means for printing a web so that the columns of a set of the impressions will be parallel with the run of the web and the columns of another set of impressions will be at right angles to the run of the web, of means for giving the web a central fold, means for severing it into sheets, and means for associating the sheets having their columns at right angles to the run of the web with the sheets having their columns parallel with the run of the web, and means for folding the associated product, substantially as described.

2. The combination with means for forwarding a web having a set of impressions the columns of which are parallel with the run of the web, and a set of impressions the columns of which are at right angles to the run of the web, of means for giving the web a central fold, means for severing it into sheets between the sets of impressions, means for associating the sheets with the columns of one sheet at right angles to the columns of the other sheet, and means for folding the associated product, substantially as described.

3. The combination with means for printing a web so that the columns of a set of the impressions will be parallel with the run of the web and the columns of another set of impressions will be at right angles to the run of the web, of means for severing the web into sheets, part of the sheets containing the columns which run in one direction and part of the sheets containing the columns which run in the other direction, and means for associating the sheets having their columns running one way with the sheets having their columns running the other way, substantially as described.

4. The combination with means for forwarding a web having a set of impressions the columns of which are parallel with the run of the web, and a set of impressions the columns of which are at right angles to the run of the web, of means for severing the web into sheets between the sets of impressions, means for associating the sheets with the columns of one sheet at right angles to the columns of the other sheet, and means for folding the associated product, substantially as described.

5. The combination with means for printing a web so that each side of a section of it shall contain two pages with the columns running lengthwise of the web, and each side of a section of it shall contain four pages with the columns running at right angles to the run of the web, and said four pages being equal in size to the two pages whose columns run lengthwise of the web, and means for associating the section of web having two pages on each side with the section of web having four pages on each side, substantially as described.

6. The combination with means for printing pages on a web in sets of two and sets of four, the columns of the two-page set running in one direction and the columns of the four-page set being at right angles to the columns of the two-page set, of means for associating the sets, substantially as described.

7. The combination with means for printing pages on a web in sets of two and sets of four, the columns of the two-page set running in one direction and the columns of the four-page set being at right angles to the columns of the two-page set, of means for severing the web between the sets of impressions, and means for associating the sets, substantially as described.

8. The combination with means for printing pages on a web in sets of two and sets of four, the columns of the two-page set running in one direction and the columns of the four-page set being at right angles to the columns of the two-page set, of means for severing the web between the sets of impressions, and means for associating the sets with the columns of one set at right angles to the columns of the other set, substantially as described.

9. The combination with means for printing pages on a web in sets of two and sets of four, of a slitting mechanism, means for operating the slitting mechanism to divide that section of the web which carries the four-page impressions into two parts, means for folding the web longitudinally so as to give the two-page section a central fold and superpose the two slit parts, means for cutting the web into sheets between the sets of impressions, and means for associating the sheets, substantially as described.

10. The combination with means for printing pages on a web in sets of two and sets of four, of a slitting mechanism, means for operating the slitting mechanism to divide that section of the web which carries the four-page impressions into two parts, a longitudinal folder for giving the two-page section a longitudinal central fold and superposing the two slit parts, means for cutting the web into sheets between the sets of impressions, and means for associating the sheets, substantially as described.

11. The combination with means for printing pages on a web in sets of two and sets of four, of a slitting mechanism, means for operating the slitting mechanism to divide that section of the web which carries the four-page impressions into two parts, a longitudinal

folder for giving the two-page section a longitudinal central fold and superposing the two slit parts, and cutting and collecting cylinders operating to cut the webs into sheets between the different sets of impressions and collect the sheets, substantially as described.

12. The combination with means for printing a plurality of webs, each web having pages printed thereon in sets of two and sets of four, of means for superposing the webs with the several sets of two in register and the several sets of four in register, means for severing the webs into sheets between the sets of impressions, and means for associating the sheets, substantially as described.

13. The combination with means for forwarding a plurality of webs, each web having pages printed thereon in sets of two and sets of four, of means for superposing the webs with the several sets of two in register and the several sets of four in register, means for severing the webs into sheets between the sets of impressions, and means for associating the sheets, substantially as described.

14. The combination with means for printing a plurality of webs, each web having pages printed thereon in sets of two and sets of four, of means for superposing the webs with the several sets of two in register and the several sets of four in register, a slitting mechanism operating to divide the sections of the webs having the sets of four pages into two parts, means for severing the webs into sheets between the sets of impressions, and means for associating the sheets, substantially as described.

15. The combination with means for forwarding a plurality of webs, each web having pages printed thereon in sets of two and sets of four, of means for superposing the webs with the several sets of two in register and the several sets of four in register, a slitting mechanism operating to divide the sections of the webs having the sets of four pages into two parts, means for severing the webs into sheets between the sets of impressions, and means for associating the sheets, substantially as described.

16. The combination with means for printing a plurality of webs, each web having pages printed thereon in sets of two and sets of four, of means for superposing the webs with the several sets of two in register and the several sets of four in register, a slitting mechanism operating to divide the sections of the webs having the sets of four pages into two parts, means for giving the webs a longitudinal fold, means for severing the webs into sheets between the sets of impressions, and means for associating the sheets, substantially as described.

17. The combination with means for forwarding a plurality of webs, each web having pages printed thereon in sets of two and sets of four, of means for superposing the webs with the several sets of two in register and the several sets of four in register, a slitting mechanism operating to divide the sections of the webs having the sets of four pages into two parts, means for giving the webs a longitudinal fold, means for severing the webs into sheets between the sets of impressions, and means for associating the sheets, substantially as described.

18. The combination with means for printing a plurality of webs, each web having pages printed thereon in sets of two and sets of four, of means for applying a line of paste longitudinally of the webs and between the pages printed in sets of two, means for applying a line of paste between the webs and transversely thereof, said line of paste extending between the pages printed in sets of four, means for applying a line of paste to the under side of the under web, said line extending transversely of the web and lying between two of the pages of the sets of four, means for bringing the webs together, a slitting mechanism operating to cut the webs longitudinally into two parts between the pages printed in sets of four, means for giving the webs a longitudinal fold, means for severing the webs into sheets between the sets of impressions, and means for collecting the sheets, substantially as described.

19. The combination with means for forwarding a plurality of webs, each web having pages printed thereon in sets of two and sets of four, of means for applying a line of paste longitudinally of the webs and between the pages printed in sets of two, means for applying a line of paste between the webs and transversely thereof, said line of paste extending between the pages printed in sets of four, means for applying a line of paste to the under side of the under web, said line extending transversely of the web and lying between two of the pages of the sets of four, means for bringing the webs together, a slitting mechanism operating to cut the webs longitudinally into two parts between the pages printed in sets of four, means for giving the webs a longitudinal fold, means for severing the webs into sheets between the sets of impressions, and means for collecting the sheets, substantially as described.

20. The combination with means for forwarding two webs, of a pasting device cut away so as to apply a longitudinal line of paste to the upper side of a portion of the under web, a pasting device operating to apply a transverse line of paste to the under side of the upper web and entirely across the same, a pasting device operating to apply a transverse line of paste to the under side of the under web and partly across the same, and means for driving the several pasting devices, substantially as described.

21. The combination with means for forwarding two webs, of a pasting device cut away so as to apply a longitudinal line of paste to the upper side of a portion of the under web, a pasting device operating to apply a transverse line of paste to the under

side of the upper web and entirely across the same, a pasting device operating to apply a transverse line of paste to the under side of the under web and partly across the same, and a common driving means for all the pasting devices, substantially as described.

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

THOMAS M. NORTH.

Witnesses:
F. W. H. CRANE,
L. ROEHM.