

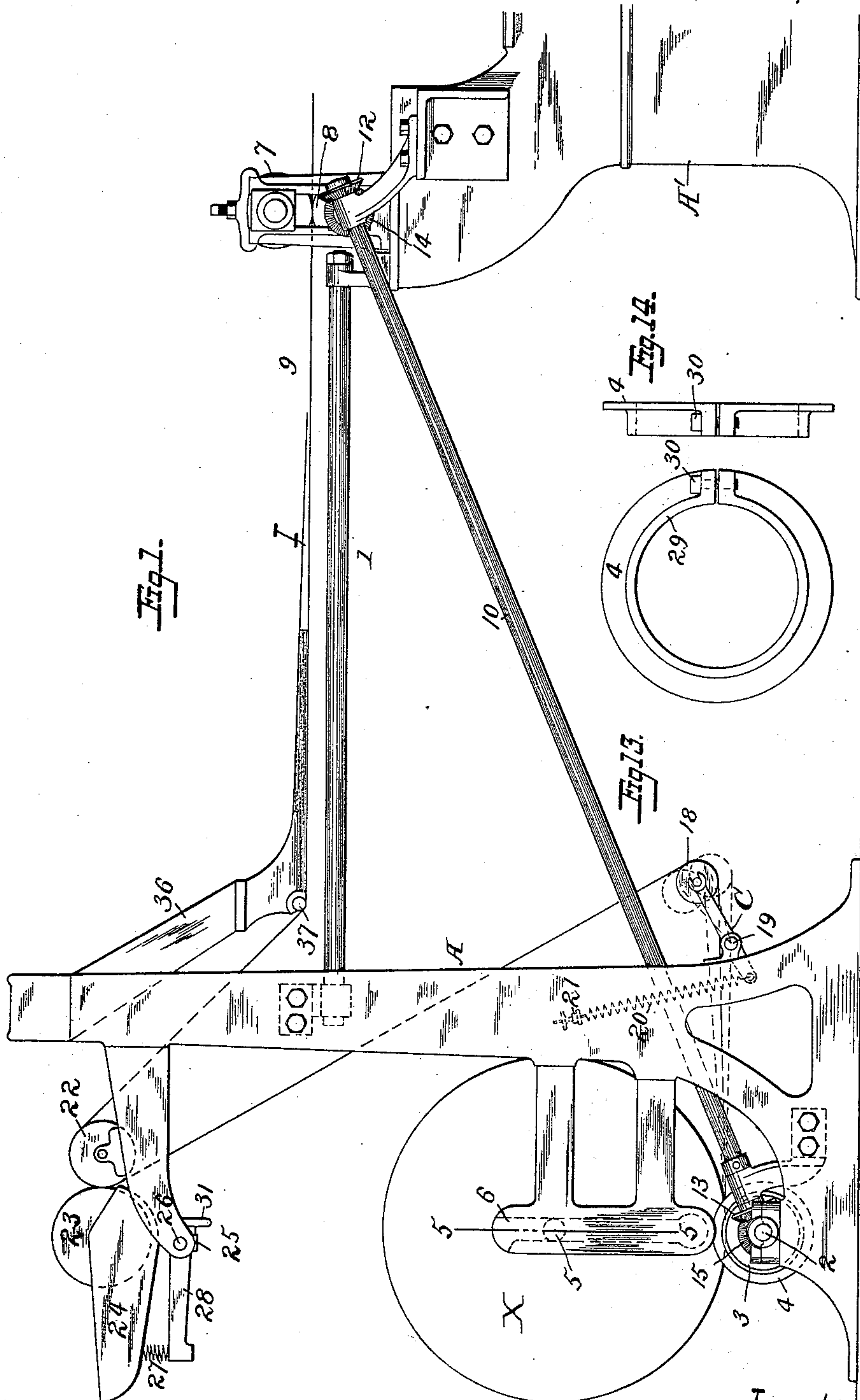
(No Model.)

5 Sheets—Sheet 1.

A. L. STEVENS.  
PAPER BAG MACHINE.

No. 461,287.

Patented Oct. 13, 1891.



Attests.

Georgia P. Kramer.  
Ch. S. McArthur

Inventor

Arthur L. Stevens  
By *Wm. Freeman*  
Attorneys.

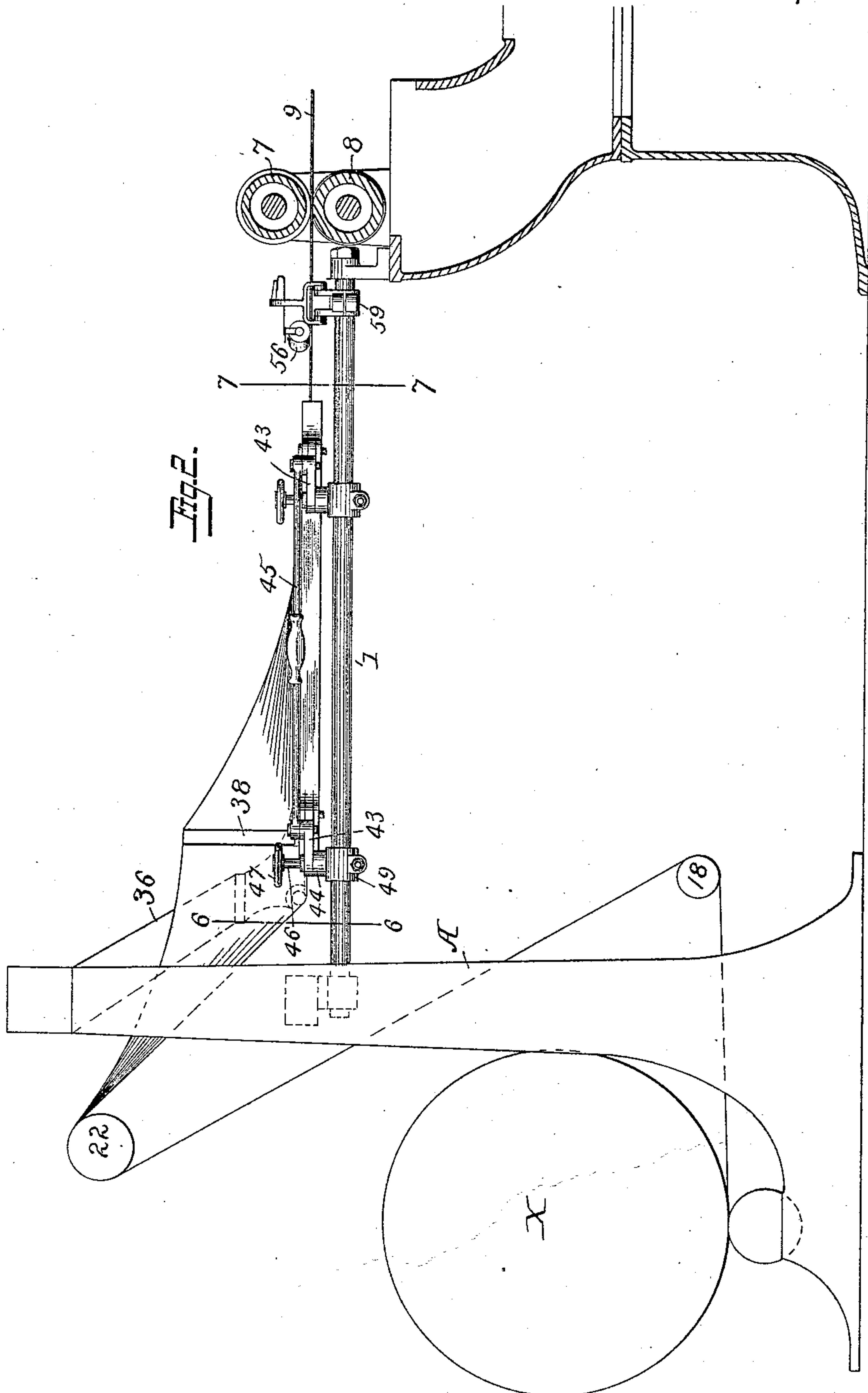
(No Model.)

5 Sheets—Sheet 2.

A. L. STEVENS.  
PAPER BAG MACHINE.

No. 461,287.

Patented Oct. 13, 1891.



Attests

Georgia P. Kramer.  
H. S. McArthur

Inventor

Arthur L. Stevens  
By J. W. Freeman  
Attorneys.

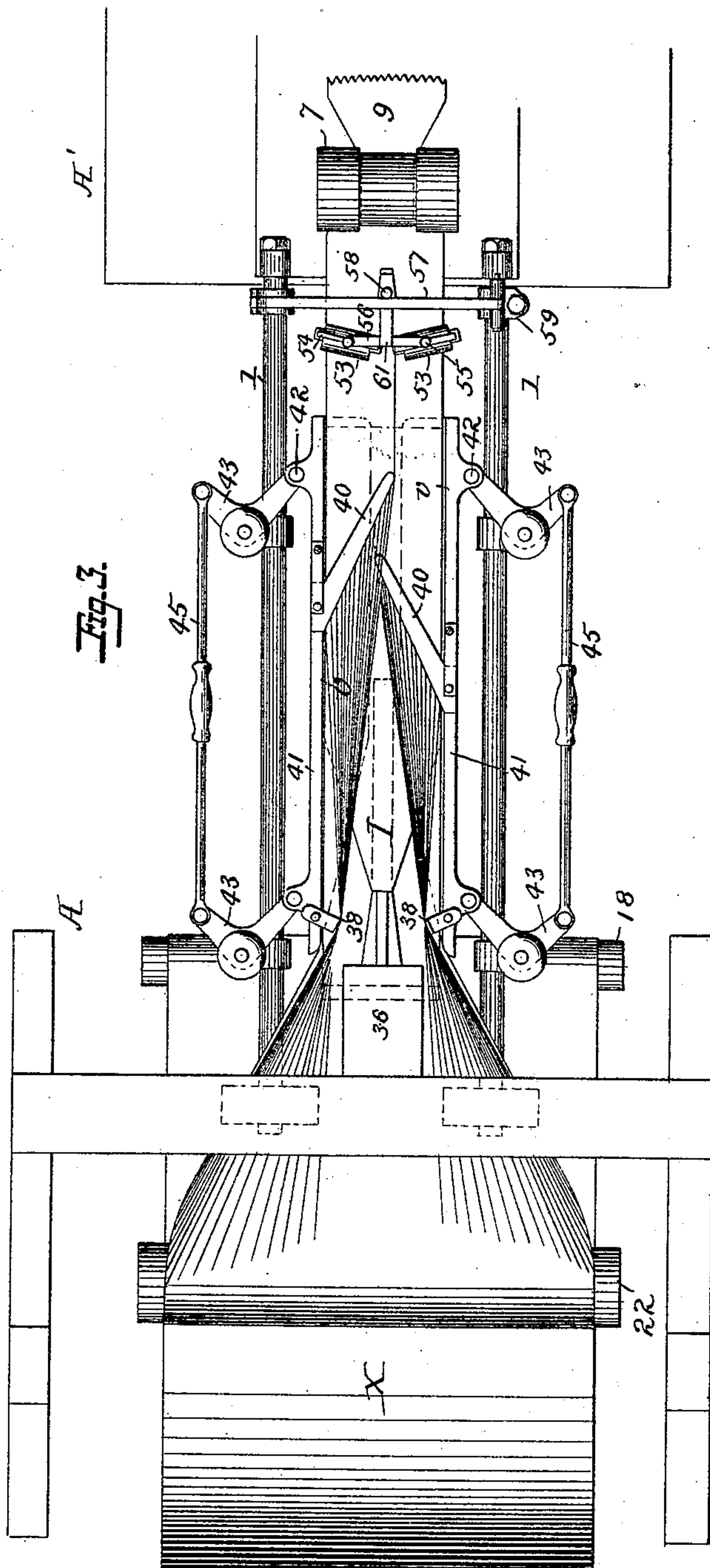
(No Model.)

5 Sheets—Sheet 3.

A. L. STEVENS.  
PAPER BAG MACHINE.

No. 461,287.

Patented Oct. 13, 1891.



Attests

Georgia P. Kramer.

H. S. McArthur

Inventor

Arthur L. Stevens

By Foster & Freeman

Attorneys



(No Model.)

5 Sheets—Sheet 4.

A. L. STEVENS.  
PAPER BAG MACHINE.

No. 461,287.

Patented Oct. 13, 1891.

Fig. 4.

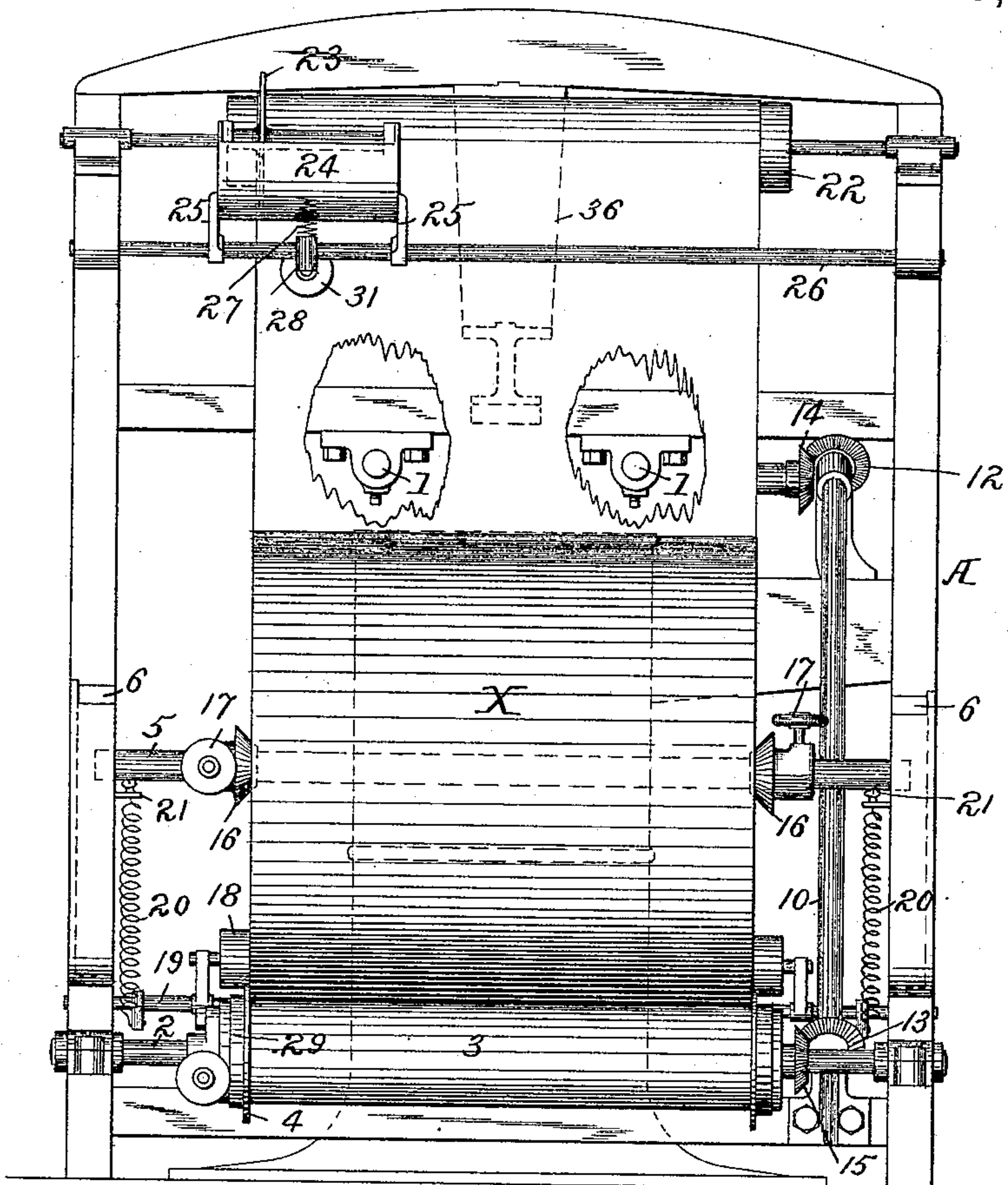
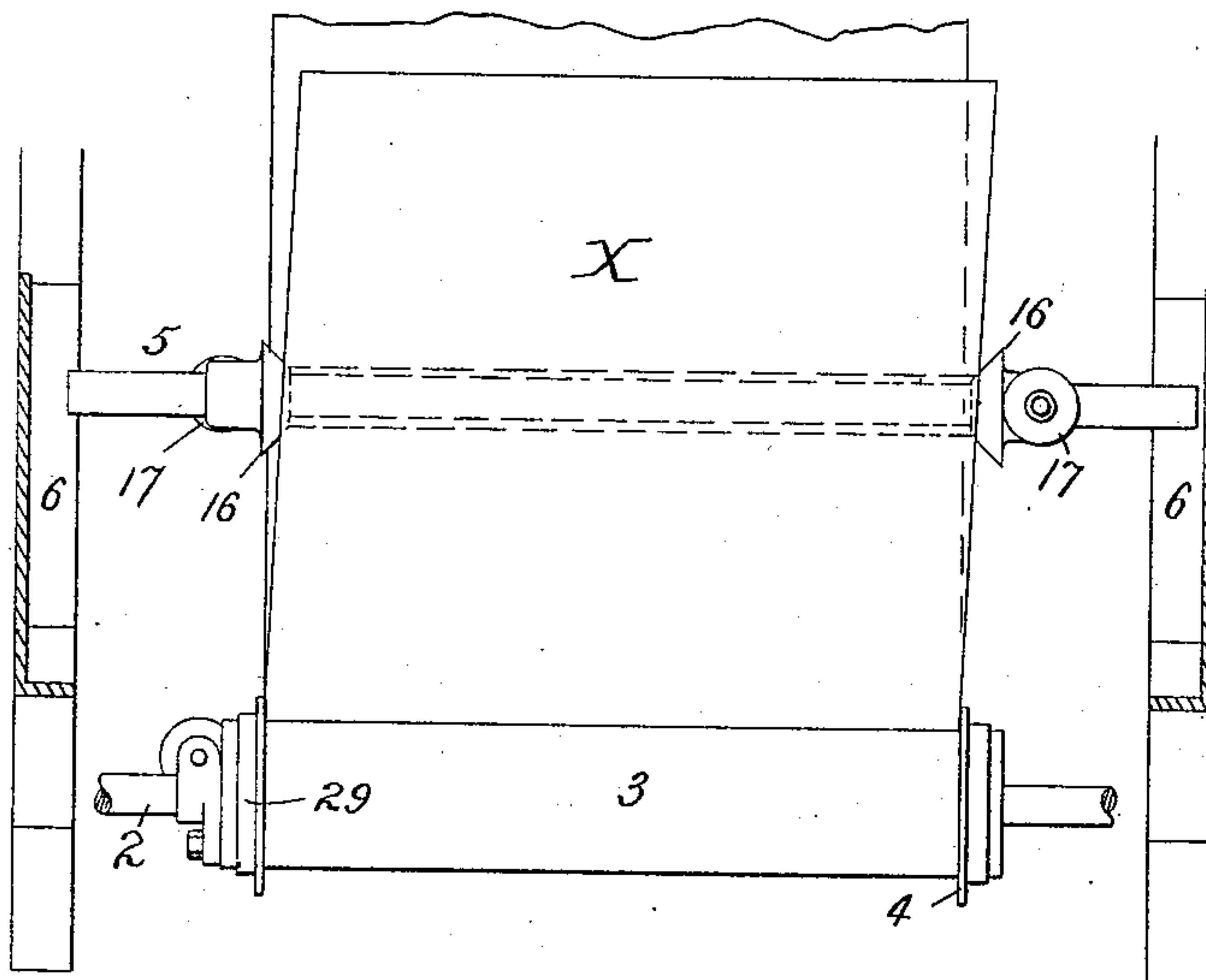


Fig. 5.



Attests.

Georgia P. Kramer.  
H. C. McArthur

Inventor

Arthur L. Stevens  
By Foster & Freeman  
Attorneys

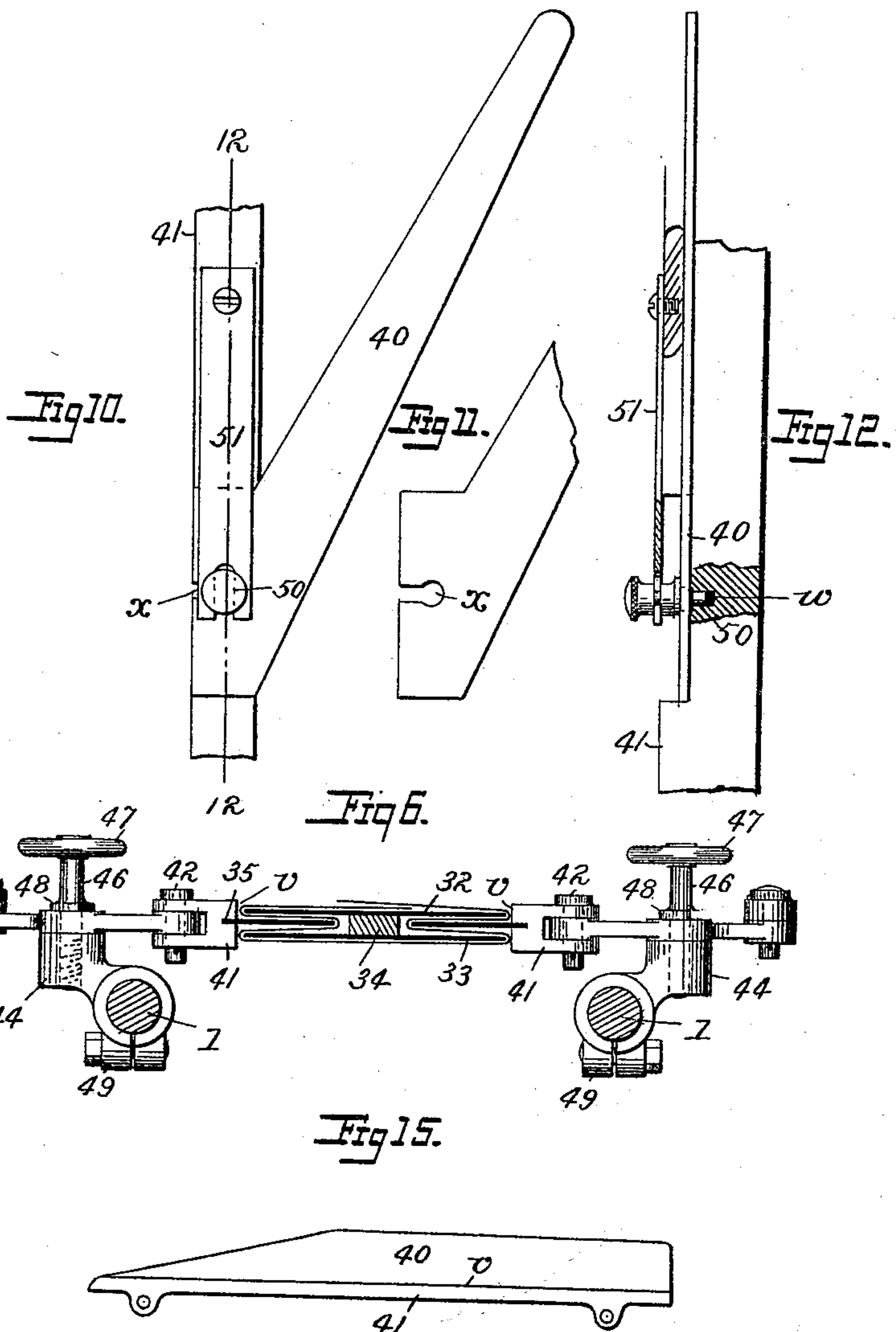
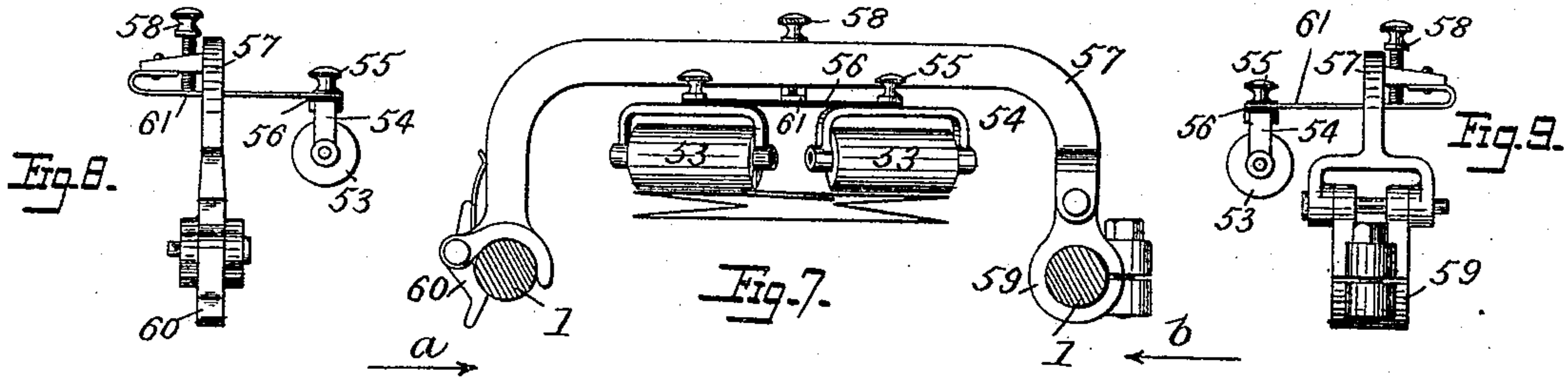
(No Model.)

5 Sheets—Sheet 5.

A. L. STEVENS.  
PAPER BAG MACHINE.

No. 461,287.

Patented Oct. 13, 1891.



Attests

George P. Kramer  
H. S. McArthur

Inventor

Arthur L. Stevens  
By Foster & Freeman  
Attorneys.



# UNITED STATES PATENT OFFICE.

ARTHUR L. STEVENS, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE  
DIAMOND PAPER BAG COMPANY, OF WILMINGTON, DELAWARE.

## PAPER-BAG MACHINE.

SPECIFICATION forming part of Letters Patent No. 461,287, dated October 13, 1891.

Application filed July 10, 1890. Serial No. 358,304. (No model.)

*To all whom it may concern:*

Be it known that I, ARTHUR L. STEVENS, a citizen of the United States, residing in the city and county of Philadelphia, and State of Pennsylvania, have invented certain new and useful Improvements in Paper-Bag Machines, of which the following is a specification.

My invention relates to that class of machines in which a strip of paper is conducted from a roll past appliances for folding or forming it to make paper bags or envelopes, and more especially for the manufacture of paper bags; and my invention consists in means for insuring the rapid and positive feed of the paper without detrimental strains for maintaining it in its true course and for folding it in the manufacture of paper bags, as fully set forth hereinafter, and as illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of sufficient of a paper-bag-making machine to illustrate my improvements, the folding-blades and connections being removed. Fig. 2 is an elevation, in part section, illustrating more especially the folding-blades and connections. Fig. 3 is a plan of Fig. 2. Fig. 4 is a rear elevation of the machine. Fig. 5 is an elevation of part of the machine on the line 5 5, Fig. 1. Fig. 6 is an enlarged transverse section on the line 6 6, Fig. 2. Fig. 7 is a transverse section on the line 7 7, Fig. 2. Fig. 8 is an edge view of Fig. 7, looking in the direction of the arrow *a*. Fig. 9 is an edge view of Fig. 7, looking in the direction of the arrow *b*. Fig. 10 is a plan of one of the folding-fingers and connections. Fig. 11 is a part of one of the folding-fingers detached. Fig. 12 is a section on the line 12 12, Fig. 10. Fig. 13 is a side view of one of the flanged guide-rings of the feed-roller. Fig. 14 is an edge view of one of said rings. Fig. 15 is a detached view of one of the folding-blades and carrier.

Inasmuch as my invention relates to those parts of a paper-bag machine that operate to deliver the paper from the roll and guide and fold the same and to facilitate the changes necessary to form bag-tubes of different sizes, I shall describe only these portions for effecting these results, making no reference to the devices for severing the tube transversely or for pasting and folding the ends to make the

ends of the bag, as these features may be of any suitable construction—as, for instance, the construction illustrated in Letters Patent No. 415,950, granted to me November 26, 1889.

The frame portion of the machine may be constructed in any suitable manner to support the parts hereinafter described, but as preferred and shown it consists of two main end portions A A' and two parallel separated rods 1 1, carried at their extremities by and connecting said end portions, the rods being of such construction that the intermediate folding and creasing mechanism supported thereby and hereinafter described may be readily adjusted lengthwise upon the bars, as required, and access may at all times be had to said mechanism from all sides, as desired. The end portion A of the frame has bearings for a horizontal transverse shaft 2, supporting a roller 3, having flanges 4 4, sufficiently separated to receive between them the roll X of paper, which bears directly upon the roller 3, and is supported by a transverse shaft 5, the ends of which extend into vertical grooves 6 6 in the side pieces of the frame, so as to permit the shaft to descend as the diameter of the roll X decreases.

The roller 3 is positively driven at the speed that it is desired to impart to the paper by any suitable driving mechanism, so that the paper is positively fed, and to prevent any fracture of the paper in one case or buckling or creasing in the other the feed-rolls 7 8 are geared with the roller 3, so as to travel at exactly the same surface speed as the latter, whereby the paper is drawn over the usual former I at the same speed with which it is fed at the rear of the machine. By thus imparting a positive movement to the paper-roll I remove all strain upon the paper in feeding, and am therefore enabled to avoid limiting the speed of the operations by the strength of the paper, so that I am enabled to make bags with great rapidity from paper that is too fragile to be drawn rapidly through machines by the action of the feeding-rolls only.

One means of connecting and driving the feed-rolls and the roller 3 is shown in the drawings, Figs. 1 and 4, the same consisting in gearing the lower feed-roll 8 with the roller



3 by means of an inclined shaft 10, carrying beveled wheels 12 13, gearing with corresponding wheels 14 15 upon the shafts of the rolls 8 3. The feed-roll 8 is driven from the main driving-shaft of the machine through the intermediate appliances, not necessary to be here described, and is of the same diameter as the roller 3, the two pairs of bevel-gears also corresponding in size.

By placing the roll X of paper in contact with the positively-moving roller 3, in addition to the feed-action, I secure a braking effect, the friction between the paper and the roller 3 being such that whatever may be the speed at which the roll X rotates it cannot be carried by momentum so as to feed out the paper any faster than the speed of the roller 3. The paper-roll and the feed-roll 3 are in contact at the point where the paper leaves the feed-roll, thereby holding the paper tight upon the whole surface of the paper-roll until it passes from it. Further, as the paper is taken from the roll at the point where the feed-roll bears, said paper is prevented from moving laterally on the roll before leaving it and is thus guided straight to the machine.

In order to center the roll X of paper upon the shaft 5, so that the axis of the roll will be coincident with that of the shaft, and, further, to secure the roll in proper position longitudinally upon the shaft, I make use of two conical centering hubs 16 16, each movable upon the shaft and secured by a set-screw 17, the conical end entering the axial opening of the roll.

It frequently happens that the paper for some reason passes unevenly from the roll X toward the folding devices, one edge being tighter than the other or having more slack than the other, whereby the paper is caused to pass unevenly to the folding devices, to obviate which I make use of a movable take-up or dandy roll 18, round which the paper passes on its way to the folding devices, which dandy-roll is supported at each end independently upon yielding bearings and serves to take up the slack side of the paper, and thereby guide it straight toward the folding devices. Thus the roll 18 turns in bearings in the side arms of a rocking frame C, consisting of said arms and a rock-shaft 19, turning in bearings secured to the frame of a machine, springs 20 being connected to the inner ends of said arms and also adjustably connected to bearings 21 upon the frame, so that they may be tightened or slackened to any desired extent to increase or decrease the pressure of the roller upon the paper.

In the construction shown the paper passes from the dandy-roll 18 over an upper guide 22, and paste is applied to one edge of the paper as it passes over the roller 22 by means of a pasting-disk 23, turning by its frictional contact with the paper in a paste-trough 24, having arms 25 25, receiving and pivoted to a cross-bar 26 of the frame, and a spring 27,

interposed between the trough 24 and an independent bearing-arm 28, serves to lift the trough and maintain the pasting-disk in yielding contact with the paper, and by adjusting the arm vertically the tension of the spring may be varied as desired. By this means I insure the application of the paste evenly and uniformly to the edge of the paper with comparatively little friction.

As the paper will vary in width according to the sizes of the bags, the parts described are adjustable accordingly. Thus the flanges 4 4 of the roller 3 are formed upon split rings 29, Figs. 13 and 14, each adapted to receive the roller and provided with a screw 30, by means of which the ring may be contracted upon the roller to hold it in place or expanded and loosened for adjustment. The conical hubs 16 in like manner can be set to any desired position upon the shaft 5 after loosening the set-screw 17 and may thereafter be secured, and the trough 24 may be set to any desired position upon the rod 26, the bearing-arm 28 being adjustable upon said rod and secured after adjustment by means of the binding-screw 31. The body or cylinder of the roller 3 turns loosely on its shaft 2 and is clamped thereto by a clamp *a*, Figs. 4 and 5, secured to the end of the roll-cylinder and split, with a screw *b* passing through the split side, so as to contract the clamp on the shaft or loosen it. This permits the roll to be loosened to pull the paper through the machine, while the other parts, including the shaft 2, are stationary.

The former I consists of two parallel blades 32 33, secured upon opposite sides of a bar 34, so as to leave an intervening space at each side of the bar for the bellows folding-blade 35, and the rear end of the former is secured to a pendent arm 36, having at its heel a cylindrical bar or rounded face 37, beneath which the strip of paper passes, the sides of the strip turning upward and passing between two vertical blades 38 38, as best shown in Figs. 2 and 3, and an oblique blade 40 turns down the unpasted side of the strip flat upon the former, and another oblique blade 40, set in advance of the first blade 40 and upon the opposite side, then turns down the adjacent pasted side of the strip upon that already turned in and presses the pasted edge against the face of the paper beneath it. To adapt these parts to bags of different sizes without the nice adjustments heretofore essential whenever such changes are made, and, further, to secure ready access to all parts of the folded strip at any time, as well as other advantages connected with the adjustment and operation of the machine, I make use of the construction shown, and which I will now describe.

The former I is connected removably to the supporting-arm 36 in any usual manner and has the usual contracted neck extending through the space afforded by contracting the diameter of the feeding-roller 7, as shown in



Fig. 3. Each of the bellows folding-blades 35, instead of being bolted to a stationary part of the frame, as heretofore, is connected to a carrier-bar 41, having ears through which pass pins 42, connecting said bar to bell-crank levers 43, that swing upon brackets 44, carried by the rods 1, the other arms of the bell-crank levers being connected by a rod 45. The parts are constructed as best shown in Fig. 6, so that by moving longitudinally either of the rods 45 the levers may be swung to move the carrier-bar 41 to or from the former to any desired extent, preserving the parallelism of the parts, so that when a change has to be made the carrier-bar may be swung back, disconnected from the levers 43 by removing the pins 42, and another carrier-bar with a blade of different width may be connected to the levers and swung into position without any other adjustment than is necessary to take out and reinsert the pins. To secure the parts in place after adjustment the levers 43 may swing upon the screw-pins 46, provided with hand-wheels 47 and with flanges 48, between which and the brackets 44 the levers may be clamped. The brackets 44 are preferably provided with split sockets for the reception of the bars 11 of the frame, and clamping-bolts 49 serve as a means of securing the brackets adjustably upon said bars, so that they may be moved lengthwise thereon, as desired.

It is necessary to change the blades 40 or remove them when the paper is first inserted in the machine, and to do this effectually and readily without repeated nice adjustments each blade is provided with a slot  $x$ , enlarged at the inner end and adapted to the enlarged portion of the pin 50, the contracted end of which fits a recess  $w$  in one of the carriers 41. By drawing the pin outward slightly the contracted portion of the slot in the blade may be passed along the contracted end of the pin. When the enlarged portion of the slot is in position, the pin may be pushed in to secure the blade in place. The necessary vertical movements of the pin may be secured without detaching it, and the pin may be retained in place by means of a flat forked spring 51, the prongs of which enter an annular groove in the pin, as best shown in Figs. 10 and 12.

In order to overcome the tendency of the overlapped pasted portion of the tube to spread or separate before the paste has dried and to draw them together should they be pasted when partly separated, I make use of two drawing-rollers 53 53, each set at an angle to bear upon the top of one side of the folded strip and to be revolved by contact therewith, thereby tending to draw each side inward and hold the same in position until the tube passes between the feed-rolls. To permit these rollers to be adjusted to any desired angle each is carried by a yoke 54, centrally clamped by a screw-pin 55 to a cross-bar 56, carried by an arm projecting from a frame

57, carried by the rods 11 of the main frame. The pressure of the rollers 53 upon the paper may be regulated by means of the screw 58, bearing upon the spring-arm 61, that carries the cross-bar 56, and to carry the rollers out of the way when the former I has to be changed I hinge the frame 57 so as to swing to one side. Thus one end of the frame is pivoted to a bracket 59, adjustable upon one of the bars 11, while the other end of the frame has a socket and spring-finger 60 for clutching the adjacent bar 1, as best shown in Fig. 7.

It will be seen that each carrier-bar 41 presents an edge  $v$ , Figs. 3 and 6, both below and above the blade 35, which edges serve as guide-edges to determine the exact extent to which the blade shall be inserted into the side channels of the former, and also aid in guiding the paper as it travels along the former at the edge of both blades thereof.

It will be evident that any other desired parallel motion than the connected levers 43 may be employed for facilitating the adjustment of the carrier and guiding-bars and their blades.

The blades 40 may be of any desired shape, but I prefer to make them substantially triangular—that is, tapering from a point where the paper first meets the same toward the butt-ends, and then, if desired, continuing for a portion of the length of uniform width. This insures a gradually folding in of the paper that permits it to be operated upon with great rapidity without danger of fracture.

Without limiting myself to the precise construction and arrangement of parts shown and described, I claim—

1. A paper-bag machine in which the folding-blades are supported adjustably upon an open frame having for its sides two parallel bars adjacent to the former, whereby free access may be had to said parts at all sides, substantially as described.

2. The combination, with the shaft of the paper-roll supported to move vertically, of a roller arranged to support the paper-roll and means for imparting a positive movement to said roller, the two rolls being in contact at the point where the paper passes from the paper-roll, substantially as set forth.

3. The combination, with the paper-roll and its shaft movable in vertical guides and with the feed-rolls 7 8, of a driven roller 3, supporting the paper-roll at the point where the paper leaves the latter, the axes of the paper-roll and driven roller being in the same vertical plane, and connections between the driven roller and one of said feed-rolls, whereby they are driven simultaneously at the same speed, substantially as set forth.

4. The combination, with the devices for supporting and feeding the paper-roll and with the feed-rollers, of an intermediate dandy-roll having an independent support at each end, and adjustable appliances for vary-



ing the pressure of the roll against the paper at each end, substantially as set forth.

5. The combination, with a support for the traveling strip of paper, of a paste-trough carrying a pasting-disk, an independent arm 28, an intermediate spring 27, and supports upon which the arm and trough are independently adjustable, substantially as and for the purpose set forth.

6. The combination, with the rocking paste-trough and its disk, of a supporting-rod 26, extending through arms upon the trough and upon which rod the trough is pivoted, an independent arm 28, and a spring interposed between the arm and the trough, the arm being adjustable to vary the tension of said spring, substantially as described.

7. The combination, with the former having side channels, of folding-blades and carrying-bars therefor, said bars arranged to form guiding-edges opposite and immediately adjacent to the edges of the blades of the former, substantially as set forth.

8. The combination, with the former having side channels, of folding-blades and carrying-bars therefor, constructed to form guiding-edges *v* above and below the blades and adjustably supported to move to and from the edges of the former parallel therewith, for the purpose described.

9. The combination, with the folding-blades, of bell-crank pivoted adjusting-levers, connecting-rod 45, and means for securing the parts after adjustment, substantially as set forth.

10. The combination, with the former, folding-blades, and pivoted levers, of a support for said levers and a fastening for securing the levers in different positions, substantially as described.

11. The combination, with the former and folding-blades extending between the blades of said former, of pivoted levers connected to said folding-blades, and the support for each lever movable longitudinally on a support upon the frame, substantially as set forth.

12. The combination, with the former, of

the parallel side bars 1 1 of the frame and folding-blades and levers connected therewith and supported adjustably by said bars, substantially as described.

13. The finger 40, provided with the slot *x*, in combination with securing-pin and actuating-spring 51, substantially as set forth.

14. The combination, with the former and the drawing-rolls, of a support overhanging the former and means for adjusting each roll vertically and horizontally upon said support, substantially as specified.

15. The combination, with the stationary former, of a support overhanging the former, inclined rolls 53, carried by the support, and means for varying the pressure of the rolls 53 upon the former, substantially as set forth.

16. The combination, with the former and with the rolls 53, of a movable frame 57, supporting said rolls, substantially as described.

17. The combination, with the former, of the vertically-swinging frame 57, and the rolls 53, adjustably supported to be set at different angles upon said frame, substantially as described.

18. The combination, with the former and the rolls 53, of a frame supporting said rolls, pivoted at one side and provided with a clamping device at the opposite side, substantially as described.

19. The combination, with the parallel bars 1 1, of a swinging frame 57, adjustably connected with said bars and supporting the rollers 53, substantially as described.

20. The combination, with the frame 57, of a spring-blade connected with said frame, and rollers 53, supported by said blade and adjustable at different angles thereto, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ARTHUR L. STEVENS.

Witnesses:

MINOR HARVEY,

JAMES S. PHILLIPS.