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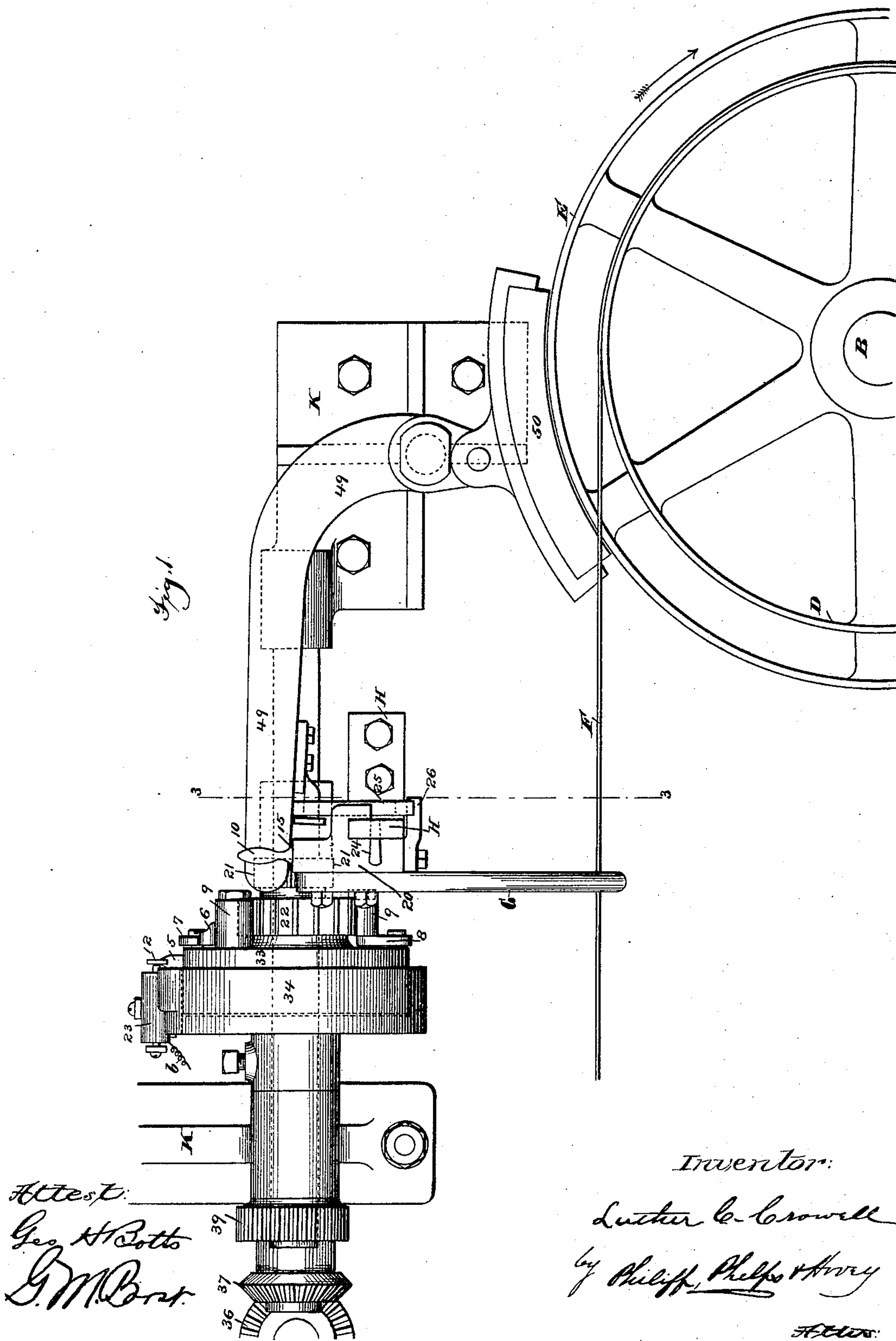
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L. C. CROWELL.

STOP MECHANISM FOR WEB PRINTING MACHINES.

No. 404,959.

Patented June 11, 1889.



*Attest:*

*Geo. H. Botta*

*G. M. Bort*

*Inventor:*

*Luther C. Crowell*

*by Philip Phelps & Henry*

*Attors.*

(No Model.)

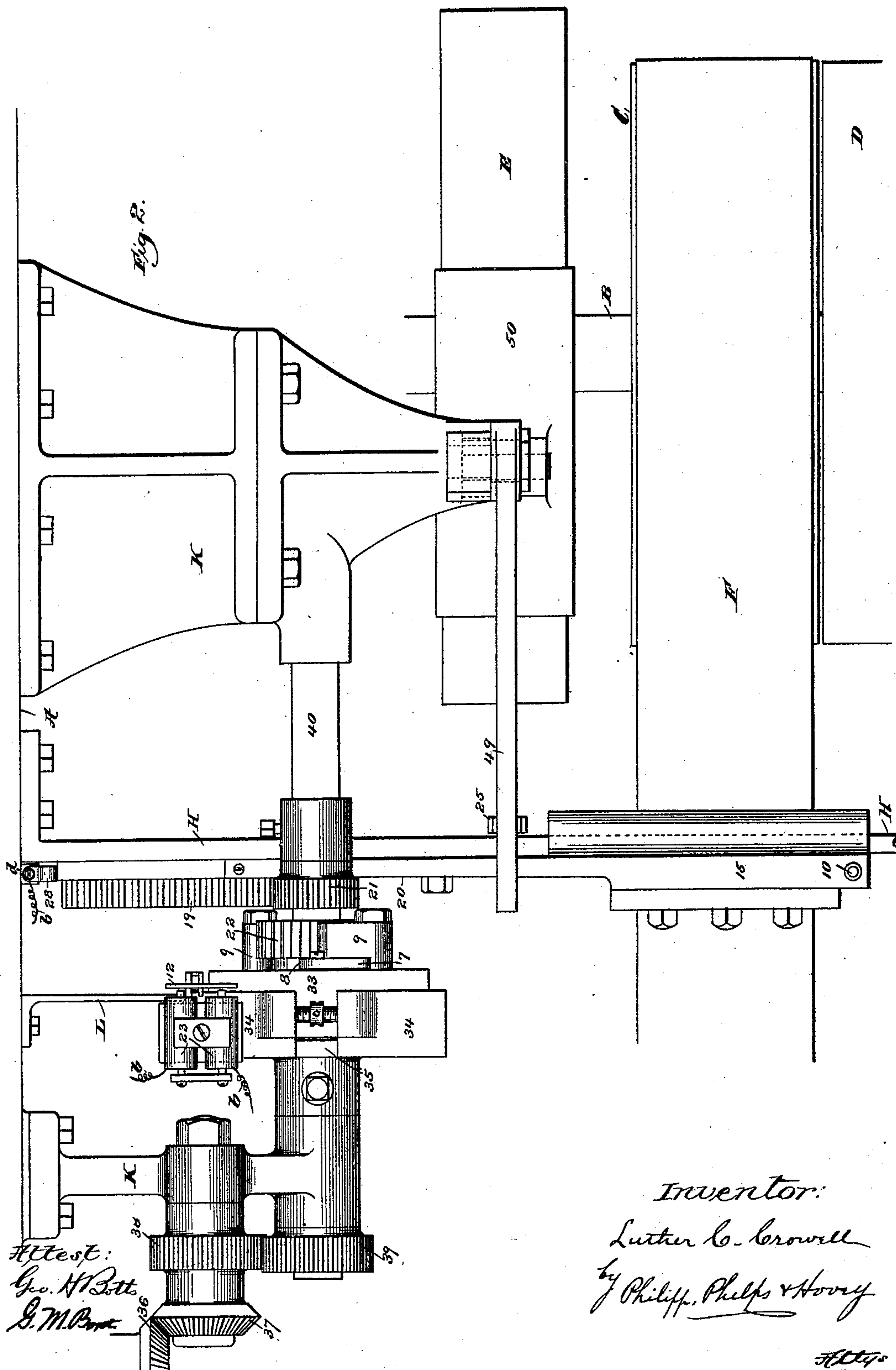
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L. C. CROWELL.

# STOP MECHANISM FOR WEB PRINTING MACHINES.

No. 404,959.

Patented June 11, 1889.



*Inventor:*

Luther C. Crowell  
by Philipps, Phelps & Hoovey

Fltys

(No Model.)

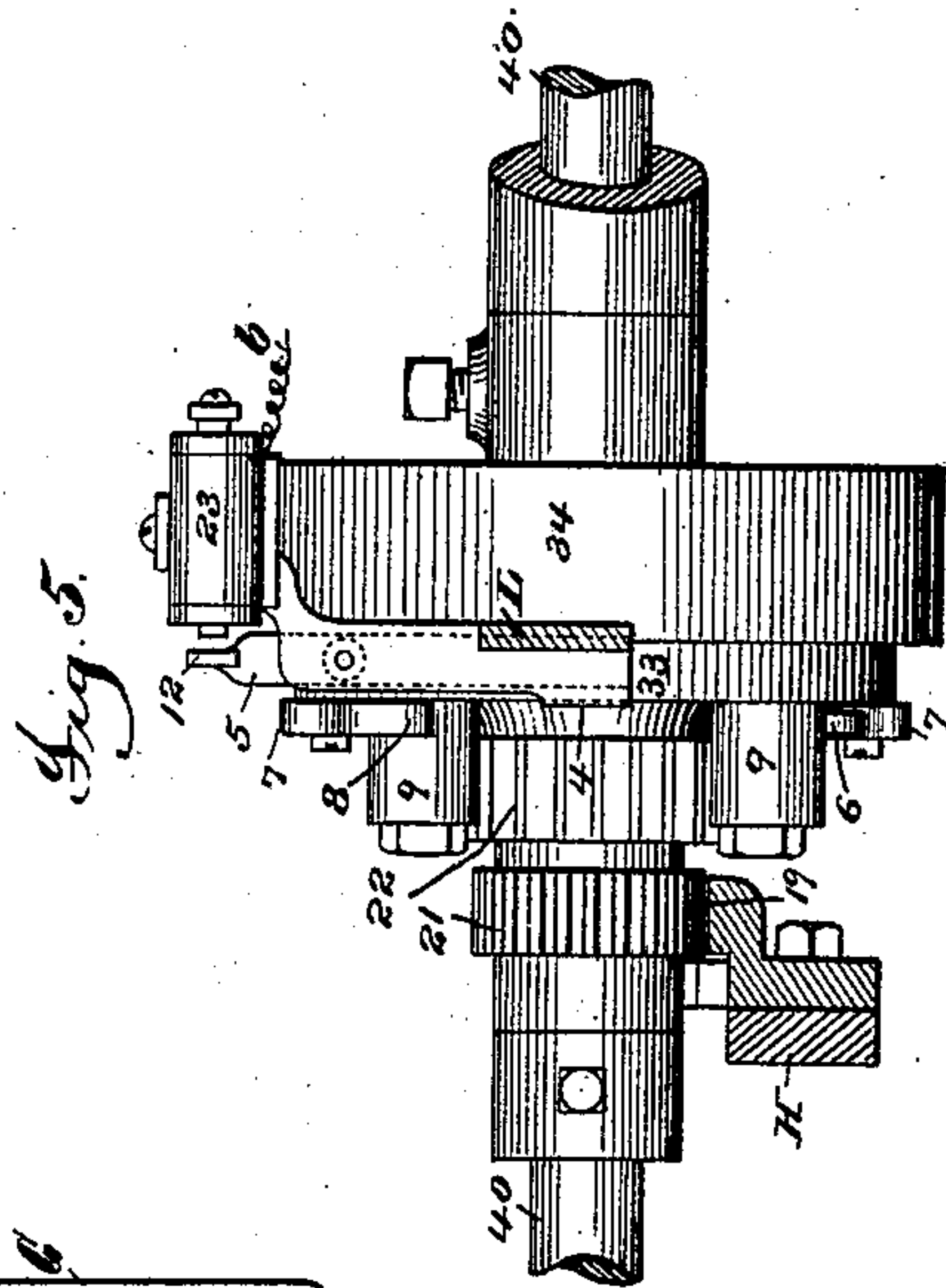
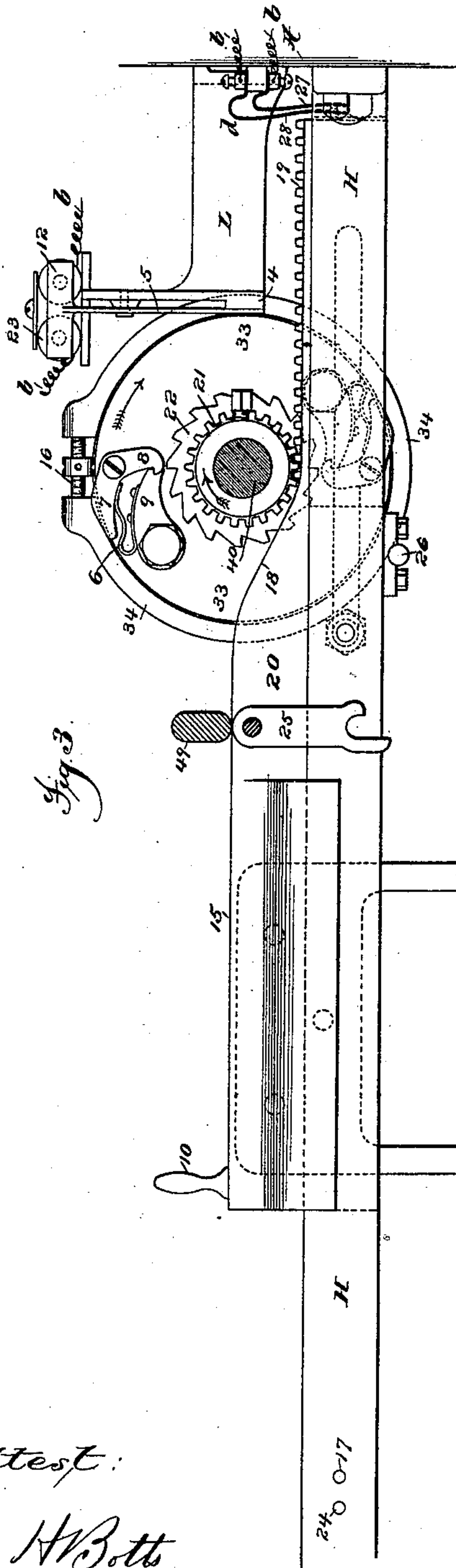
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L. C. CROWELL,

STOP MECHANISM FOR WEB PRINTING MACHINES.

No. 404,959.

Patented June 11, 1889.



Attest:

Geo. H. Bott

G. M. Borch

\*Inventor:

Luther C. Crowell  
by Philip Phelps & Hovey

Attys:



(No Model.)

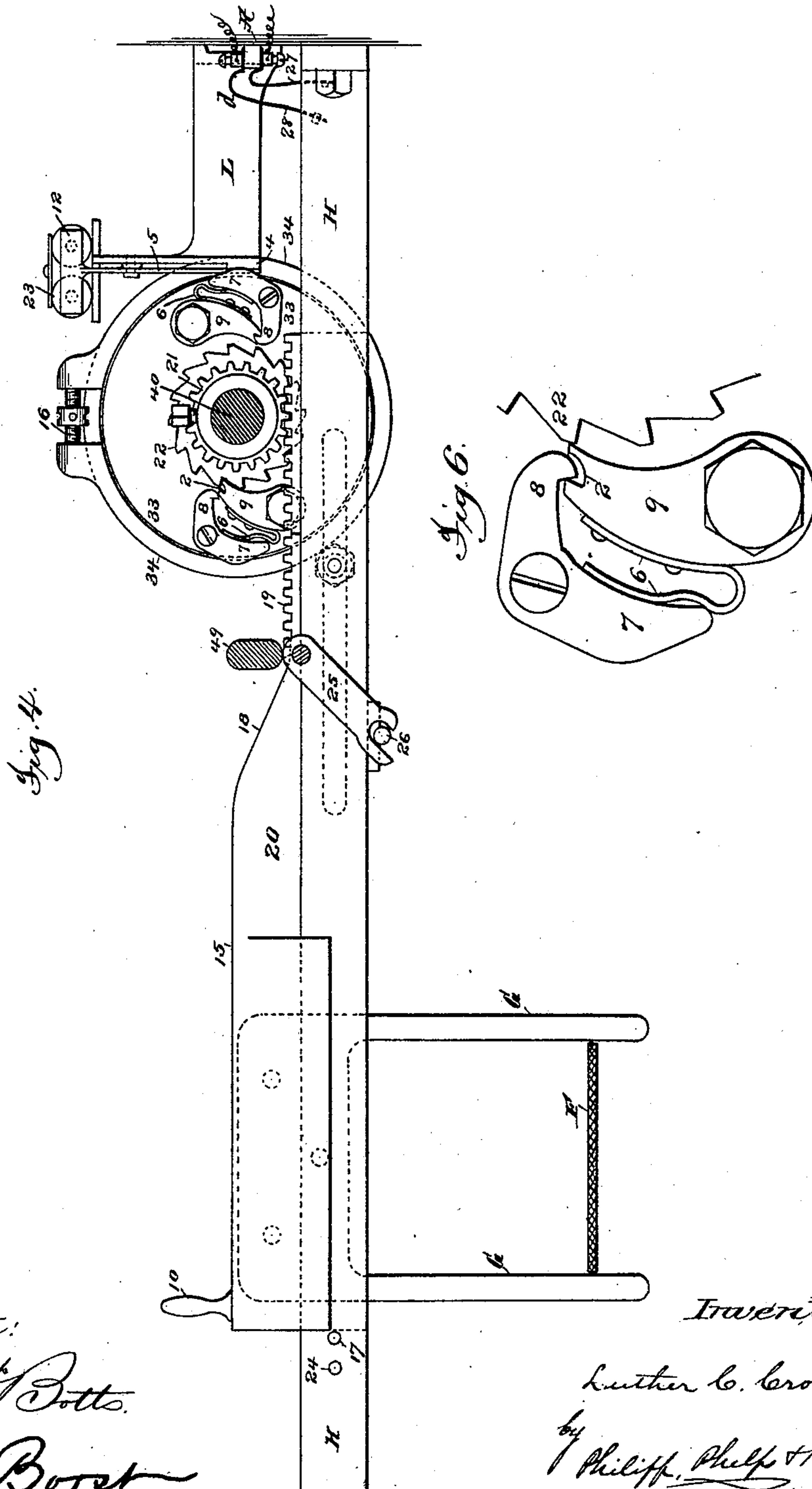
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L. C. CROWELL.

STOP MECHANISM FOR WEB PRINTING MACHINES.

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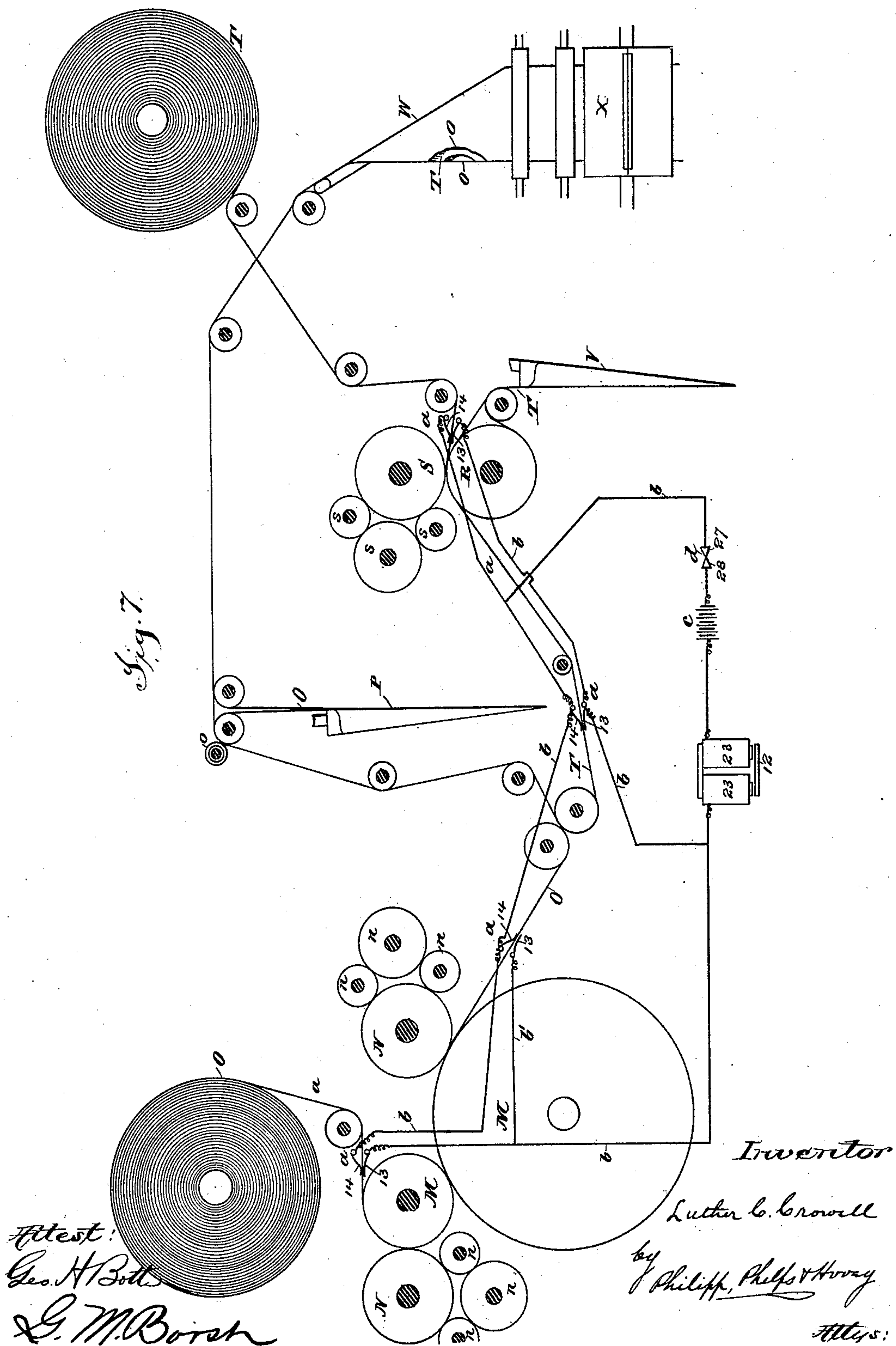
Attest:  
Geo. H. Botts.  
G. M. Borch.

Inventor:  
Luther C. Crowell  
by Philp. Phelps & Hooy  
Atty's:

5 Sheets—Sheet 5.

STOP MECHANISM FOR WEB PRINTING MACHINES.

Patented June 11, 1889.





# UNITED STATES PATENT OFFICE.

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

## STOP MECHANISM FOR WEB-PRINTING MACHINES.

SPECIFICATION forming part of Letters Patent No. 404,959, dated June 11, 1889.

Application filed June 22, 1887. Serial No. 242,108. (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 Stop Mechanism for Web-Printing Machines, fully described and represented in the following specification and the accompanying drawings, forming a part  
10 of the same.

This invention relates to an automatic stop mechanism to be used in connection with a web-printing or printing and delivery mechanism for the purpose of stopping the latter  
15 in case of the breaking of the web, and thus preventing a "choke," which would be liable to damage the machine.

In many web-printing machines as at present organized and operated the web passes  
20 through the printing mechanism and through a great part of the delivery mechanism before it is severed into sheets. During its passage through the machine the web usually undergoes a considerable amount of manipulation. For example, it may be folded longitudinally and then transversely before being  
25 severed into sheets; it may be split longitudinally and its sections associated; one or both of the sections of the web or the whole web may be turned at right angles one or more  
30 times or be transferred laterally by passing over turning-bars; two webs coming from different rolls may be associated; two or more webs or sections of a web may be pasted together; the web may be turned over between  
35 the printing of its opposite sides, or it may be made to undergo various other manipulations. The particular manipulation to which the web is subjected varies, of course, with different  
40 classes of machines; but in all the more improved web-printing machines the web necessarily undergoes considerable manipulation, and is subjected to considerable strain, and, owing to the fact that the more improved  
45 machines are operated at a very high rate of speed, there is always more or less danger that the web will become broken either from some imperfection in it or from some slight imperfection in the operation of the machine, and  
50 this, when it occurs, is liable, unless the machine is at once stopped, to cause the damp

paper to wedge in among the parts of the machine in such a way as to occasion a choke, which will cause much trouble and delay, and is liable to break or otherwise damage parts  
55 of the machine. It is therefore exceedingly desirable that means should be provided by which, in case the web breaks during any part of its course through the machine, the machine will be stopped in time to prevent a  
60 choke and its attendant damage.

The present invention is designed to accomplish this result, and to this end I provide the devices which are employed to start and stop the machine—viz., the belt-shifter or  
65 other similar device and the brake, with connections by which they can be operated from some moving part of the machine, and these connections include a clutch mechanism which is operated by an electro-magnet. The  
70 term "connections" is therefore used to designate the mechanism which connect the belt-shifter or similar device with some moving part of the machine and through which the belt-shifter is operated from the machine. 75  
This magnet is located in an electric circuit having a number of branches, which are connected with circuit-closers located in different parts of the machine, and so arranged that so long as the web is unbroken the circuit through the magnet will remain open  
80 and the clutch mechanism will not be operated; but whenever a break occurs in the web the circuit through the magnet will be closed, thereby energizing the magnet and operating  
85 the clutch mechanism so as to establish the connection between the machine and the stopping devices, and thus operate these and stop the machine in time to prevent a choke and its attendant trouble and damage. 90

The organization thus briefly outlined will now be described in detail, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of the automatic stop mechanism embodying the present  
95 invention. Fig. 2 is a plan view of the same. Fig. 3 is a sectional elevation taken on the line 3 3 of Fig. 1. Fig. 4 is a similar view showing the parts in a different position to illustrate the operation of the apparatus. 100  
Fig. 5 is an elevation of the clutch-mechanism looking outward from the frame of the



machine. Fig. 6 is a detail of the clutch mechanism, and Fig. 7 is a diagrammatic view illustrating the application of the invention to a web printing and delivery mechanism.

5 Referring now particularly to Figs. 1 to 6, it is to be understood that A represents the side frame of a printing mechanism; B, the main driving-shaft; C D, the usual fast and loose pulleys with which the main shaft is  
10 provided; E, the brake-pulley; F, the driving-belt, and G the usual forked belt-shifter. The belt-shifter G is attached to a head 15, which is arranged to slide freely upon a bar H, projecting from the frame-work A, and is  
15 provided with a handle 10, by which the belt-shifter can be operated. The connections for operating the belt-shifter from the machine are in the case illustrated organized as follows: The head 15 is provided with an inwardly-extending bar 20, having a rack 19,  
20 which engages with a pinion 21, which is mounted to turn freely upon a shaft 40, supported in brackets K, extending from the side frame A. Secured to the side of the pinion 21, or made integral therewith, is a ratchet  
25 22, which is of somewhat larger size than the pinion. The shaft 40 is provided with a gear 39, which engages with a gear 38, mounted on a stud extending from the bracket K and  
30 connected to a bevel-gear 37, which in turn engages with a similar gear 36, mounted upon a shaft which is constantly driven from the printing-machine, so as to drive the shaft 40 when the printing mechanism is in operation.  
35 The shaft 40, in addition to the loose pinion 21 and ratchet 22, is provided with a disk 35, which is fixed to the shaft and carries a friction-band 34, inside of which is arranged a disk 33, which is loose upon the shaft. The  
40 friction-band 34 is provided with an adjusting-screw 16, by which it can be tightened onto the disk 33, so as to cause the latter to turn with the shaft 40 until sufficient resistance is offered to overcome the friction  
45 of the band 34. The disk 33 is provided upon its face with one or more pawls 9, which are so arranged that when they are permitted to do so they engage with the ratchet 22, and thus impart the motion of  
50 the shaft 40 and disk 33 to the ratchet and the pinion 21, and thence to the rack 19 and the belt-shifter. The pawls 9 are provided at their ends with recesses 2, which are engaged by the hooked ends of catches 8, which  
55 are also pivoted upon the face of the disk 33 in such manner as to normally hold the pawls 9 out of engagement with the ratchet 22, as shown in Fig. 3. The catches 8 are provided with tail-pieces 7, which project outward  
60 slightly and between which and the pawls are arranged springs 6, which perform the double function of holding the catches in engagement with the recesses 2 in the ends of the pawls and also of throwing the pawls into  
65 engagement with the ratchet 22 whenever they are released from the catches.

Located at one side of the disk 33 is a le-

ver 5, which is pivoted upon a bracket L in such position that its lower end normally lies out of the path of the tail-pieces 7 of the catches 8 as they are carried around by the disk 33 in its revolution with the shaft 40. The lever 5 is so positioned, however, that by being rocked slightly on its pivot its lower end will be thrown into the path of the tail-pieces 7, and thus rock the catches 8 so as to cause them to release the pawls 9 and allow the latter to engage with the ratchet 22.

In order to prevent the lever 5 from being sprung or bent as it is struck by the tail-pieces 7, its lower end is arranged to move along the face of and be supported by a projection 4, extending from the bracket L. The upper end of the lever 5 is provided with a cross-head 12, which forms the armature of an electro-magnet 23, which is so arranged that when energized it will move the armature 12, and thus rock the lever 5 so as to carry its lower end into the path of the tail-pieces 7 of the catches 8. This magnet 23 is located in the electric circuit before referred to, which is provided with circuit-closers so arranged that whenever the web breaks at any point in the printing or delivery mechanism the circuit will be closed through the magnet and the magnet energized, as just stated.

Referring now to Fig. 7, the manner in which the apparatus is applied to an ordinary web printing and delivery mechanism will be explained. The particular form of web printing and delivery mechanism which has been selected for the purpose of illustration is substantially that which is shown in the United States Letters Patent No. 325,197, heretofore granted to me. The apparatus is equally applicable, however, to any other form of web printing and delivery mechanism, as will be readily understood from the following description.

It is to be understood that in the diagram given M represents the impression-cylinders, N the form-cylinders, and *n* the inking mechanism for the main printing-machine.

O represents the main web, *o* the slit by which the main web is divided, and P the web-turners, by which the sections of the main web are associated.

R represents the single-impression cylinder, S the single-form cylinder, and *s* the inking mechanism of the supplement-printing machine.

T represents the supplement-web, which is of one-half the width of the main web, and V the web-turners, by which the supplement-web is transferred laterally and turned over after it is printed on one side, so as to be represented to the same cylinders to be printed on its other side.

W represents the longitudinal folder, by which the two sections of the main web and the supplement-web, after being associated, are folded longitudinally, and X the cutting and folding cylinders, by which the associated



and longitudinally-folded webs are severed into sheets and the sheets folded transversely preparatory to being finally delivered from the machine.

5 Located at suitable points in the paths of the webs through the machine where the webs are most likely to become broken are a number of circuit-closers *a*, which consist of fixed contact-points 13, located upon one side of  
10 the web and just out of contact therewith, and light spring contact-points 14, located upon the other side of the web and arranged to bear gently upon the web, so that as long as the web is unbroken the two contact-points of the  
15 circuit-closers are kept apart; but whenever the web becomes broken at any point where one of these circuit-closers is located the two contact-points will immediately come together and thus close the circuit at that point. These  
20 contact-points 13 14 are connected by wires *b* with a suitable battery *c* and with the electro-magnet 23, as indicated in Fig. 7, so that whenever the two points forming any one of the circuit-closers are permitted to come to-  
25 gether a circuit will be closed through the magnet 23 and it will be energized and rock the lever 5, as before explained. The points indicated in the diagram for the location of the circuit-closers *a* are purely arbitrary, and  
30 have been selected merely for the purpose of illustration. The circuit-closers can be located at any points, and there can be a greater or less number of them, according to the requirements of any particular machine to  
35 which the apparatus is applied.

Referring now again to Figs. 1 to 6, the operation of the automatic stop mechanism will be explained. In describing this operation it will first be assumed that the printing mechanism is operating in a perfect manner. So  
40 long as this continues the contact-points 13 14 of the various circuit-closers *a* will be kept separated and no circuit will be completed through the magnet 23. The pawls 9 will be  
45 held out of engagement with the ratchet 22 by the catches 8, and the lever 5 will remain in its normal position, so as not to engage with the tail-pieces 7. The shaft 40 will be driven by the printing mechanism, and the  
50 disk 33 and pawls 9 will be carried idly by it, and the belt-shifter *G* and the parts connected therewith will remain in the position shown in Figs. 1, 2, and 3. If at any time, however, either of the webs should break, the  
55 contact-points of the one of the circuit-closers *a* located at or next in advance of the point where the web breaks will at once or almost immediately afterward come together, thereby closing the circuit through the magnet 23,  
60 so as to energize the magnet. The magnet thus energized will, through its armature 12, rock the lever 5 and throw its lower end into the path of the tail-pieces 7, so that as soon as the first one of these tail-pieces arrives op-  
65 posite the lever it will be rocked by the lever, so as to disengage the catch 8 and allow the pawl 9 of that catch to engage with the ratchet

22, and this will cause the ratchet 22 and pinion 21 to revolve with the shaft 40, and thus through the rack 19 move the bar 20 and shift the belt *F* from the fast pulley  
70 *C* to the loose pulley *D* and remove the power from the machine, as shown in Fig. 4. As soon as the belt *F* has been fully shifted onto the loose pulley the belt-shifter will be ar-  
75 rested by its head 15 coming into contact with a pin or other suitable stop 17, projecting from the bar *H*, as also shown in Fig. 4. As soon as the belt-shifter is thus arrested it will overcome the friction between the disk 33  
80 and band 34 and permit the band to move around the disk, and thus avoid danger of breaking the parts of the apparatus in case the printing mechanism should not come to rest by the time the belt has been entirely  
85 shifted onto the loose pulley.

As the printing mechanisms to which this invention is designed to be applied are very heavy and are run at great speed, the parts necessarily acquire a great momentum, so that  
90 the machine will continue to run for a considerable time after the belt has been shifted onto the loose pulley unless resistance is offered. It is therefore desirable, in order to bring the machine to rest quickly in case of  
95 the breaking of the web, to provide a brake mechanism which shall be automatically applied at the same time the belt is shifted. For this purpose the brake-pulley *E* is provided with a brake-shoe 50, which is pivoted  
100 to the short arm of a lever 49, the long arm of which rests upon the upper edge of the bar 20 of the belt-shifter. The bar 20 is so formed that when the belt-shifter is in its normal po-  
105 sition—that is to say, when the belt is on the fast pulley *C*—the long arm of the lever 49 will be raised, so as to hold the shoe 50 out of contact with the brake-pulley, as indicated in Fig. 1. The bar 20 is, however, provided with  
110 an incline 18, which, as the bar is moved outward to shift the belt onto the loose pulley, permits the long arm of the lever 49 to drop, so as to lower the shoe 50 onto the pulley *E*, and the shoe 50 and the fulcrum of the lever  
115 49 are so positioned with relation to each other and to the pulley *E* that as soon as the shoe is applied to the pulley the further movement of the pulley tends to increase the pressure of the shoe and make the brake more effective.

In order to prevent the battery *c* from being consumed when the machine is not in operation, and when as a consequence the web is not threaded through the machine, so as to prevent the contact-points of the circuit-closers *a* from coming together, and also to  
125 permit the machine to be operated slowly, as in starting up, it is desirable to provide means by which the clutch mechanism will only be operated to automatically stop the machine after the belt has been shifted fully onto the  
130 fast pulley or after the machine has attained its full speed. For this purpose the circuit in which the magnet 23 is located is provided with a circuit-breaker *d*, consisting of two



contact-points 27 28, formed of spring-arms and located in such position that the two points will be brought together, so as to close the circuit at that point only when the bar 20 is moved inward to its extreme position, as shown in Figs. 2 and 3, so as to shift the belt fully onto the fast pulley. From this it will be seen that whenever the belt is on the loose pulley or not fully on the fast pulley, as will be the case when the machine is at rest or is being operated slowly, the circuit through the magnet 23 will be broken, so that the clutch mechanism will not be operated by the lever 5, and the circuit can only be completed when the belt is fully shifted onto the fast pulley, so as to operate the machine at full speed.

Whenever the clutch mechanism has been operated to shift the belt and apply the brake, as has been explained, it is of course necessary before again starting the machine to disengage the pawl 9 from the ratchet 22 and restore it to its normal position. To effect this the pin or stop 17 is made removable from the bar H, and the bar is provided with a second pin or stop 24, located outward from the stop 17 a distance just equal to the distance between two of the teeth of the ratchet 22. When therefore it is desired to disengage the pawl from the ratchet, it is only necessary to remove the pin or stop 17 and move the bar 20 and the belt-shifter outward, which can readily be done by grasping the handle 10 against the stop 24. This will, through the rack 19, revolve the ratchet a distance equal to the length of one of its teeth, so as to bring the pawl 9 onto the crown of the tooth in the rear of one with which it is in engagement, and when it is in this position it will be caught by the catch 8 and retained, so that the belt-shifter and the bar 20 can then be moved freely inward. The recesses 2 in the ends of the pawls 9 are inclined, as best shown in Fig. 6, so that as soon as the catches 8 are fairly entered into the recesses the tension of the springs 6 will force them farther in, and thus raise the pawls slightly away from the teeth of the ratchet. It is also necessary, before commencing to shift the belt back onto the fast pulley to start the machine, to raise the shoe 50 away from the pulley E. The incline 18 cannot be depended upon for this purpose, because it would not act to rock the lever 49 until after the belt had been shifted a considerable part of the required distance. The bar 20 is therefore provided upon its under side with a stud 26, which as the bar is moved outward to shift the belt onto the loose pulley engages with a pivoted dog 25, depending from the underside of the lever 49, and rocks said dog to the position shown in Fig. 4. Whenever, therefore, the bar 20 and belt-shifter are moved inward, the stud 26 engages with the recess formed in the end of the dog 25 and acts to raise the lever abruptly, so as to raise the shoe 50 from the pulley E. As the bar 20 and the belt-shifter are moved inward to their extreme

position the stud 26 is carried so far inward as to pass out of the recess in the end of the dog and permit the latter to rock back to its normal position, as shown in Fig. 3.

It is to be understood that the electrical connections, which are herein illustrated as consisting of wires *b*, may in practice be formed partly by the frame and other parts of the machine.

Although the automatic stop mechanism is herein shown as applied to a machine in which the starting and stopping are effected by shifting the driving-belt from a loose to a fast pulley, and vice versa, it can, by changing the form of the connections, be applied equally well to those machines where the starting and stopping are effected by tightening and loosening the driving-belt, or by operating a friction or other clutch, and such an application of the stop mechanism is, in a broad sense, within the scope of the present invention.

What I claim is—

A portion of the mechanisms shown herein are made the subject-matter of my application filed December 5, 1888, No. 219,718.

1. The combination, with a web-printing machine and the devices for starting and stopping the same, of connections, including a clutch mechanism, for operating the latter from the former, an electro-magnet for controlling the operation of said clutch mechanism, one or more circuit-closers located in the path of the web through the machine and arranged to be controlled by the web, and electrical connections between said circuit closer or closers and said electro-magnet, all substantially as described.

2. The combination, with a web-printing machine, the mechanism for acting on its driving-belt to apply and remove the power, and the brake mechanism, of connections, including a clutch mechanism, for operating the latter mechanism from the former, an electro-magnet for controlling the operation of said clutch mechanism, one or more circuit-closers located in the path of the web through the machine and arranged to be controlled by the web, and electrical connections between said circuit closer or closers and said electro-magnet, all substantially as described.

3. The combination, with a web-printing machine, of a belt-shifter for applying and removing the power, and brake-connections, including a clutch mechanism, for operating the belt-shifter and applying the brake from the printing-machine, an electro-magnet for controlling the operation of said clutch mechanism, one or more circuit-closers located in the path of the web through the machine and arranged to be controlled by the web, and electrical connections between said circuit closer or closers and said electro-magnet, all substantially as described.

4. The combination, with a web-printing machine and the devices for starting and stopping the machine, of the rack 19 and pinion 21, for operating the starting and stopping



mechanism, connections for operating said pinion from the printing-machine, including a clutch mechanism consisting of a ratchet and a pawl or pawls for making and breaking said connections, an electro-magnet for controlling said pawl or pawls, one or more circuit-closers located in the path of the web through the machine and arranged to be controlled by the web, and electrical connections between said circuit closer or closers and said electro-magnet, all substantially as described.

5. The combination, with a web-printing machine and its belt-shifter and brake, of the rack 19 and pinion 21, for operating the belt-shifter and applying the brake, connections for operating said pinion from the printing-machine, including a clutch mechanism consisting of a ratchet and a pawl or pawls for making and breaking said connections, an electro-magnet for controlling said pawl or pawls, one or more circuit-closers located in the path of the web through the machine and arranged to be controlled by the web, and electrical connections between said circuit closer or closers and said electro-magnet, all substantially as described.

6. The combination, with a web-printing machine and the devices for starting and stopping the machine, of connections for operating said devices from the printing-machine, including a clutch mechanism for controlling said connections, and also including the disk 33 and friction-band 34, forming a yielding joint in said connections, an electro-magnet for controlling said clutch mechanism, one or more circuit-closers located in the path of the web through the machine and arranged to be controlled by the web, and electrical connections between said circuit closer or closers and said electro-magnet, all substantially as described.

7. The combination, with a web-printing machine and the devices for starting and stopping the same, of connections, including a clutch mechanism, for operating the latter from the former, an electro-magnet for controlling the operation of said clutch mechanism, one or more circuit-closers located in the path of the web through the machine and ar-

50 ranged to be controlled by the web, electrical connections between said circuit closer or closers and said electro-magnet, and a circuit-breaker *d*, controlled by the stopping and starting devices and arranged to break the circuit through the magnet when the devices 55 are operated to stop the machine, all substantially as described.

8. The combination, with a web-printing machine and its starting and stopping devices, of the rack 19 and pinion 21, for operating 60 said devices, the disk 33, carrying a pawl or pawls 9 and driven through yielding frictional connections from the printing-machine, the ratchet 22, connected to the pinion 21 and arranged to be engaged by the pawl or pawls 9, 65 the electro-magnet 23, having the lever 5, for tripping said pawl or pawls, one or more circuit-closers located in the path of the web through the machine and arranged to be controlled by the web, and electrical connections 70 between said circuit closer or closers and said electro-magnet, all substantially as described.

9. The combination, with a web-printing machine and its starting and stopping devices, of the rack 19 and pinion 21, for operating 75 said devices, the disk 33, carrying a pawl or pawls 9 and driven through yielding frictional connections from the printing-machine, the ratchet 22, connected to the pinion 21 and arranged to be engaged by the pawl or pawls 9, 80 the electro-magnet 23, having the lever 5 for tripping said pawl or pawls, one or more circuit-closers located in the path of the web through the machine and arranged to be controlled by the web, electrical connections be- 85 tween said circuit closer or closers and said electro-magnet, and a circuit-breaker *d*, controlled by the stopping and starting devices and arranged to break the circuit through the magnet when the devices are operated to stop 90 the machine, all substantially as described.

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

LUTHER C. CROWELL.

Witnesses:

GEORGE H. BOTTS,

J. J. KENNEDY.