

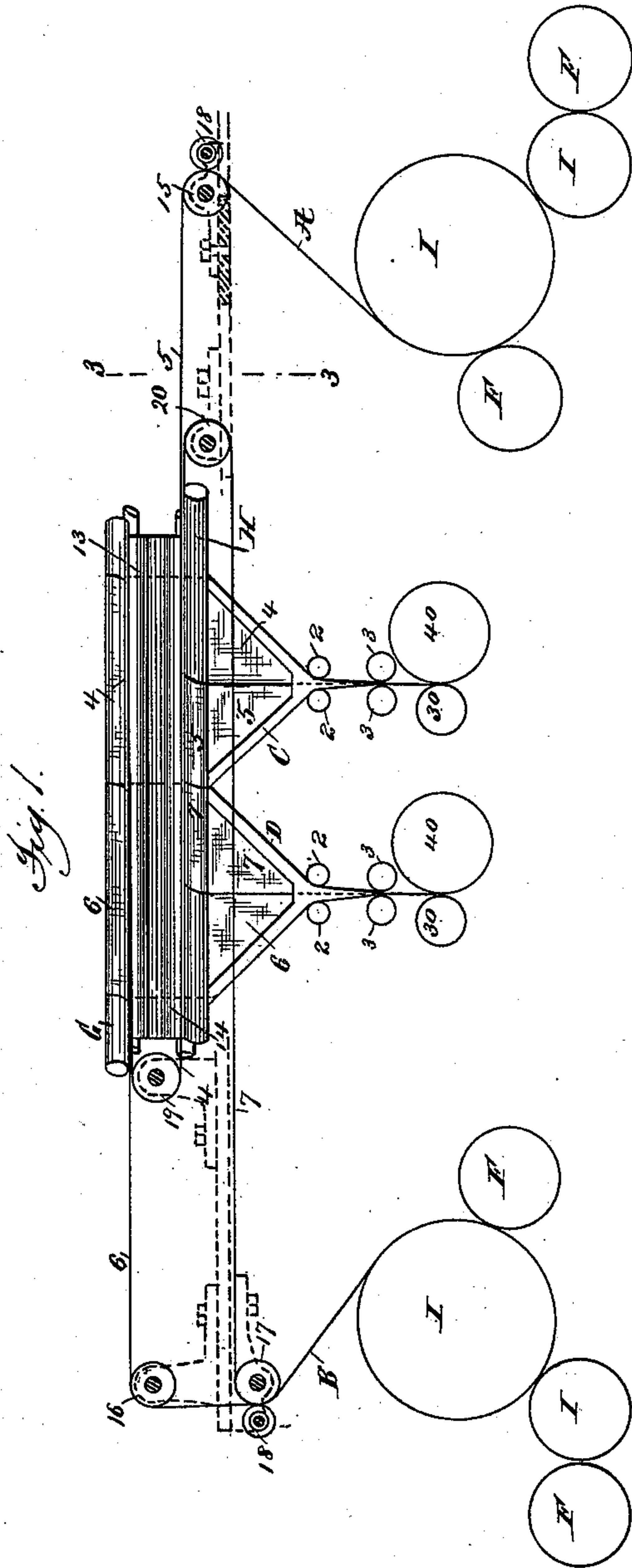
(No Model.)

9 Sheets—Sheet 1.

L. C. CROWELL.  
WEB PRINTING AND DELIVERY MECHANISM.

No. 400,548.

Patented Apr. 2, 1889.



Attest:  
Geo. H. Botto.  
G. M. Borch

Inventor:  
Luther C. Crowell  
by Philip Phelps Hovey  
Attys

(No Model.)

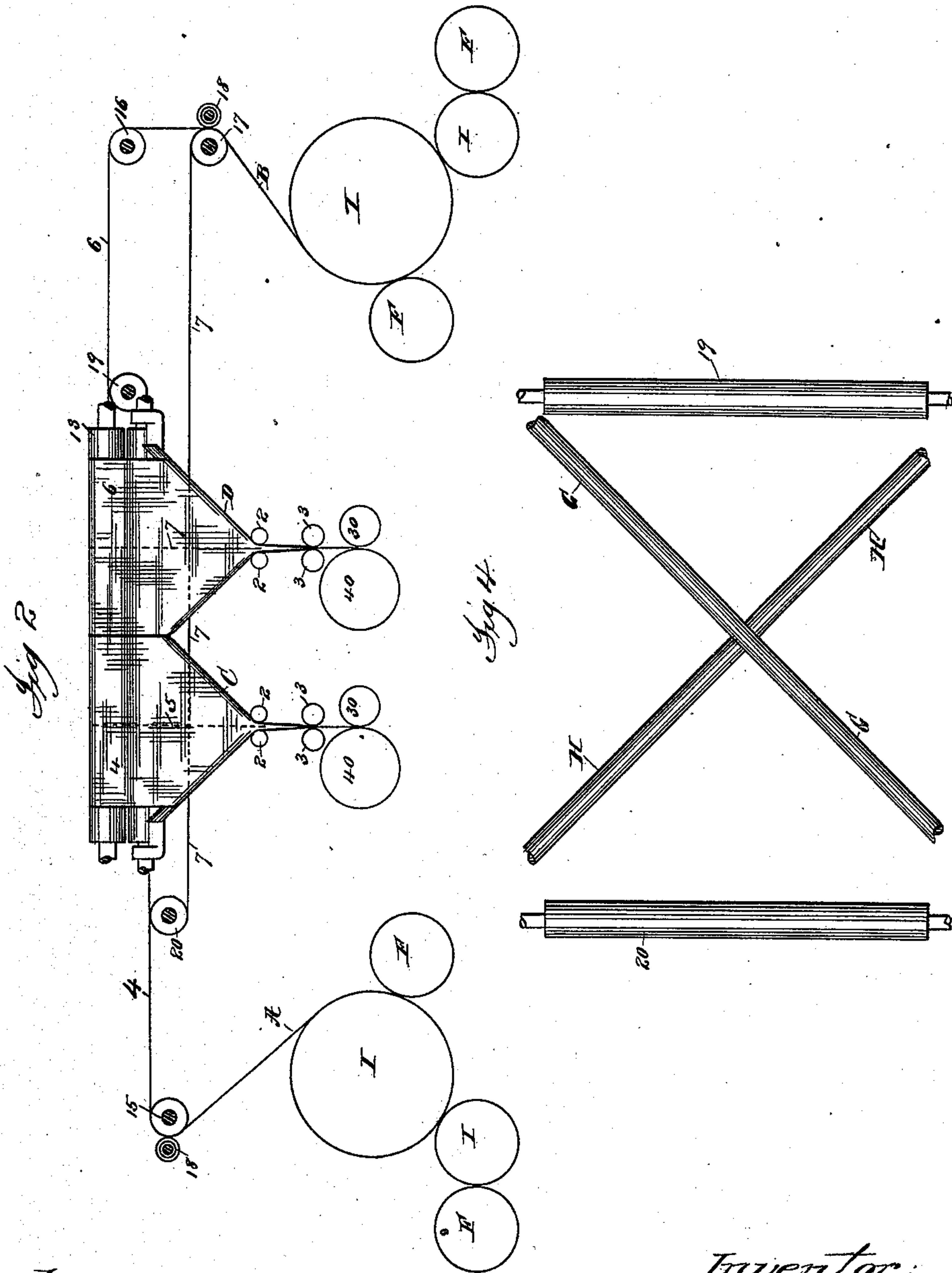
9 Sheets—Sheet 2.

L. C. CROWELL.

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Patented Apr. 2, 1889.



Attest:

G. H. Bitts  
G. M. Boret

Inventor:

Luther C. Crowell  
by Philipp Phelps & Henry  
Attys.



(No Model.)

9 Sheets—Sheet 3.

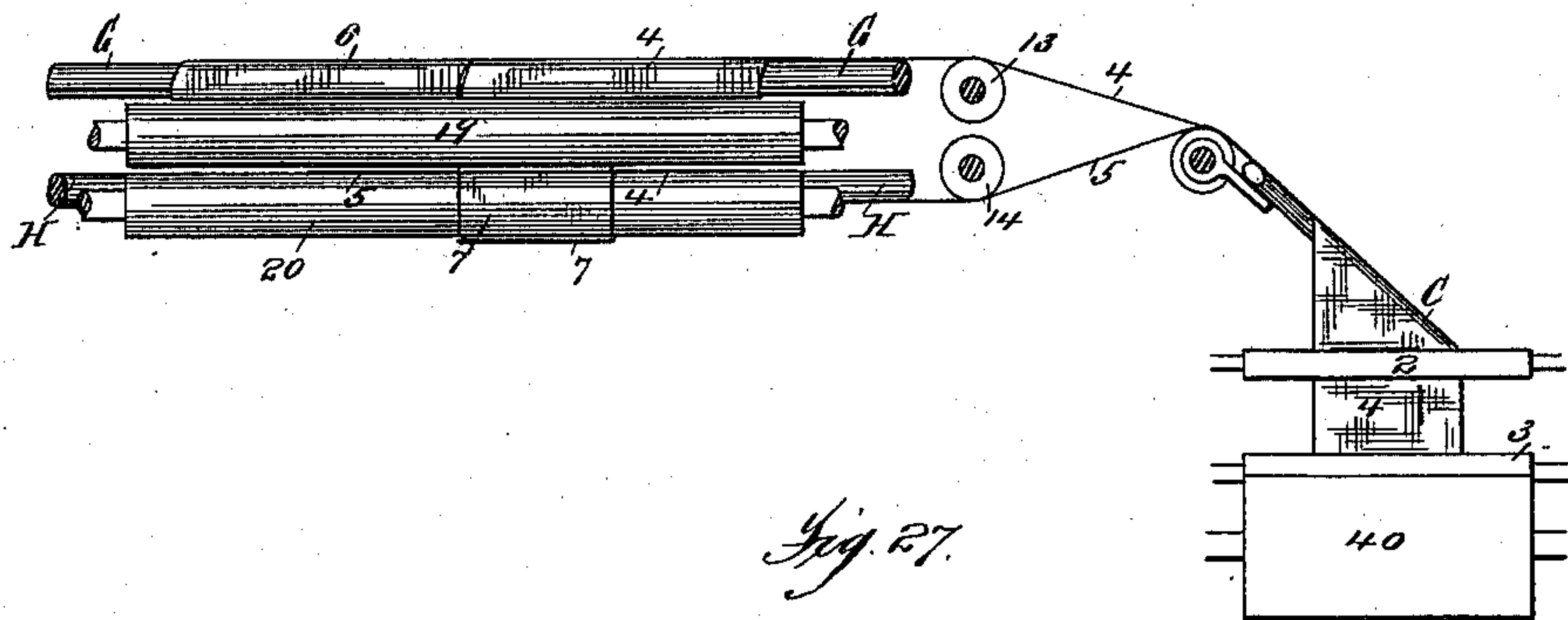
L. C. CROWELL.

WEB PRINTING AND DELIVERY MECHANISM.

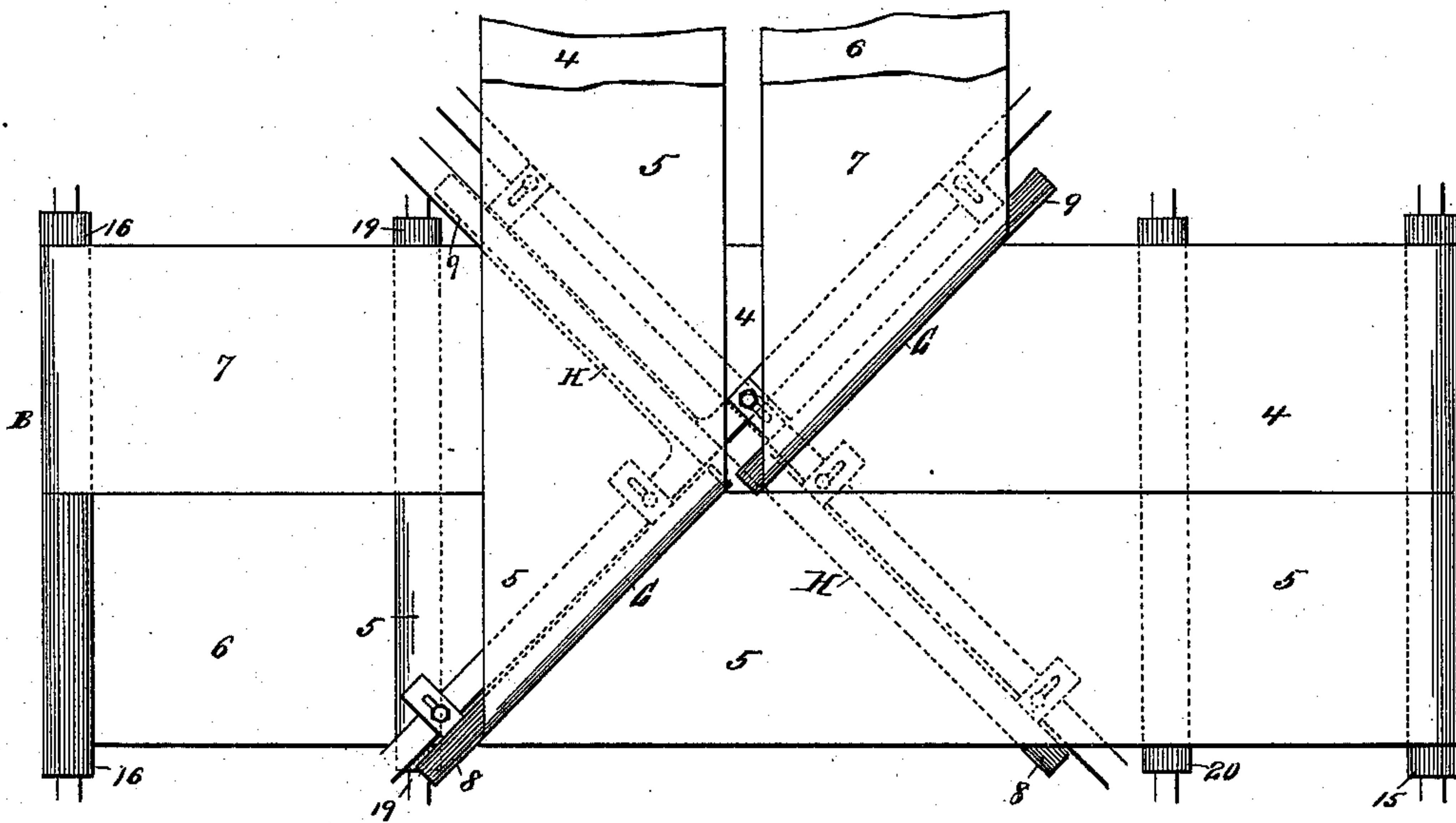
No. 400,548.

Patented Apr. 2, 1889.

*Fig. 3.*



*Fig. 27.*



*Attest*

*Geo. H. Bots.*  
*G. M. Bots.*

*Inventor*

*Luther C. Crowell*  
*by Philip Phelps & Hoey*  
*Attys*

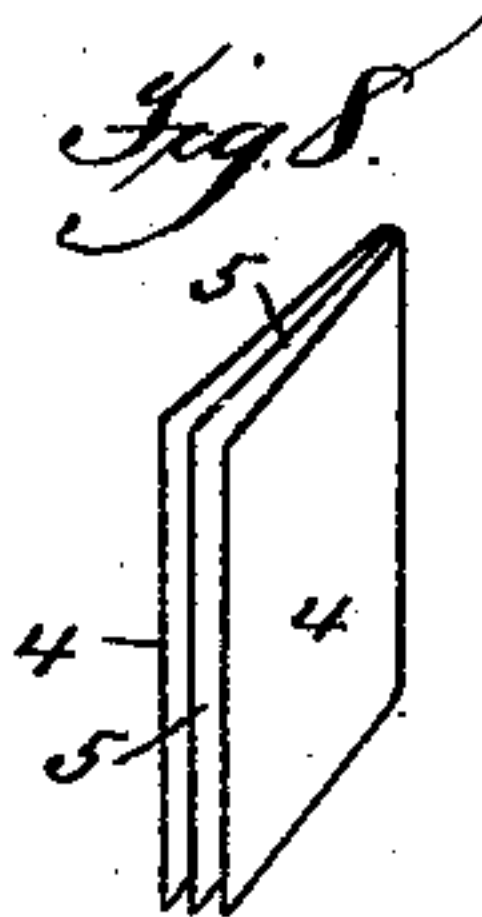
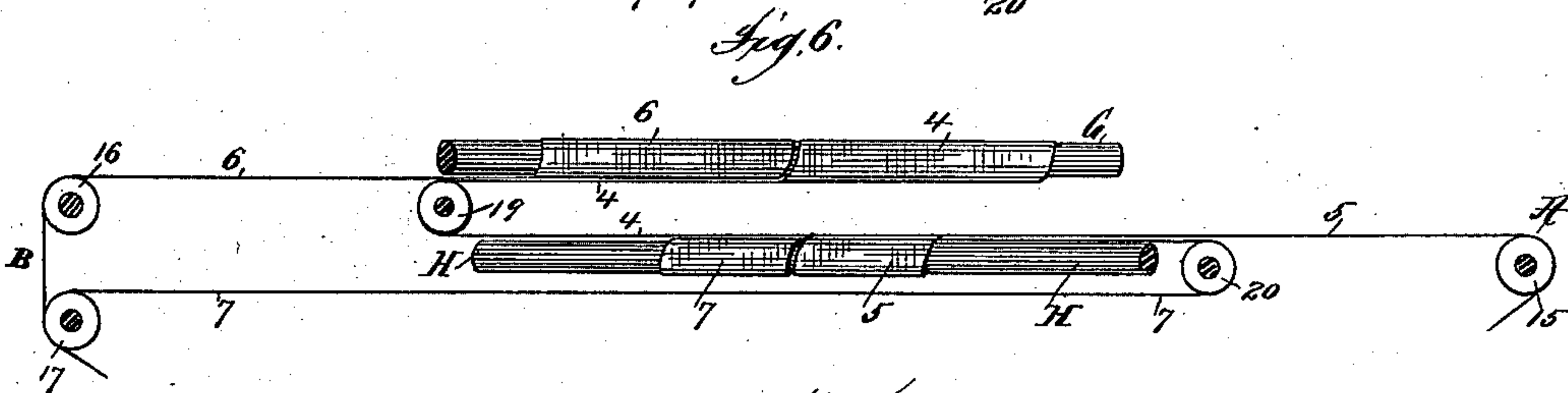
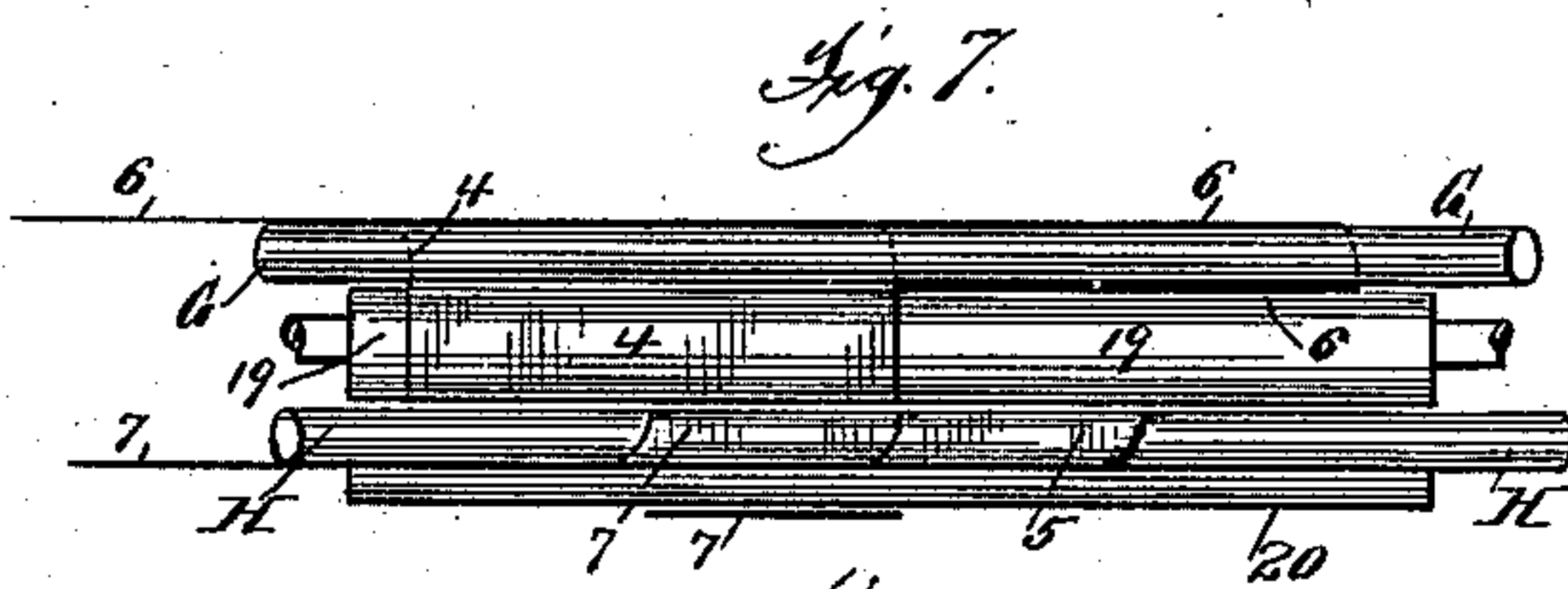
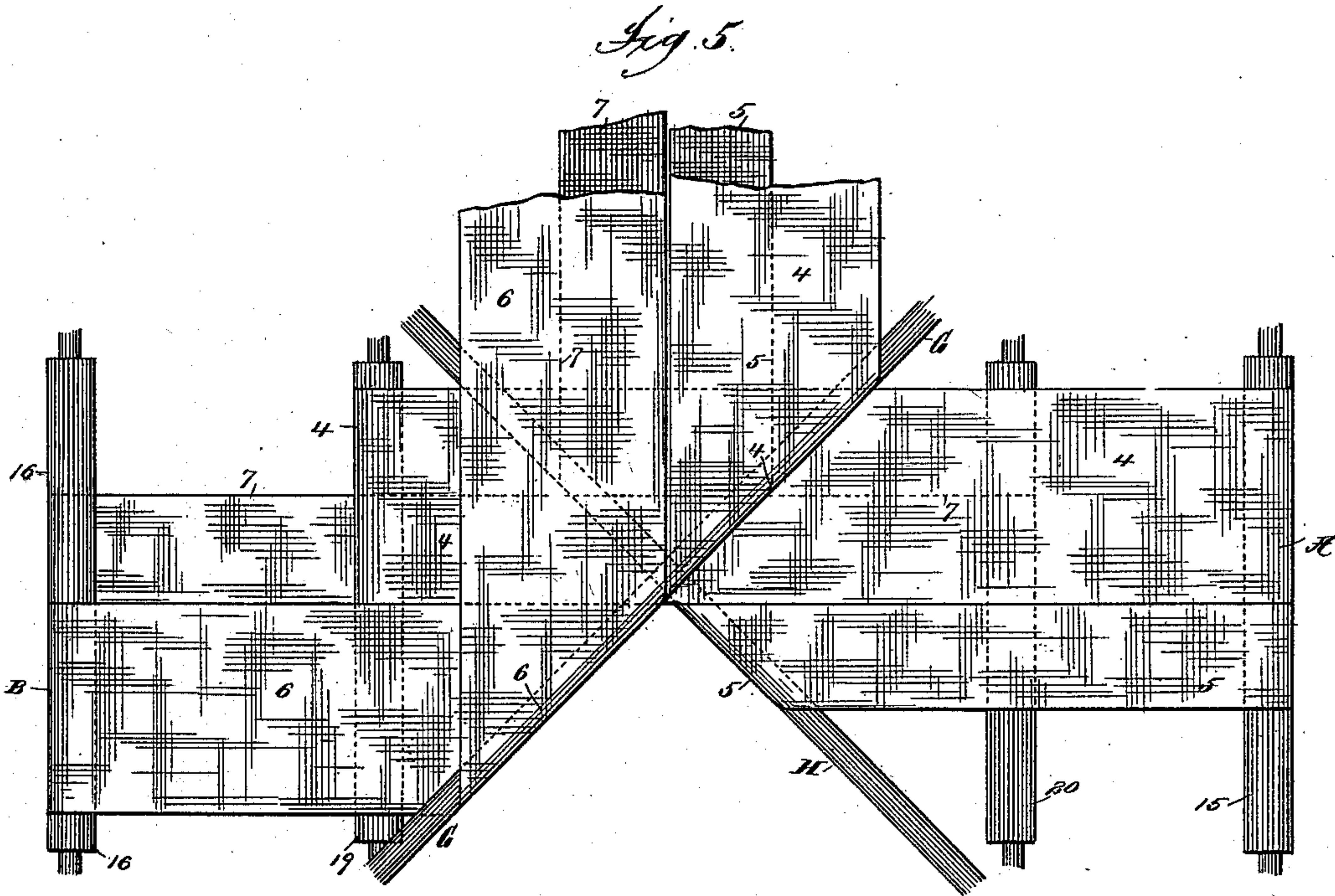
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9 Sheets—Sheet 4.

L. C. CROWELL.  
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No. 400,548.

Patented Apr. 2, 1889.



Attest:  
Geo. H. Borth  
G. M. Borth

Inventor:  
Luther C. Crowell  
by Philip Phelps & Hovey  
Attys



(No Model.)

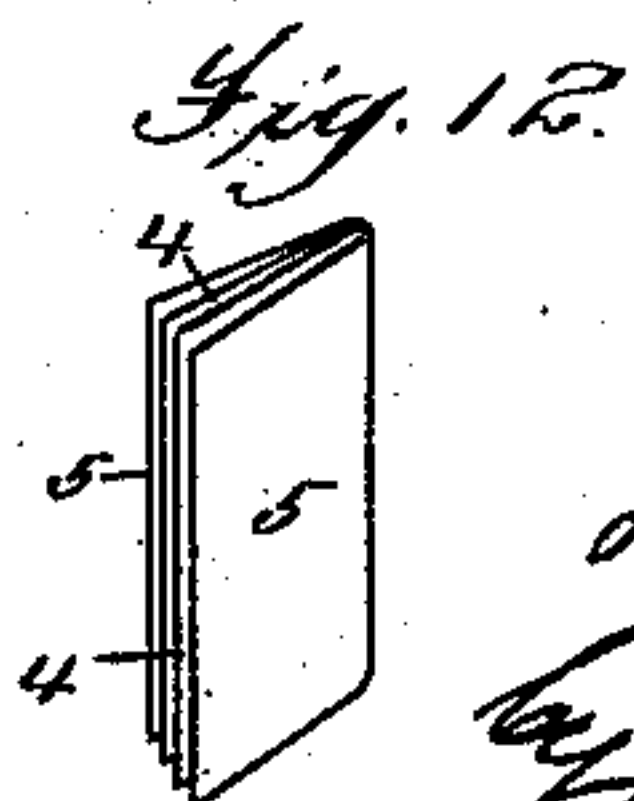
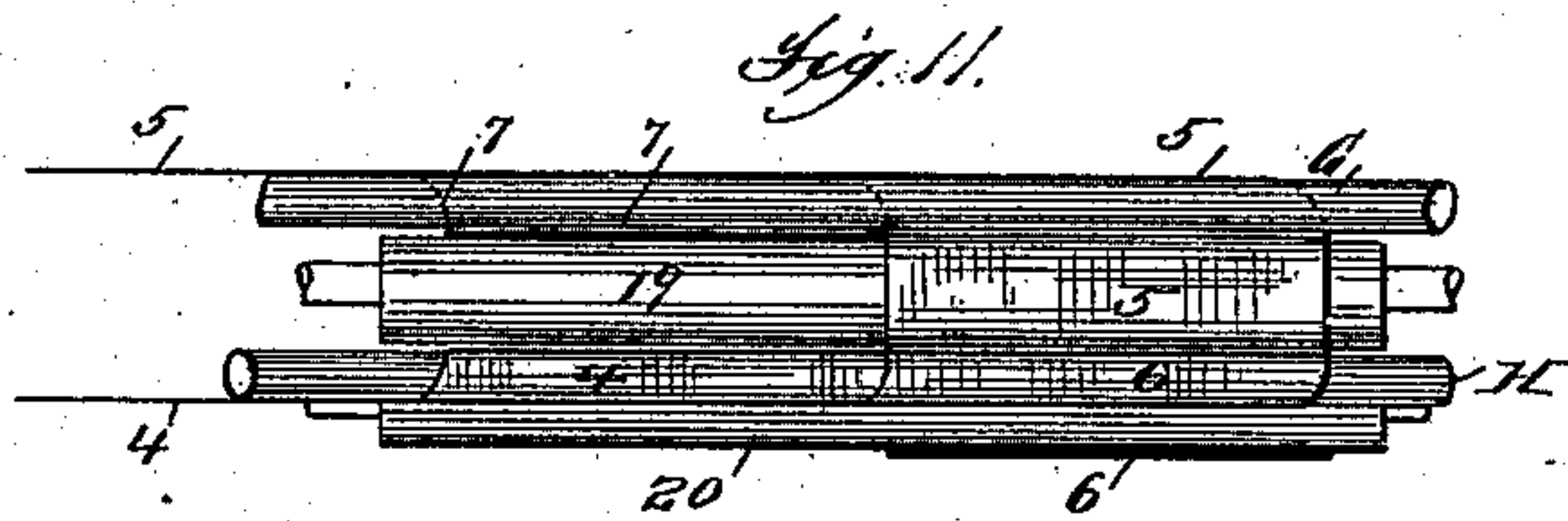
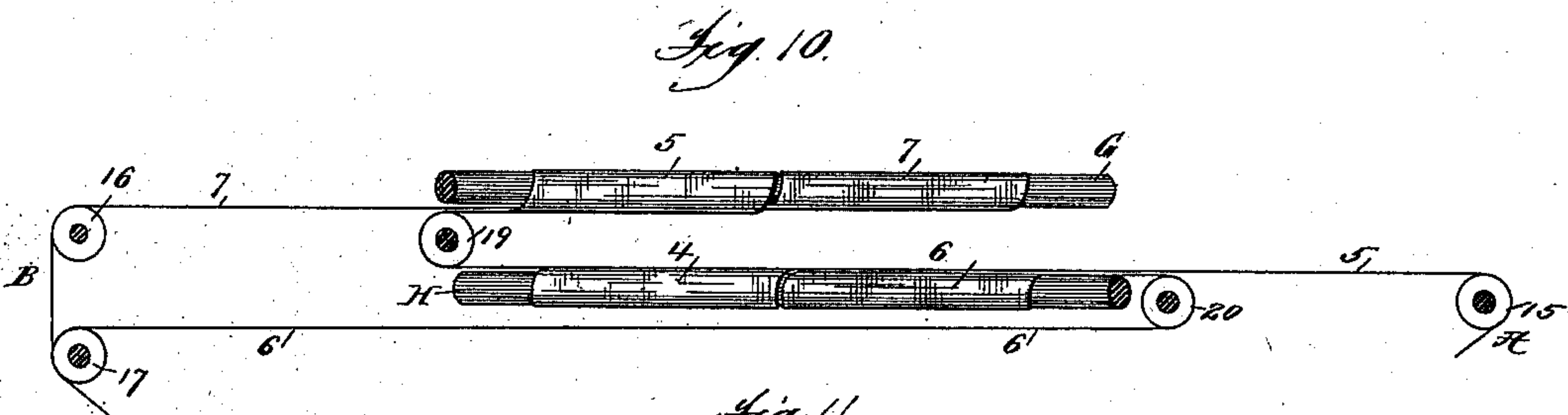
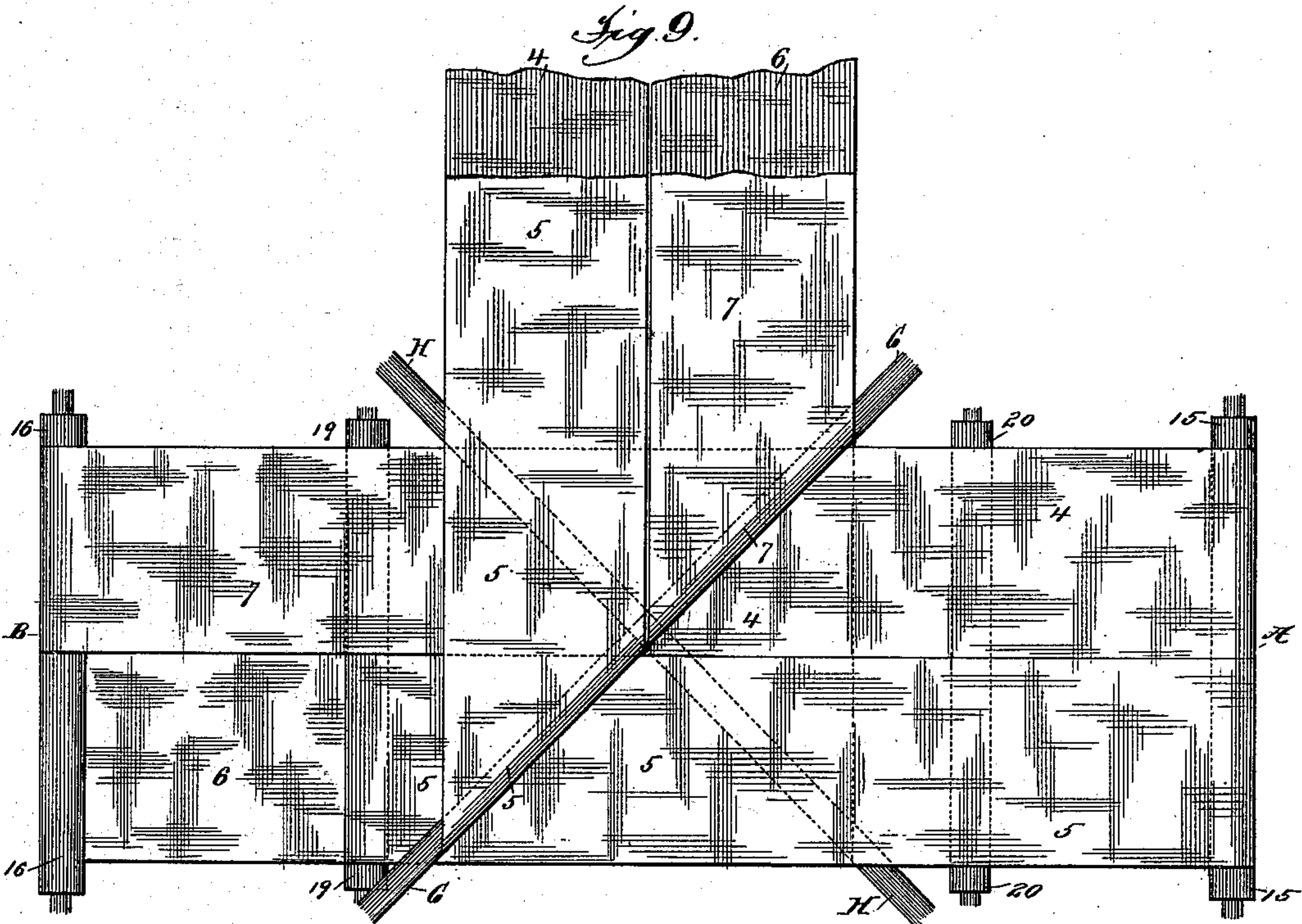
9 Sheets—Sheet 5.

L. C. CROWELL.

WEB PRINTING AND DELIVERY MECHANISM.

No. 400,548.

Patented Apr. 2, 1889.



Attest:  
Geo. H. Bots.  
G. M. Borsch

Inventor:  
Luther C. Crowell  
by Philipp Phelps Hovey  
Atty.

(No Model.)

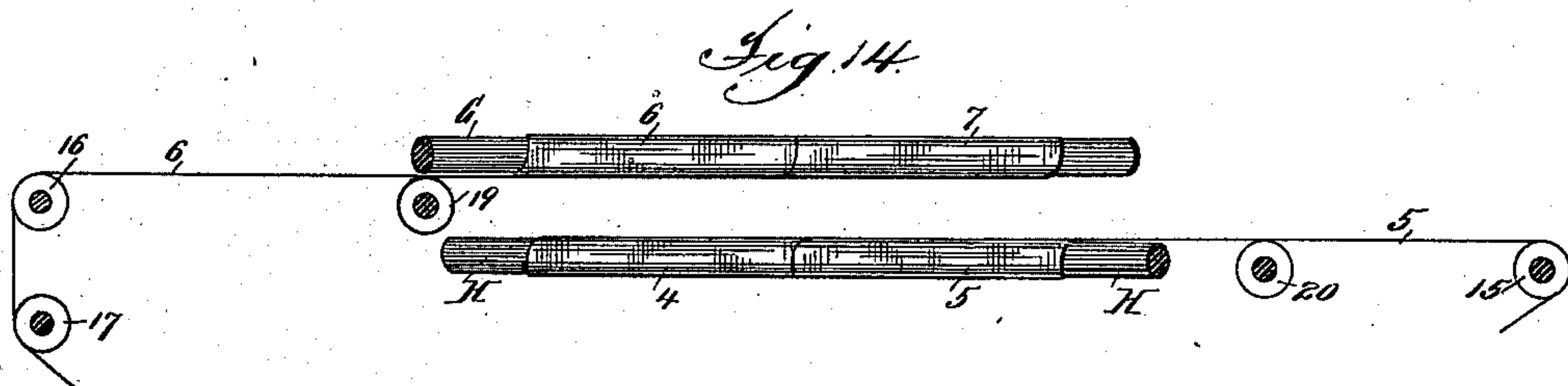
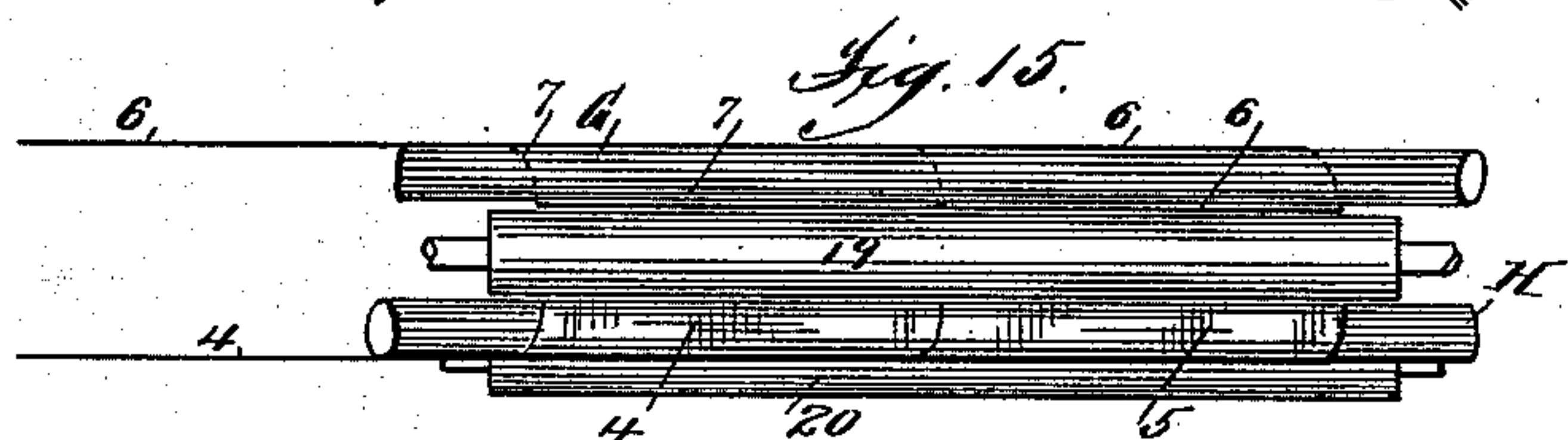
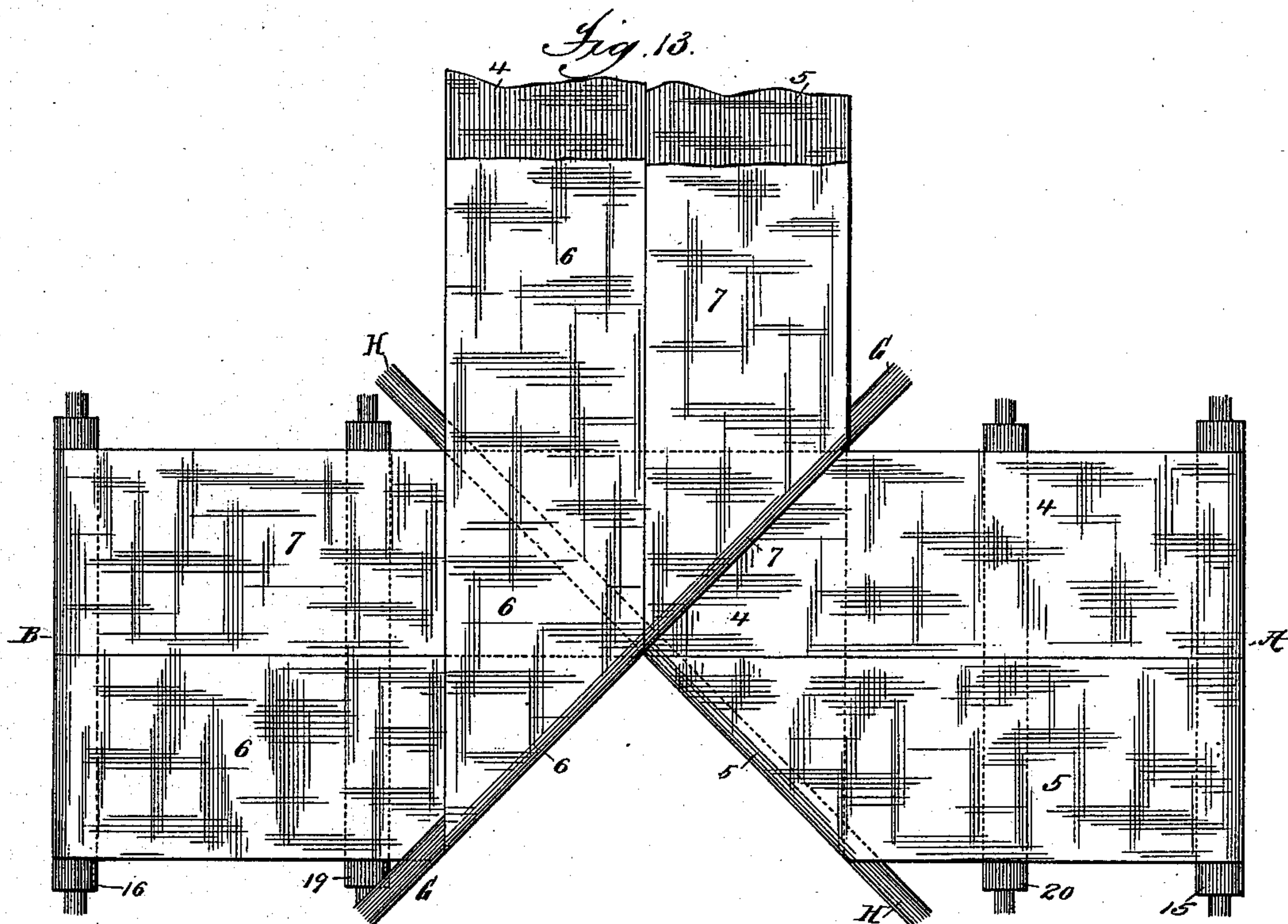
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L. C. CROWELL.

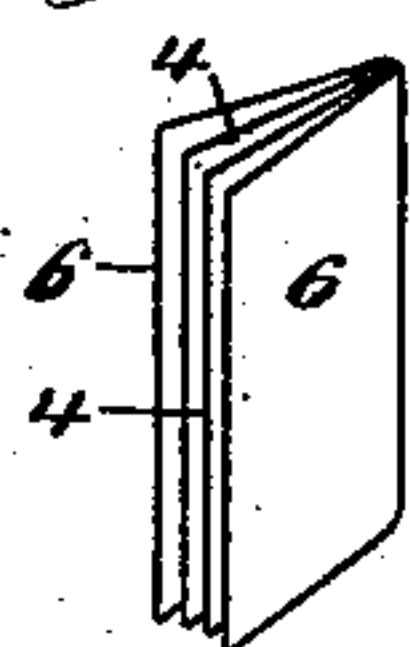
WEB PRINTING AND DELIVERY MECHANISM.

No. 400,548.

Patented Apr. 2, 1889.



*Fig. 16.*



Attest:  
Geo. H. Bots.  
G. M. Borch

Inventor  
Luther C. Crowell  
by Philip Phelps Hovey  
Attys



(No Model.)

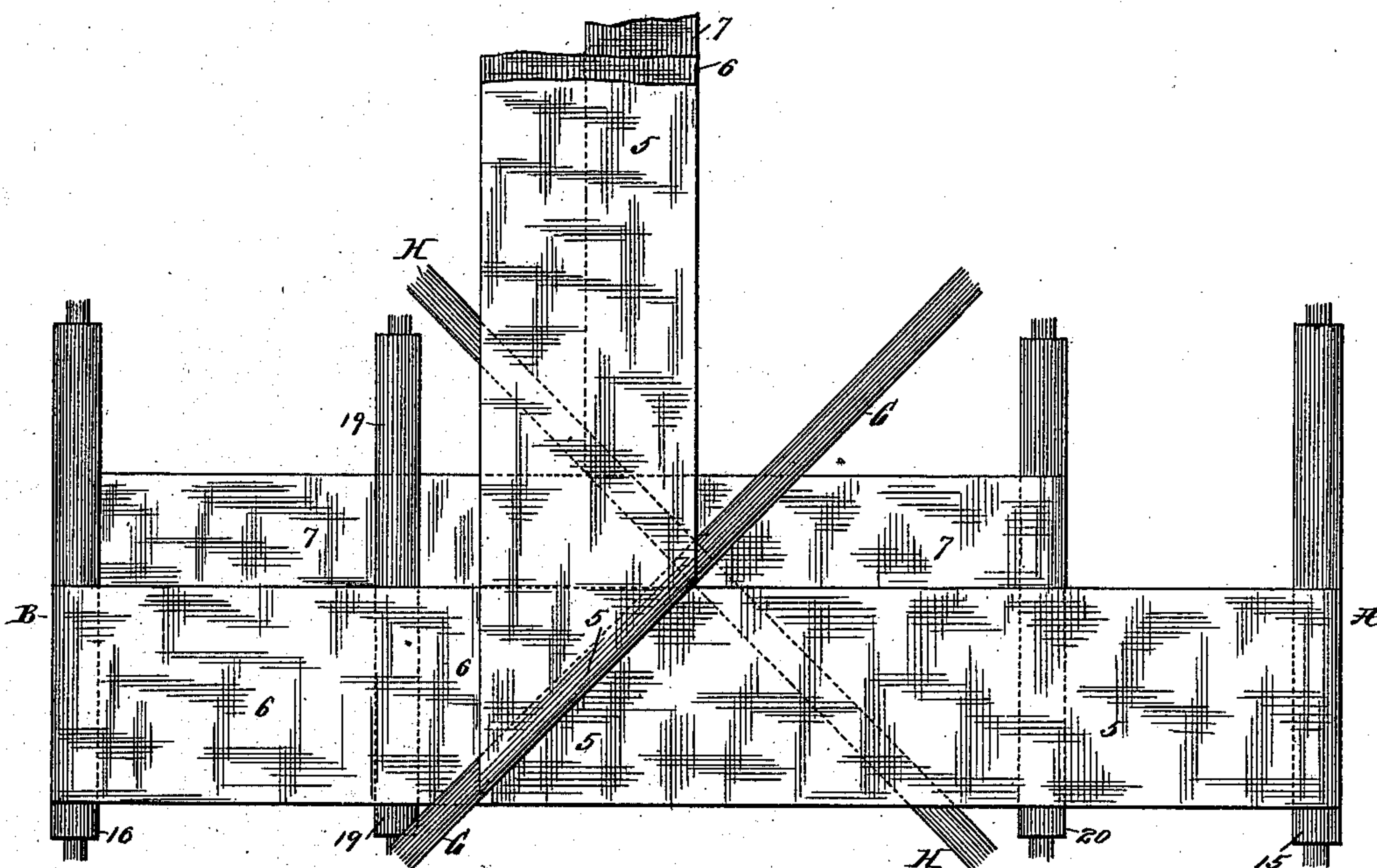
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L. C. CROWELL.  
WEB PRINTING AND DELIVERY MECHANISM.

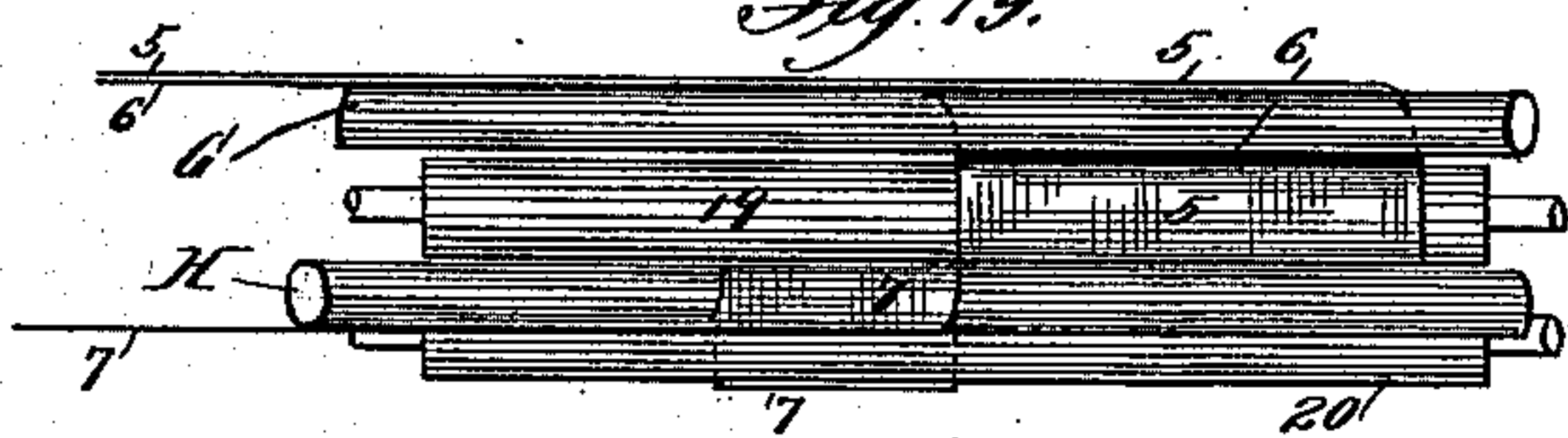
No. 400,548.

Patented Apr. 2, 1889.

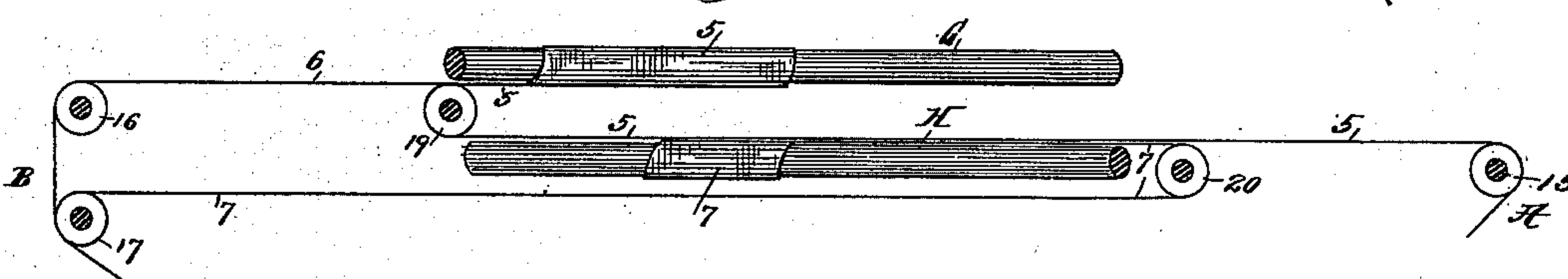
*Fig. 17.*



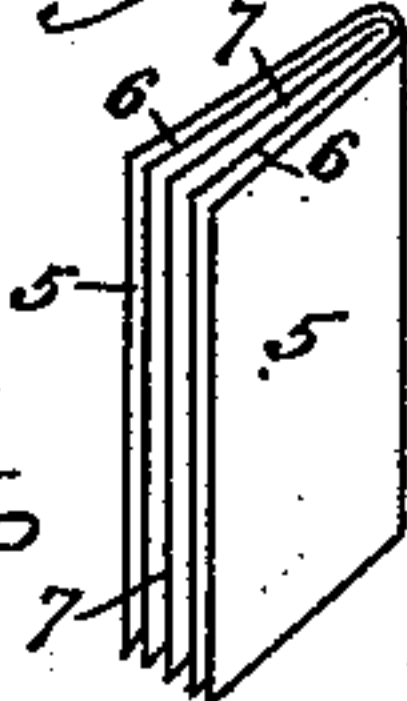
*Fig. 19.*



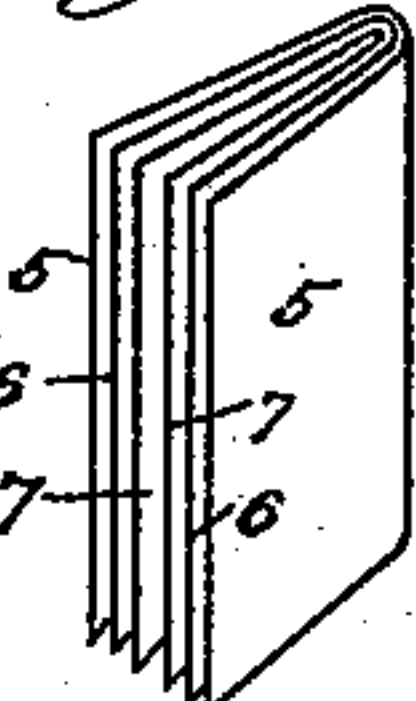
*Fig. 18.*



*Fig. 20.*



*Fig. 21.*



Attest:

*Geo. H. Batts*

*G. M. Bost.*

Inventor:

*Luther C. Crowell*

*by Philipp Phelps & Henry*

*Attys.*

(No Model.)

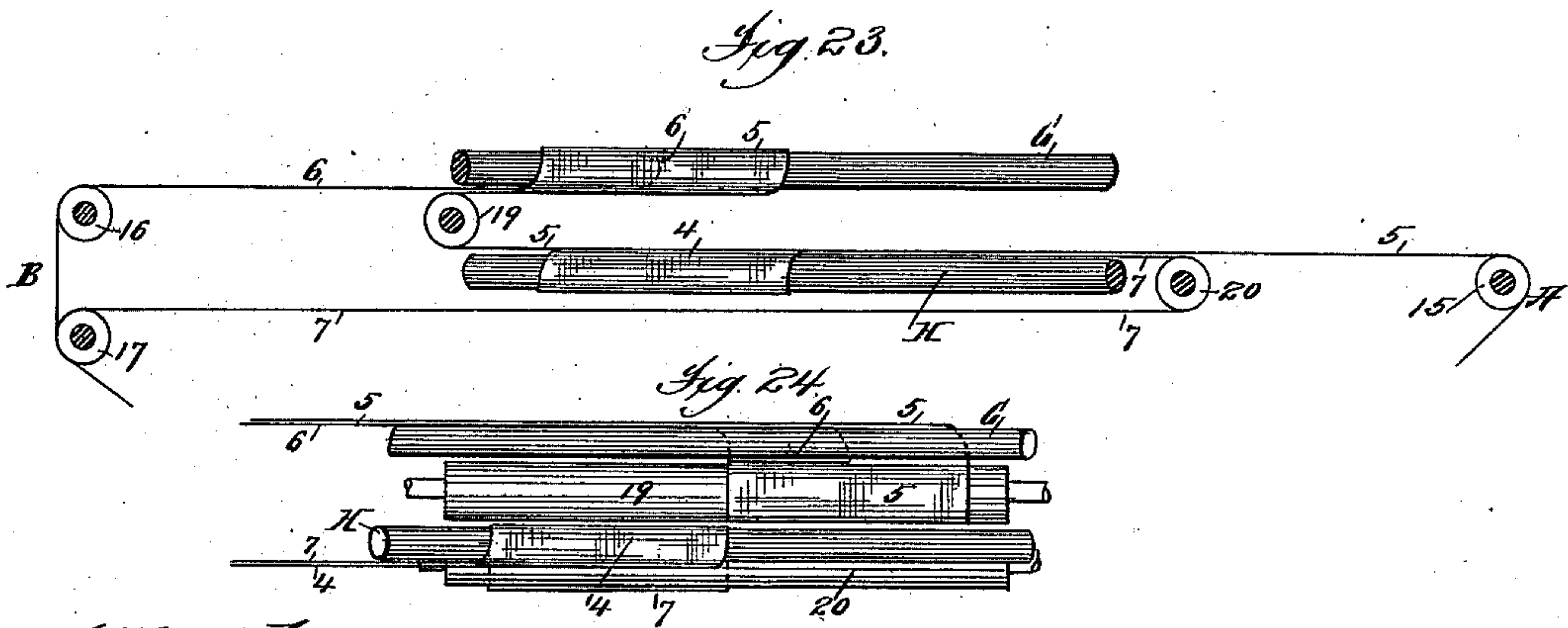
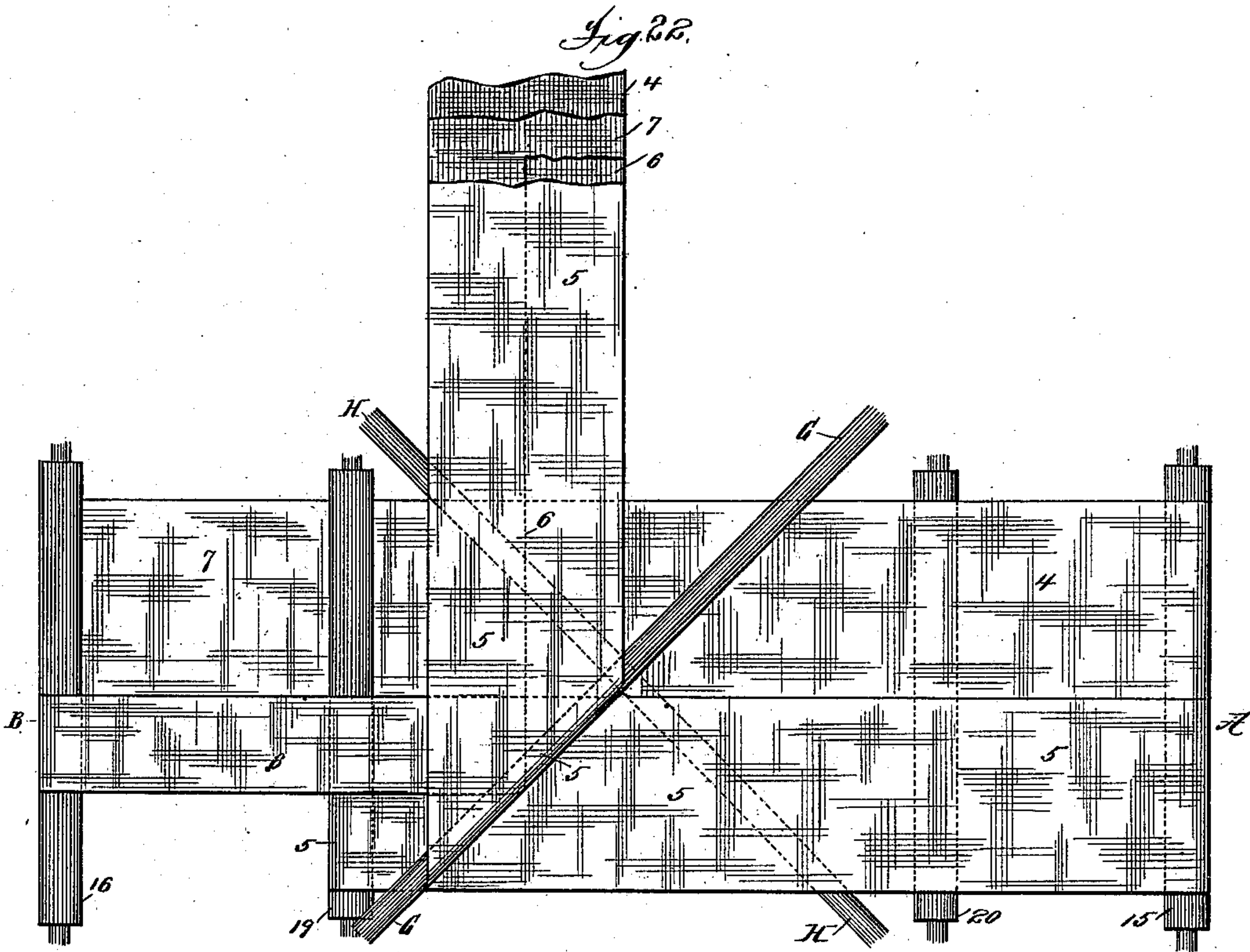
9 Sheets—Sheet 8.

L. C. CROWELL.

WEB PRINTING AND DELIVERY MECHANISM.

No. 400,548.

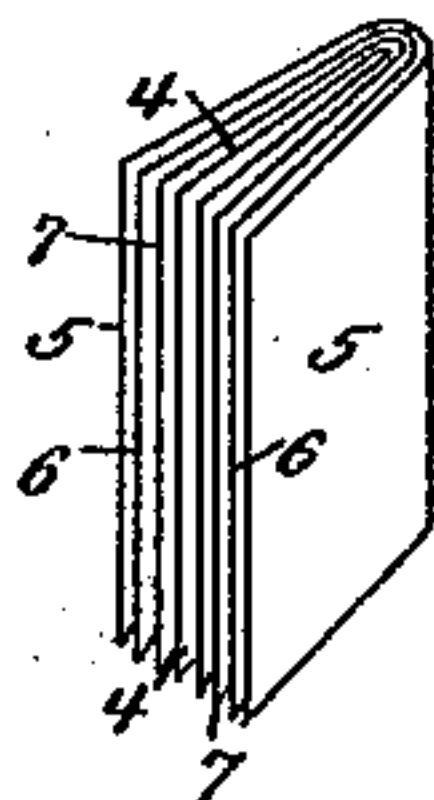
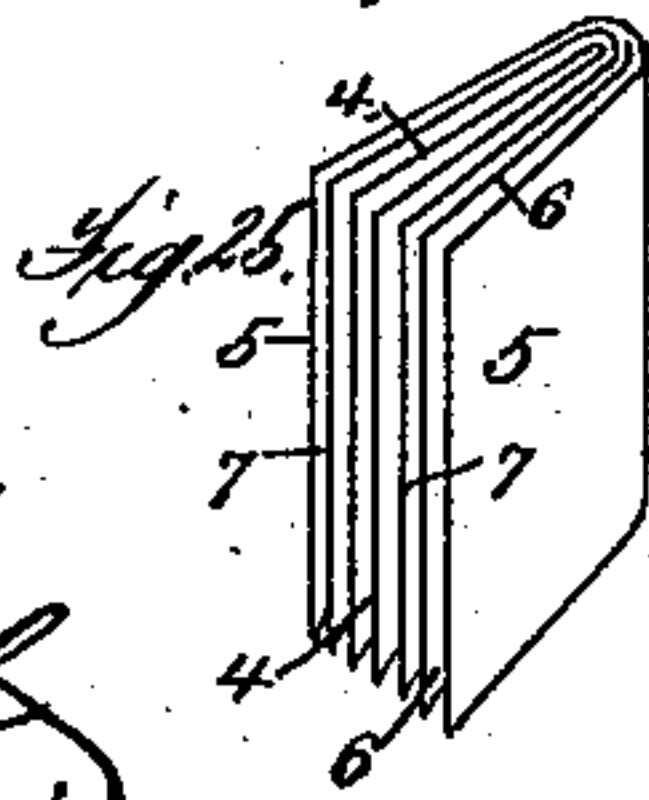
Patented Apr. 2, 1889.



Attest:

Geo. H. Bots

G. M. Borsch



Inventor,

Lester C. Crowell

by Philip P. Harvey  
Att'y



(No Model.)

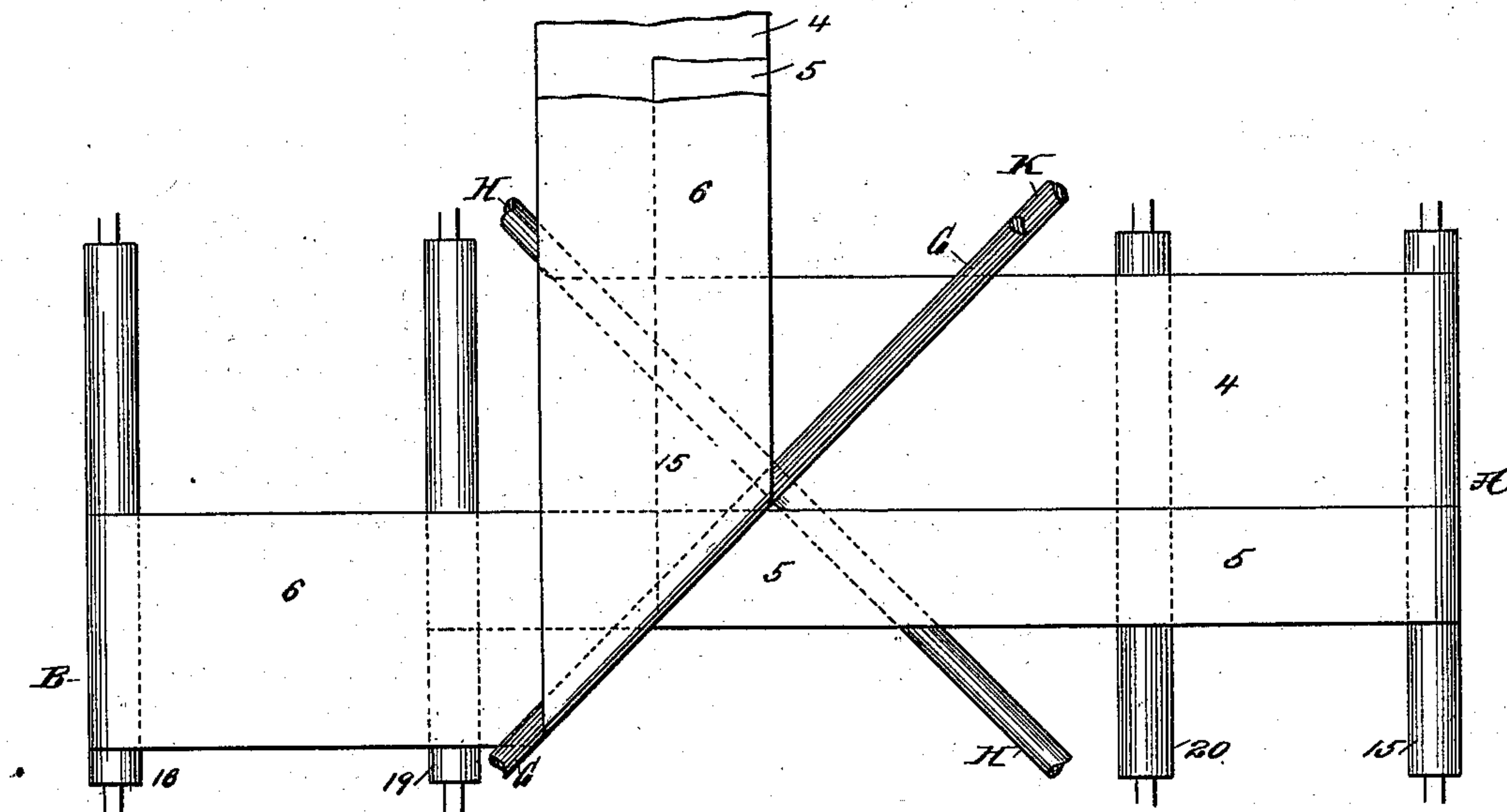
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L. C. CROWELL.  
WEB PRINTING AND DELIVERY MECHANISM.

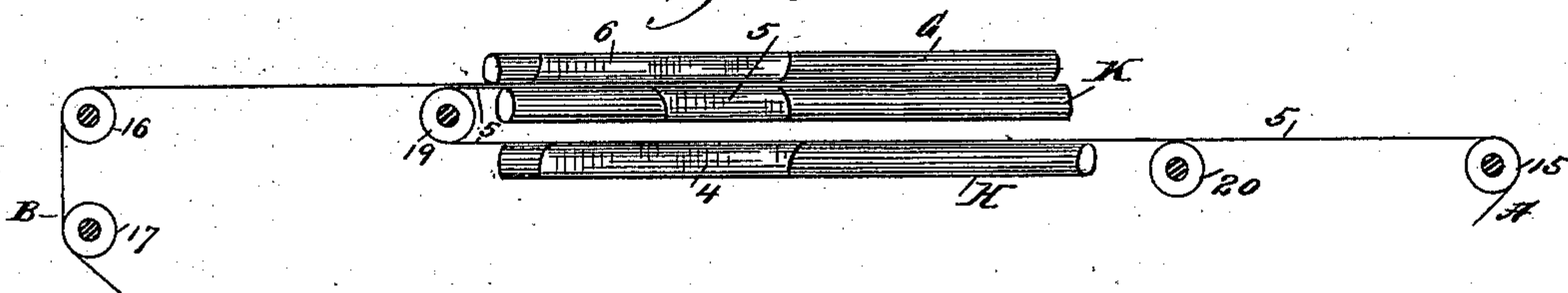
No. 400,548.

Patented Apr. 2, 1889.

*Fig 28.*



*Fig 29.*



Attest:

*Geo. H. Wells*

*J. M. Borst*

Inventor

*Luther C. Crowell*

*by Philip Phelps & Son*

*Attys*



# UNITED STATES PATENT OFFICE.

LUTHER C. CROWELL, OF BROOKLYN, ASSIGNOR TO R. HOE & CO., OF NEW YORK, N. Y.

## WEB PRINTING AND DELIVERY MECHANISM.

SPECIFICATION forming part of Letters Patent No. 400,548, dated April 2, 1889.

Application filed January 24, 1888. Serial No. 261,763. (No model.)

*To all whom it may concern:*

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

In the publication of newspapers, and particularly of daily newspapers as it is carried on at the present time, it is of the highest importance to have machinery which will print an entire edition in the least possible time, and thus permit the forms to be kept open for the reception of news up to within the shortest possible time before the actual issue of the paper.

In the case of many newspapers, and particularly the larger newspapers, it has become customary to issue papers upon different days which vary greatly in their amount or volume of printed matter. It is therefore desirable in such establishments to have printing machinery which, in addition to a capacity for rapid production, shall also be capable of producing either of several different-sized products.

The present invention relates to an organization of web printing and delivery mechanisms which are especially designed to meet these requirements, it being the object of the invention to provide a machine of this class which shall be so organized as to secure great capacity both as to amount and variety of production, together with exceeding simplicity of construction, in which the various parts shall be so arranged as to be easily accessible for the introduction and removal of the plates and inking-rolls and for threading the machine, and in which the disabling of one part of the mechanism will not render the whole machine inoperative. These objects are attained, principally, by means of certain novel combinations of web-printing and web turning and associating mechanisms, which will be hereinafter fully described and particularly pointed out.

The organized machine embodying the invention consists, generally, of two independent web-printing mechanisms arranged end to end—that is to say, with their printing-cylinders

parallel or approximately parallel with each other—a web turning and associating mechanism located between the two printing mechanisms and arranged to turn and associate the webs from the two in the various ways necessary to produce the several different-sized products, and a suitable cutting and folding mechanism for severing the printed webs into sheets and folding the sheets to the required dimensions.

In the accompanying drawings, Figure 1 is a diagrammatic side view showing the general organization of the entire machine. Fig. 2 is a similar view of the opposite side of the machine. Fig. 3 is a similar view taken on the line 3 of Fig. 1. Fig. 4 is a plan view of the web turning and associating mechanism. Figs. 5 to 26 illustrate the manner of using the web turning and associating mechanism to produce the different products. Fig. 27 illustrates a way of securing the proper adjustment of the turning-bars. Figs. 28 and 29 illustrate an addition which will be hereinafter explained.

Referring now particularly to Figs. 1 to 4, it is to be understood that F I represent the form and impression cylinders of two ordinary web-printing mechanisms, each of which mechanisms is complete in itself and is adapted to perfect a double-width web. These two printing mechanisms are arranged end to end—that is to say, with the cylinders F I parallel, or approximately so—and a sufficient distance from each other to afford a passage-way between them, to enable the cylinders and inking mechanisms to be easily accessible.

Located between the two printing mechanisms, and in position to act upon the webs delivered from both, is a web turning and associating mechanism, which consists, primarily, of two turning-bars, G H, arranged crosswise of each other and obliquely across the paths of the webs, and in such position that the webs, being led around their respective turners, will be turned and directed laterally away from the machine, one above the other, in position to be associated. The bars G H, forming the web-turners, are located at different heights—that is, in different horizontal planes—and are separated sufficiently to allow ample space between them for the passage of the webs, as will more fully appear



when the operation of the mechanism is explained.

Co-operating with the turning-bars, and forming a part of the associating mechanism, are a pair of adjustable register-rolls, 19 20, which are located upon opposite sides of the turning-bars and are arranged parallel with the printing-cylinders. Co-operating with the printing and web associating mechanisms to dispose of the printed product are suitable folding and cutting mechanisms, which, as illustrated in the present case, consist of two longitudinal folders, C D, of the form shown in my prior Letters Patent, No. 331,280, which are located side by side at the side of the printing mechanisms and in position to receive and act upon the webs as they pass from the web turning and associating mechanisms. These folders are provided with the usual external turners, 2, and fold-laying rolls 3, and are arranged to deliver the longitudinally-folded webs to transverse cutting and folding or cutting, folding, and associating mechanisms, represented by the cylinders 30 40, which are or may be equipped in substantially the manner shown in my prior Letters Patent, No. 317,740, or as shown in my applications filed November 9 and 10, 1887, Serial Nos. 254,669 and 254,765.

The frame-work for supporting the various parts and the gearing and other connections for communicating the proper motion to the same are not shown, as such parts can readily be supplied by any one familiar with the art. The details of the several mechanisms are also for the most part omitted, as the individual mechanisms are well known in the art, and will be readily understood without detailed illustration and description.

It is also to be remarked that the form of both the printing and delivery mechanisms may be varied widely from what is shown without departing from the invention, as the invention relates more to the general organization and combinations of the mechanisms than to the construction of the specific mechanisms.

The machine thus organized is especially capacitated to produce and deliver the following variety of products—viz., a product consisting of one full sheet and one half-sheet, a product consisting of two full sheets, a product consisting of two full sheets and one half-sheet, a product consisting of three full sheets, a product consisting of three full sheets and one half-sheet, and a product consisting of four full sheets.

To produce a product consisting of one full and one half-sheet, or what will usually be a six-page paper, two webs each of three-fourths full width will be used. The webs A B, after being perfected by their respective printing mechanisms, will be conducted around guide-rolls 15 17, which rolls may be made adjustable to aid in securing proper register where they are acted on by slitters 18, so as to be respectively divided into narrow webs

4 5 and 6 7, the webs 5 7 being of one-half the width of the webs 4 6. After being thus slit the webs are associated, as shown in Figs. 1, 2, 3, 5, 6, and 7. The web 5 passes from the roll 15 directly to the turning-bar H, and is led around that bar, so as to be turned at right angles to its previous course and pass out from the side of the printing mechanism beneath a guide-roll, 14, and thence onto the folder C. The web 4 passes forward from the roll 15 between the turning-bars G H to the register-roll 19, and, passing around that roll, returns and is led around the turning-bar G, and passes thence laterally from the printing mechanism above a guide-roll, 13, and onto the folder C above the web 5, so that the two webs are associated. The web 7 is led from the roll 17 beneath the turning-bar H to the register-roll 20, and, passing around that roll, returns and is led around the turning-bar H at the side of the web 5, and passes thence beneath the roll 14 onto the folder D. The web 6 is led from the roll 17 around a guide-roll, 16, which may also be adjustable, and passes thence directly to the turning-bar G, where it is led around the bar at the side of the web 4. After passing the bar G the web 6 is led above the roll 13 and onto the folder D above the web 7, so that these two webs are associated. The associated webs 4 5 and 6 7 then pass over their respective folders C D, by which the webs 4 6 are folded longitudinally, so as to inset the webs 5 7. After being thus folded the webs pass to the cylinders 30 40, by which they are severed into sheets, thus producing a product consisting of one full sheet and one half-sheet, as shown in Fig. 8. The product thus produced may be piled or further folded and then piled by any suitable form of mechanism.

It will be observed that in this case the two webs produced from the web A are associated and pass over one of the folders, while the two webs produced from the web B are associated and pass over the other folder. By associating the webs in this manner it is possible to operate either one of the printing mechanisms and its delivery mechanism independently of the other, so that in case of accident to either one of the printing or delivery mechanisms the other can still be operated and have one-half the productive capacity of the entire machine.

If in any case it should not be desired to have the narrow webs 5 7 inset within the folds of the wider webs, 4 6, the forms upon the printing-cylinders can be shifted and the webs A B moved laterally, so that after being split the relative positions of the wide and narrow webs will be reversed.

To produce a product consisting of two full sheets, or what will usually be an eight-page paper, such as shown in Fig. 12, the operation will preferably be exactly the same as described in connection with Figs. 5, 6, and 7, except that the webs A B, instead of being of three-fourths width, will be of full width, so



that when they are split the webs 5 7 will be equal in width to the webs 4 6.

It will be observed that in the operation thus far described the two webs 4 5, formed from the web A, are so associated as to pass to the folder C, while the two webs 6 7, formed from the web B, pass to the folder D. It may sometimes be desirable, however, to reverse this order, and this can, if desired, be readily done by associating the webs in the manner shown in Figs. 9, 10, and 11. In this case the web 4 passes from the roll 15 directly around the bar H and thence to the folder D, while the web 5 passes from the roll 15 between the bars G H and around the register-roll 19, and from that roll returns and passes around the bar G, and is led thence to the folder D above the web 4. The web 6 passes from the roll 17 beneath the bar H and around the register-roll 20, and from that roll returns and passes around the bar H at the side of the web 4, and is led thence to the folder C, while the web 7 passes from the roll 17 over the roll 16, and thence directly around the bar G at the side of the web 5 and to the folder C above the web 6.

As shown in Figs. 9, 10, and 11, the webs A B are of full width, so that the product consists of two full sheets, as shown in Fig. 12; but a product consisting of one full sheet and one half-sheet can be produced in the same manner by reducing the width of the webs A B, so that the webs 4 6 or 5 7 will be of half width.

It may sometimes be desirable to so distribute the forms that one part of the product will be printed by one of the printing mechanisms and the other part by the other. When this is done, it is necessary that the web 4 should be associated with the web 6 and the web 5 with the web 7. This can readily be accomplished in the manner illustrated in Figs. 13, 14, and 15. In this case the webs 4 5 pass from the roll 15 directly to the bar H, and are turned side by side around that bar, the web 4 passing to the folder D and the web 5 to the folder C. The webs 6 7 pass from the roll 17 over the roll 16 and directly to the bar G, and are turned side by side around that bar, the web 6 passing to the folder D above the web 4 and the web 7 to the folder C above the web 5.

As shown in Figs. 13, 14, and 15, the webs A B are of full width, so that the product consists of two full sheets, as shown in Fig. 16; but a product consisting of one full sheet and one half-sheet can be produced in the same manner by reducing the width of the webs.

To produce a product consisting of two full sheets and one half-sheet, or what will usually be a ten-page paper, one of the webs, A or B, will be of half width and the other web of three-fourths width, and the webs will be associated as illustrated in Figs. 17, 18, and 19. As shown in these figures, the web A is of half width and the web B of three-fourths

width. The web B is split the same as first described, and the web 7 passes from the roll 17, beneath the bar H, to the register-roll 20, and from the roll is returned and led around the bar H, and passes thence to the folder D. The web 6 passes around the roll 16 and directly to the bar G, and is led around the bar, and thence to the folder D above the web 7. The web 5, which in this case includes the whole of the web A, passes from the roll 15 between the bars G H, and around the roll 19, and then returns and is led around the bar G over the web 6, and passes with the web 6 to the folder D, thus producing the product shown in Fig. 20. To produce a product consisting of three full sheets, as shown in Fig. 21, the operation will be exactly the same, except that the web B will be of full width, so that the web 7 will be equal in width to the web 6. The web A may of course be the wider and the web B the narrower web, in which case the associated webs will be led to the folder C. To produce a product consisting of three full sheets and one half-sheet, or what will usually be a fourteen-page paper, one of the webs, A or B, will be of full width and the other of three-fourths width, and the webs will be associated as shown in Figs. 22, 23, and 24. As shown in these figures, the web A is of full width and the web B of three-fourths width. The web A is split as first described, and the web 4 passes directly from the roll 15 to the bar H, and thence around the bar and to the folder D. The web B is also split, and the web 7 passes from the roll 17, beneath the bar H, to the roll 20, and returns and passes around the bar H inside the web 4, and thence to the folder D above the web 4. The web 6 passes from the roll 17 around the roll 16, and thence directly around the bar G and to the folder D above the webs 4 7. The web 5 passes from the roll 15, between the bars G H, to the roll 19, and returns and passes around the bar G outside of the web 6, and thence to the folder D above the webs 4 7 6, thus producing the product shown in Fig. 25.

To produce a product consisting of four full sheets, or what will usually be a sixteen-page paper, the operation will be exactly the same, except that the web B will be of full width, so that the web 6 will be equal in width to the web 7, thus producing the product shown in Fig. 26.

Of course a product consisting of a single full sheet can be produced by omitting one of the webs, A or B, and allowing one of the printing mechanisms to remain idle, or by employing two webs, A B, of half width; but the organized machine herein shown is not especially designed for producing so small a product.

By associating the sheets after they are severed from the webs still larger products may of course be produced.

It will usually be desirable that the webs should be so associated that as they pass to



the folders their adjacent edges will be separated a short distance. This can readily be accomplished by making the bars G H each in two parts, as shown in Fig. 27. By adjusting the parts 8 9 of the bars to different positions with relation to each other the edges of the webs may be separated a greater or less distance, as shown in said figure. By making the bars adjustable in this manner it is also possible to vary the width of the webs 4 5 6 7, so as to make the sheets of greater or less width and yet present the webs to the folders C D in proper position to be folded centrally.

It will be observed that in the association of the webs shown in Figs. 17, 18, and 19 two of the webs, 5 6, pass together, one above the other, over the same bar, and also that the narrow or supplement web 7 is brought next to the folder, so that when the webs are folded the half-sheet is within the inner full sheet. It may sometimes be preferred to have the half or supplement sheet lie between the two full sheets, and it may also in some cases be preferable that no two of the webs should pass together as a two-ply web over the same bar. Both these results are accomplished by providing a supplemental turning-bar, K, as shown in Figs. 28 and 29, which is arranged parallel with the bar G, (or H, as the case may be.) In such case the webs may be associated as shown in said figures. The web A, being of three-fourths width, is split, and the web 4 is led directly from the roll 15, around the bar H, and to the folder. The web 5 (the supplement-web) is led from the roll 15 around the roll 19, and thence downward around the bar K and to the folder above the web 4. The web 6 is led from the roll 17 over the roll 16, and directly around the bar G and to the folder above the webs 4 5, thus producing the product shown in Fig. 20, except that the supplement-sheet is between the full sheets.

To produce the three-sheet product shown in Fig. 21, the webs will be associated in the same order; but the web A will be of full width, so that the web 5 will be equal in width to the web 4. The rolls 15, 16, 17, 19, and 20 have been referred to as being adjustable. For this purpose the rolls may be mounted in any suitable manner. Preferably they will be mounted in adjustable bearings, which will permit of a suitable amount of adjustment of the rolls, as indicated by dotted lines in Fig. 1.

It is to be remarked that if in any case it should be desired to only capacitate the machine to produce a product consisting of more than two sheets—as, for example, the products shown in Figs. 17 to 26—one of the folders may be omitted, and also those portions of

the turning-bars which are idle in those cases, and such an organization would embody certain features of the invention.

What I claim is—

1. The combination, with two web-printing mechanisms arranged end to end and each capacitated to perfect a web, of a web turning and associating mechanism consisting of two turning-bars arranged crosswise of each other and in position to receive the perfected webs from the two printing mechanisms and turn and associate them, substantially as described.

2. The combination, with two web-printing mechanisms arranged end to end and each capacitated to perfect a web, of a web turning and associating mechanism consisting of two turning-bars, G H, arranged crosswise of each other and in position to receive the perfected webs from the two printing mechanisms and turn and associate them, and two register-rolls, 19 20, located upon opposite sides of the turning-bars, substantially as described.

3. The combination, with two web-printing mechanisms arranged end to end and each capacitated to perfect a web, of a web turning and associating mechanism consisting of two turning-bars arranged crosswise of each other and in position to receive the perfected webs from the two printing mechanisms and turn and associate them, and two longitudinal folders arranged to receive the associated webs, substantially as described.

4. The combination, with two web-printing mechanisms arranged end to end and each capacitated to perfect a web, of a web turning and associating mechanism consisting of two turning-bars, G H, arranged crosswise of each other and in position to receive the perfected webs from the two printing mechanisms and turn and associate them, and two register-rolls, 19 20, located upon opposite sides of the turning-bars, and two longitudinal folders arranged to receive the associated webs, substantially as described.

5. The combination, with two web-printing mechanisms arranged end to end and each capacitated to perfect a web, of a web turning and associating mechanism consisting of two turning-bars, G H, arranged crosswise of each other, and a third bar, K, arranged parallel with one of the other bars, and a register-roll, 19 or 20, substantially as described.

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

LUTHER C. CROWELL.

Witnesses:

T. H. PALMER,  
G. M. BORST.