

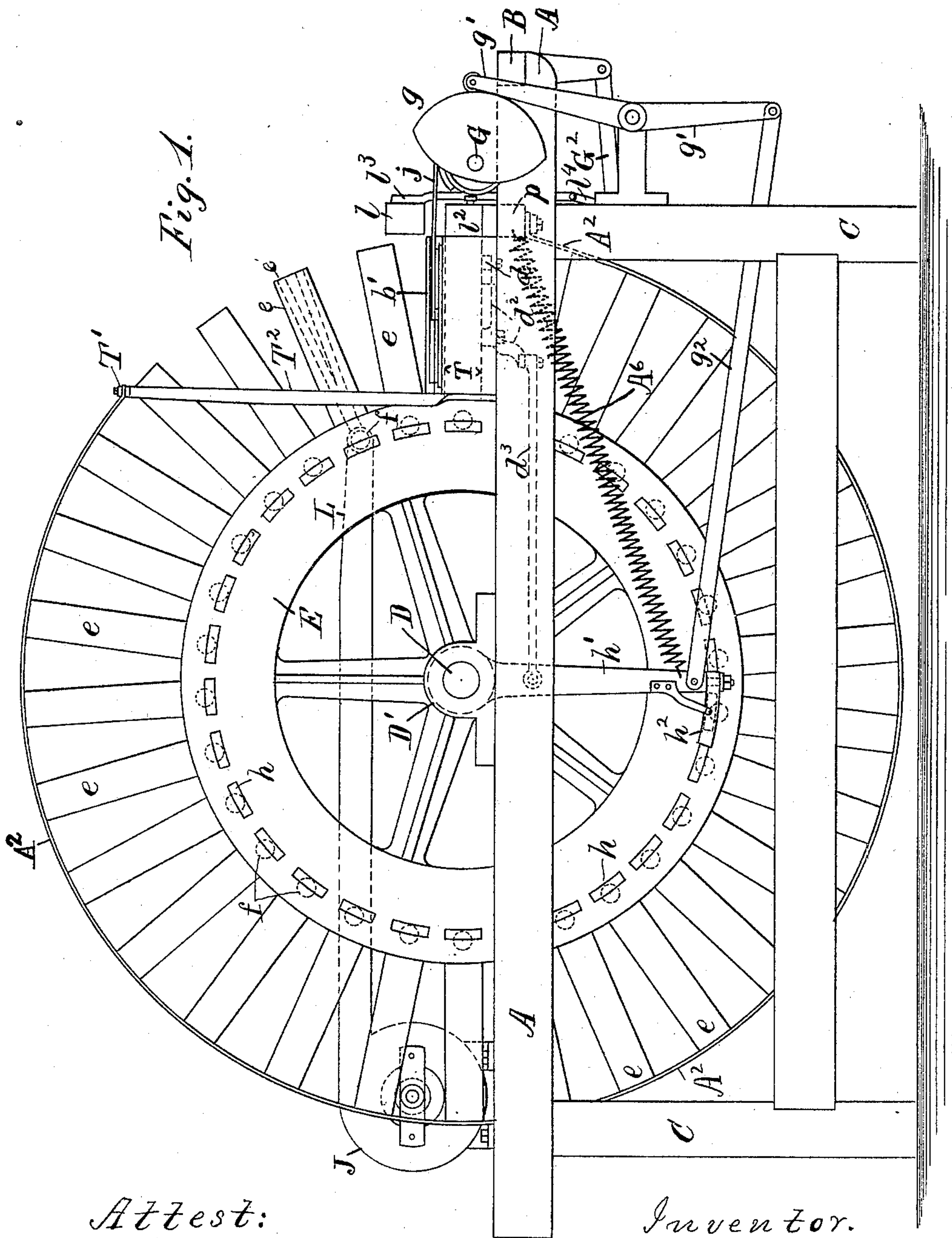
(No Model.)

6 Sheets—Sheet 1.

E. METZENAUR.
PAPER BAG MACHINE.

No. 434,939.

Patented Aug. 26, 1890.



Attest:
L. Lee.
T. C. Fischer

Inventor.
E. Metzénaur, per
Crane & Miller, Atty.

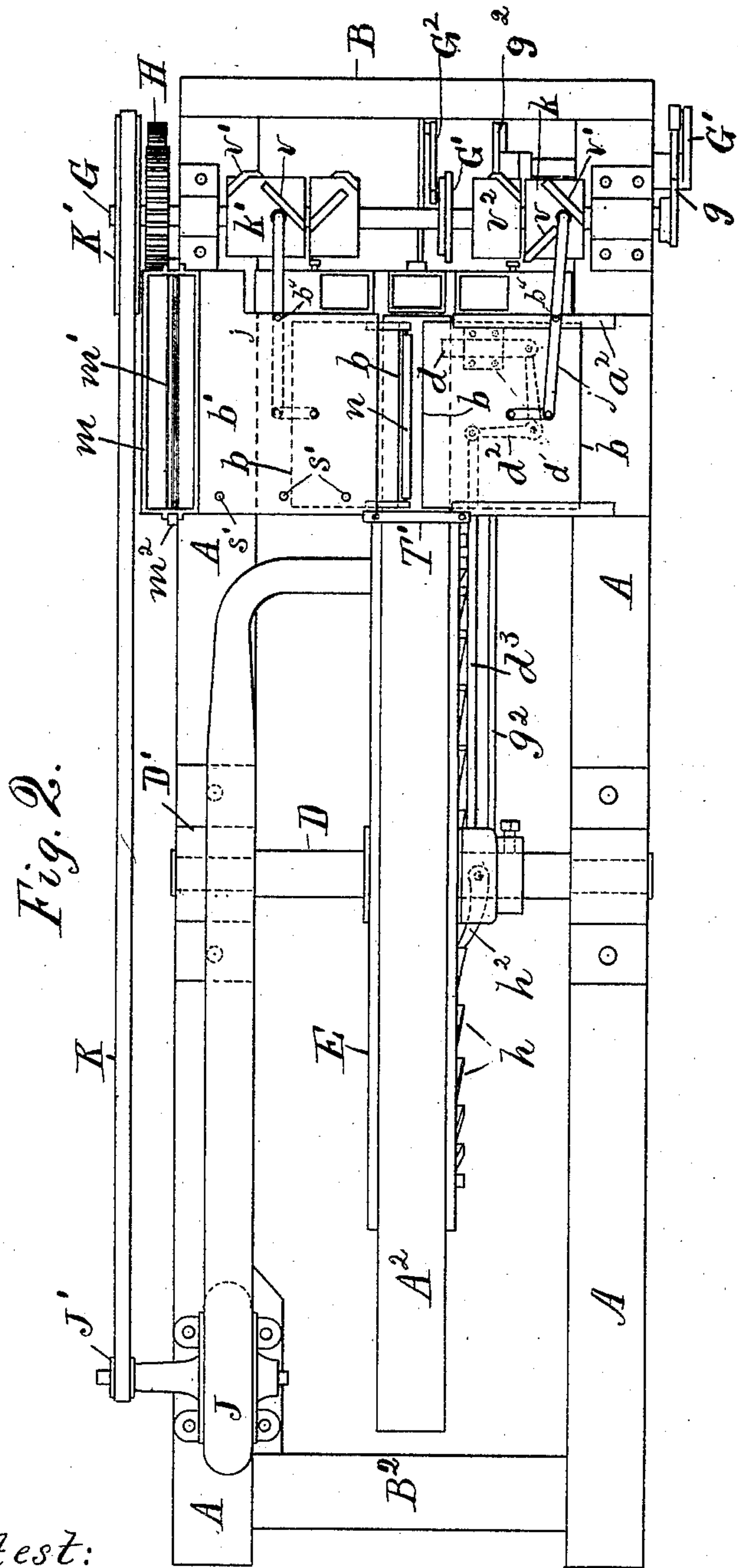
(No Model.)

6 Sheets—Sheet 2.

E. METZENAUR.
PAPER BAG MACHINE.

No. 434,939.

Patented Aug. 26, 1890.



Attest:
L. Lee,
F. C. Fischer.

Inventor
E. Metzénaur, per
Crane & Miller, Atty.

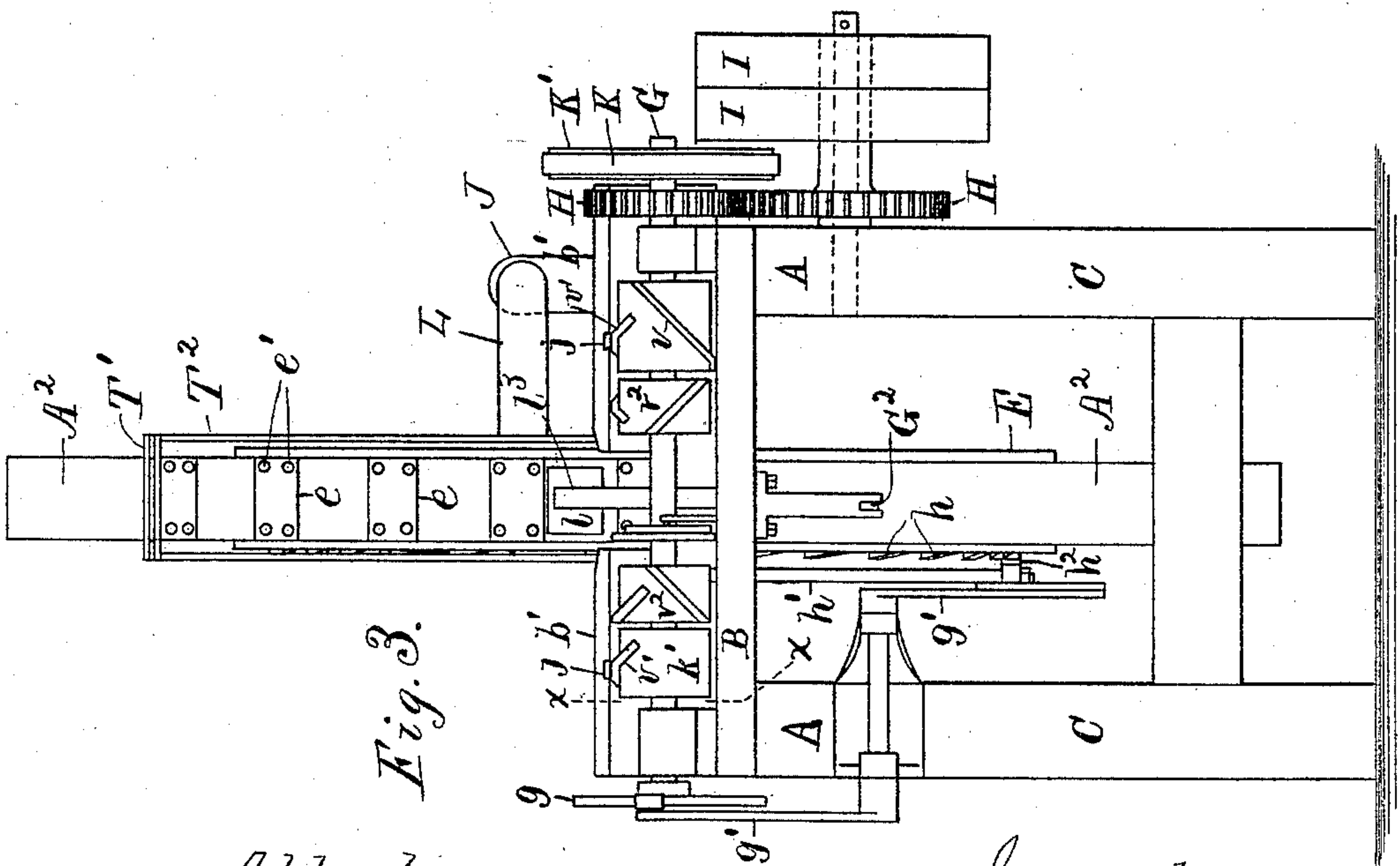
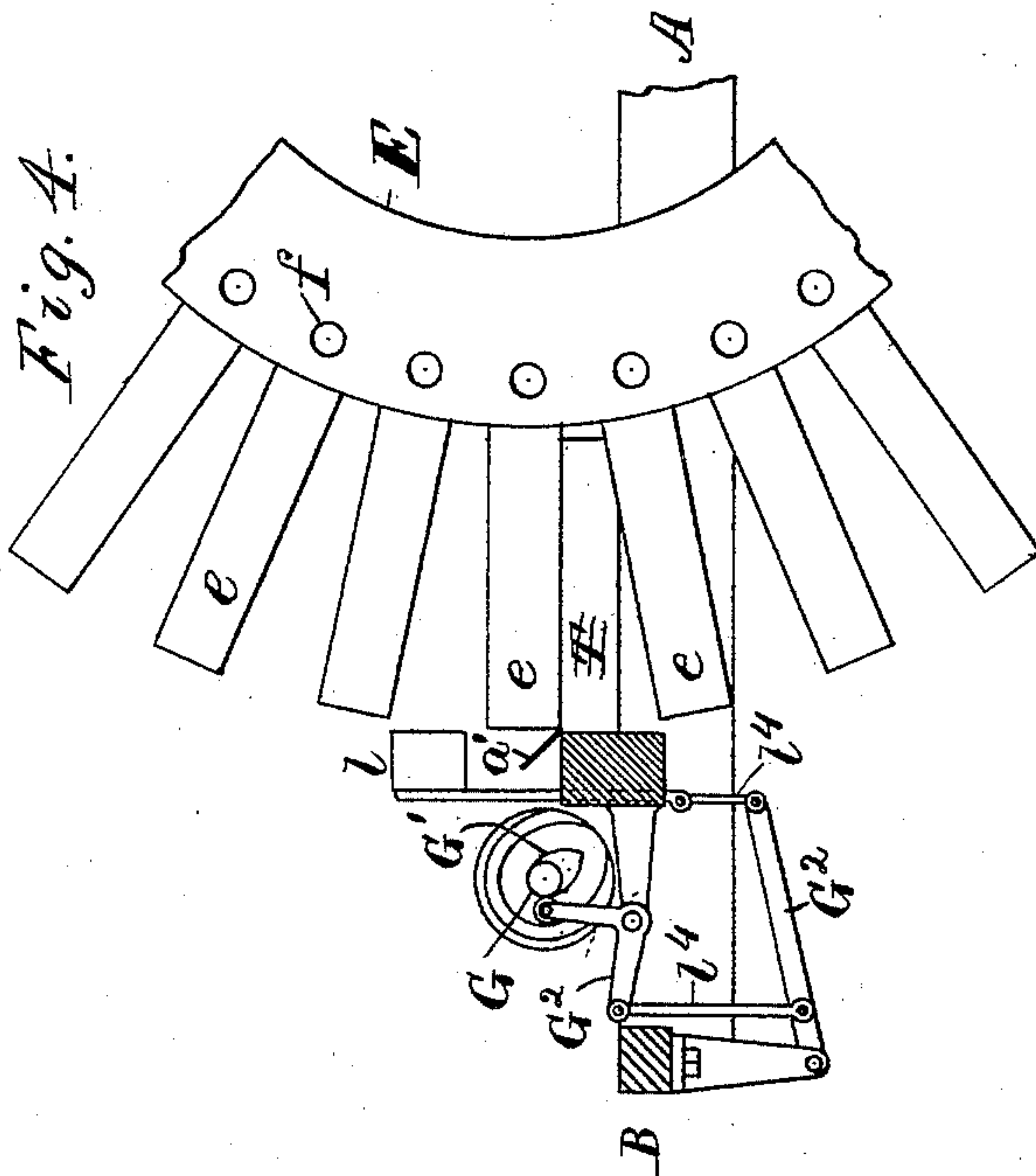
(No Model.)

6 Sheets—Sheet 3.

E. METZENAUR.
PAPER BAG MACHINE.

No. 434,939.

Patented Aug. 26, 1890.



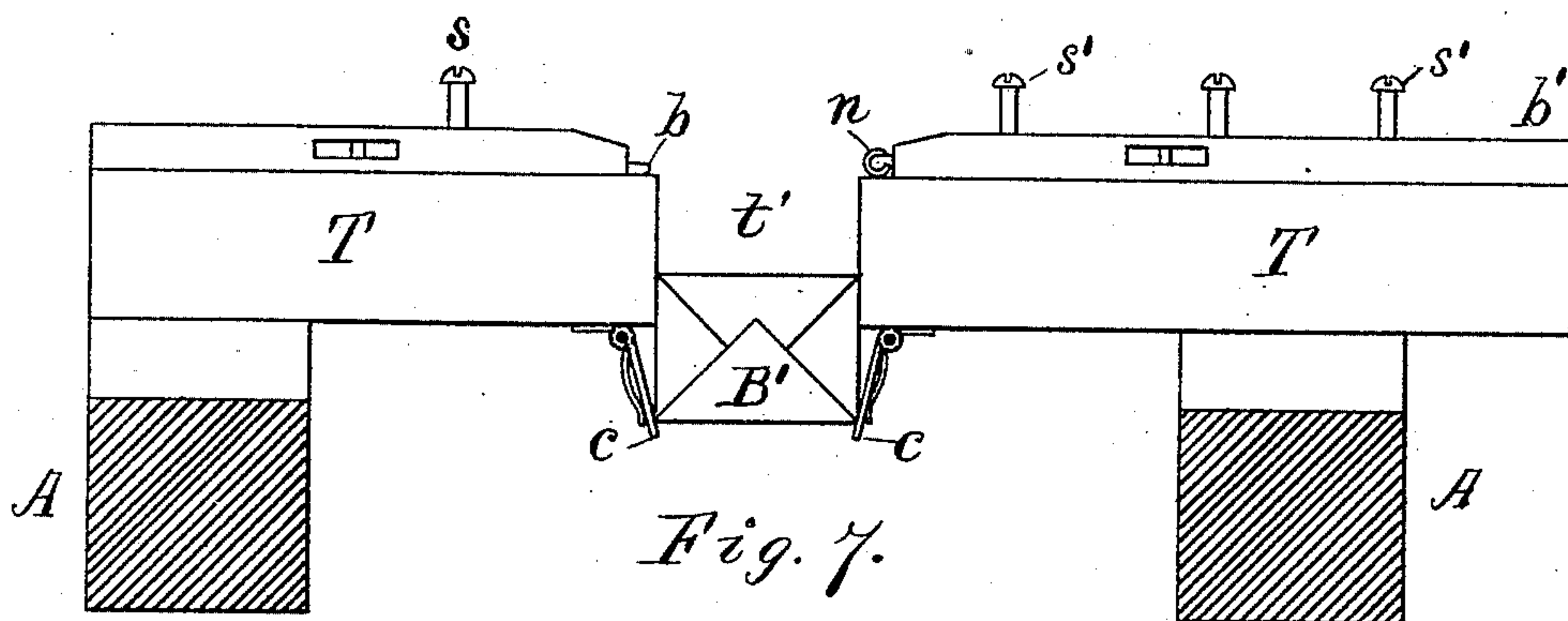
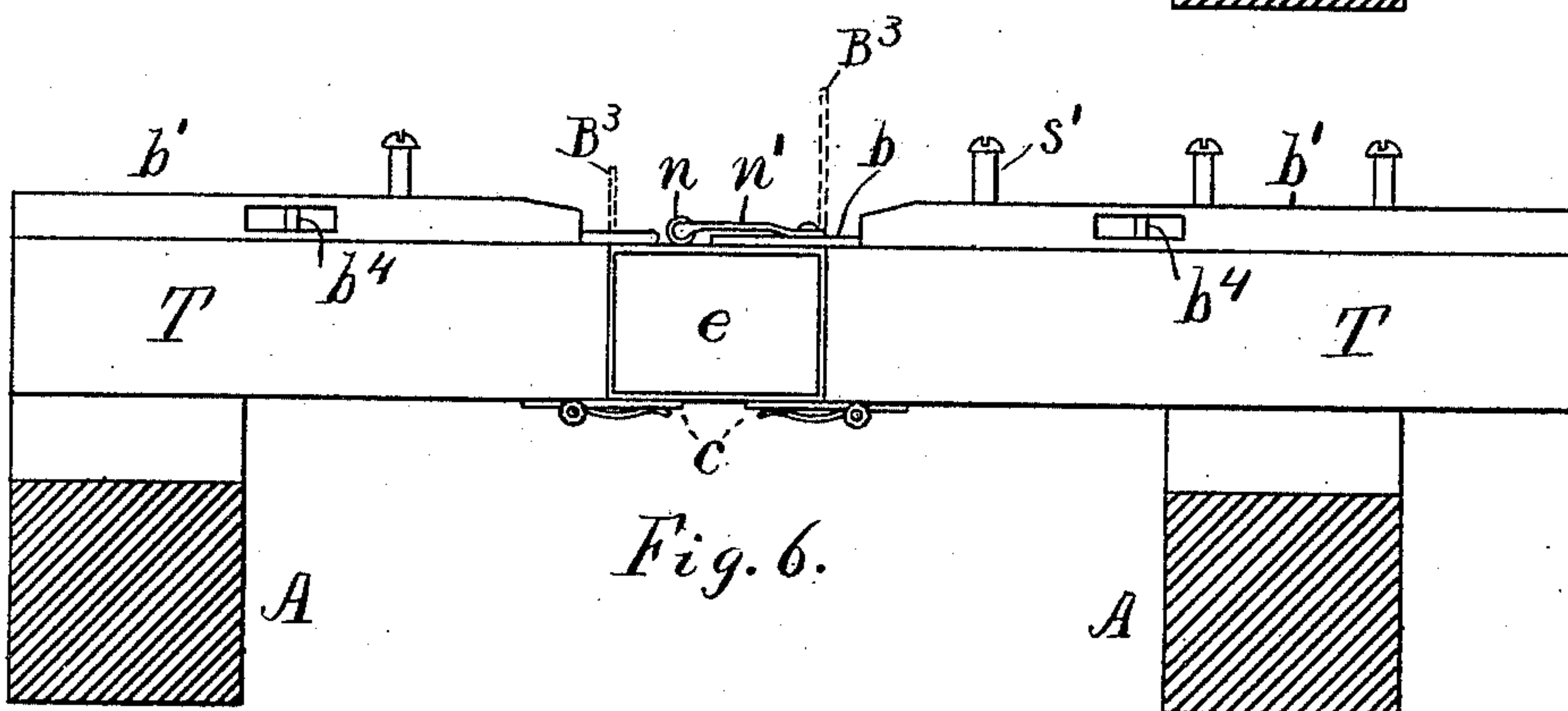
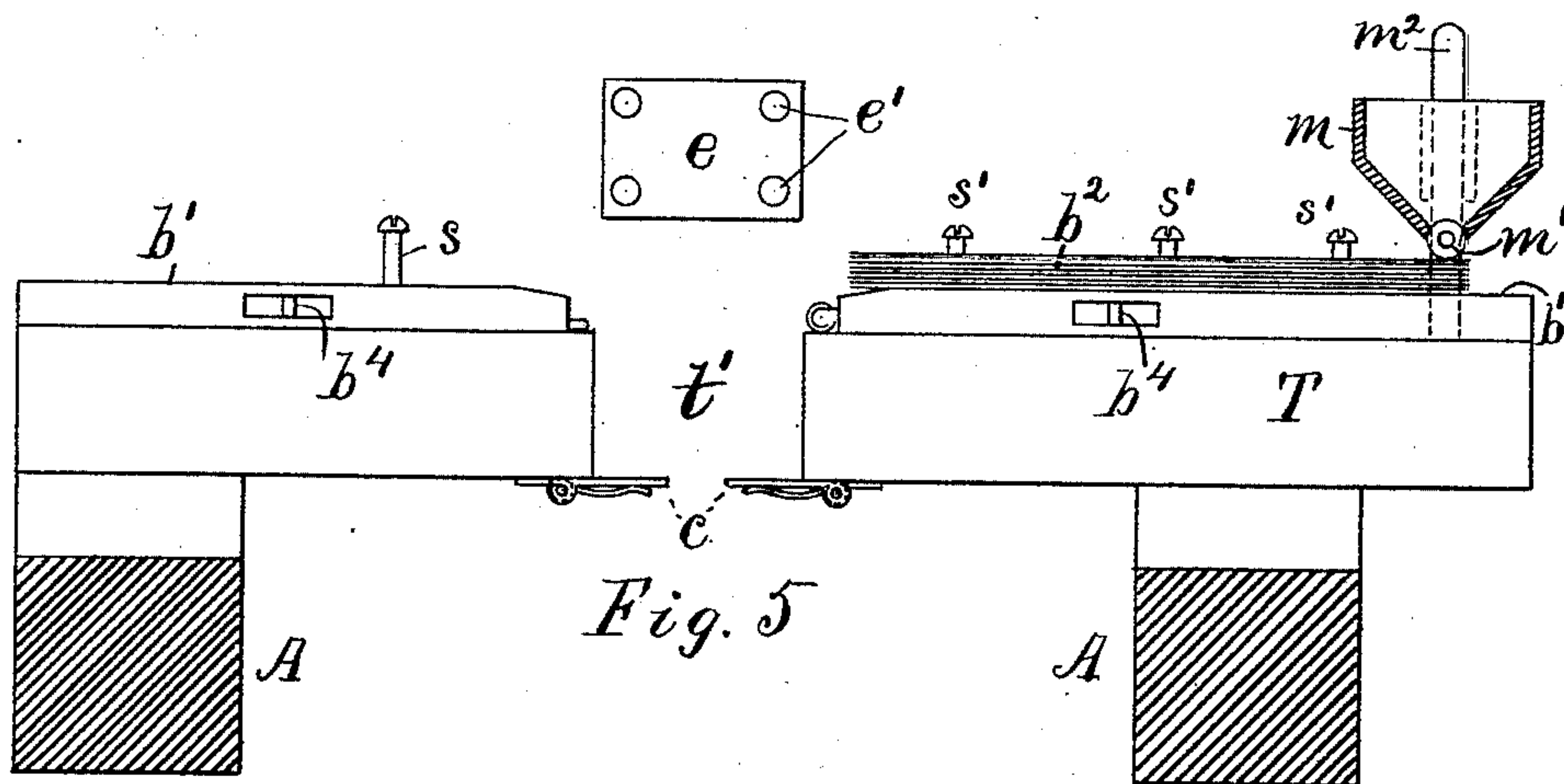
Attest:
L. Lee,
J. C. Fischer.

Inventor.
E. Metzénaur, per
Crane & Miller, Atty.

E. METZENAUR.
PAPER BAG MACHINE.

No. 434,939.

Patented Aug. 26, 1890.



Attest:
L. Lee.
F. C. Fischer.

Inventor.
E. Metzénaur, per
Crane & Miller, Attys.

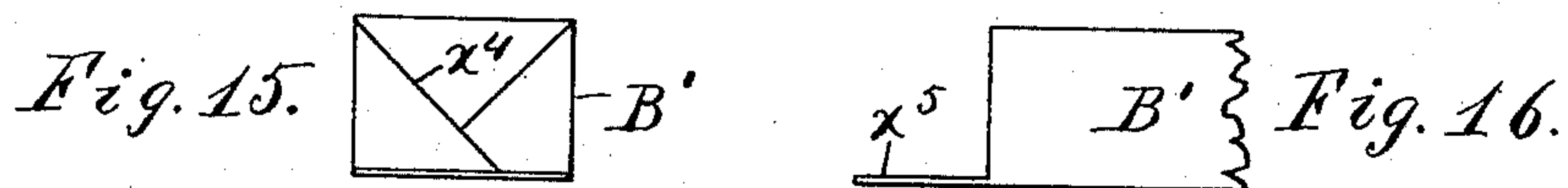
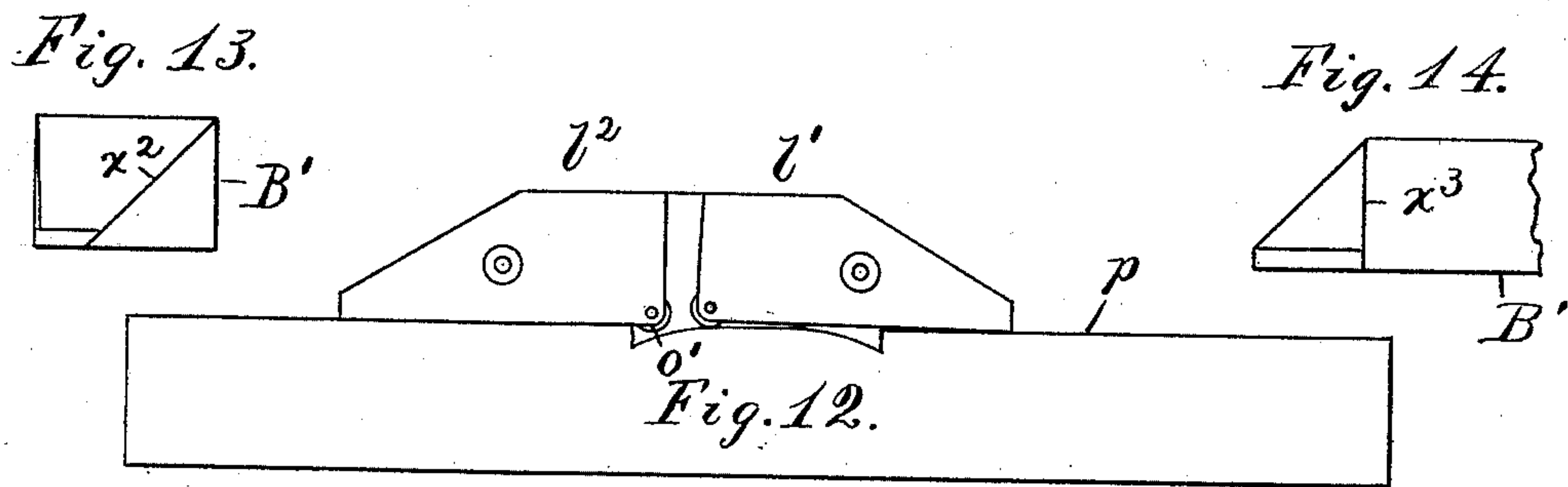
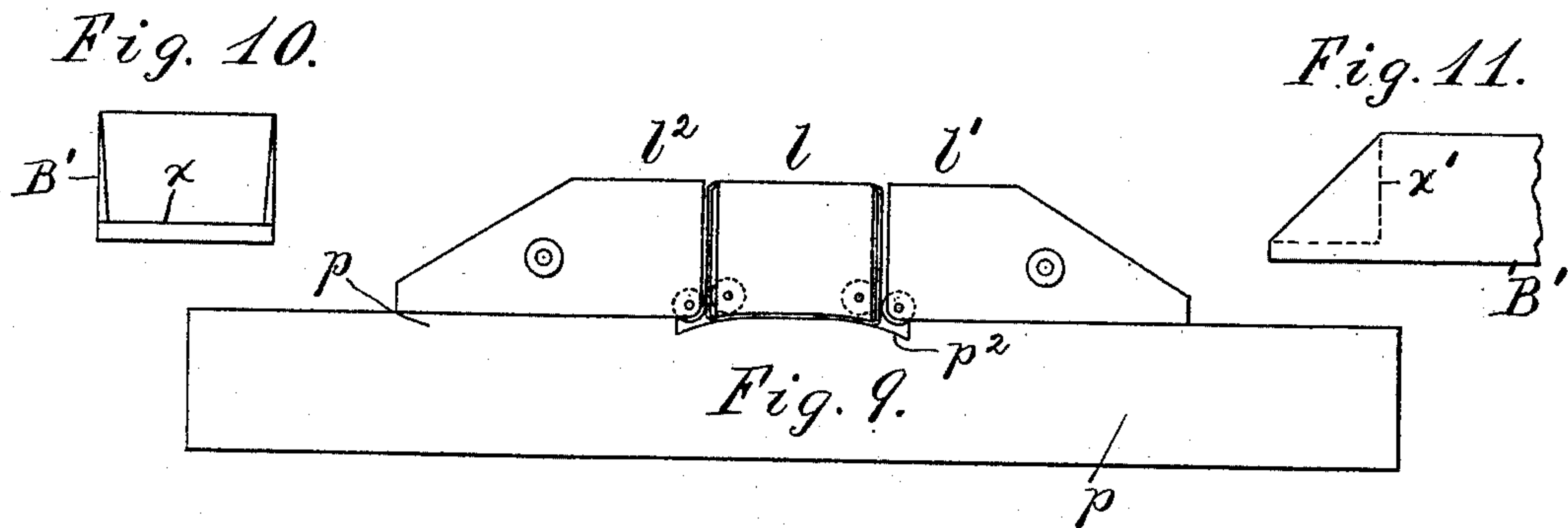
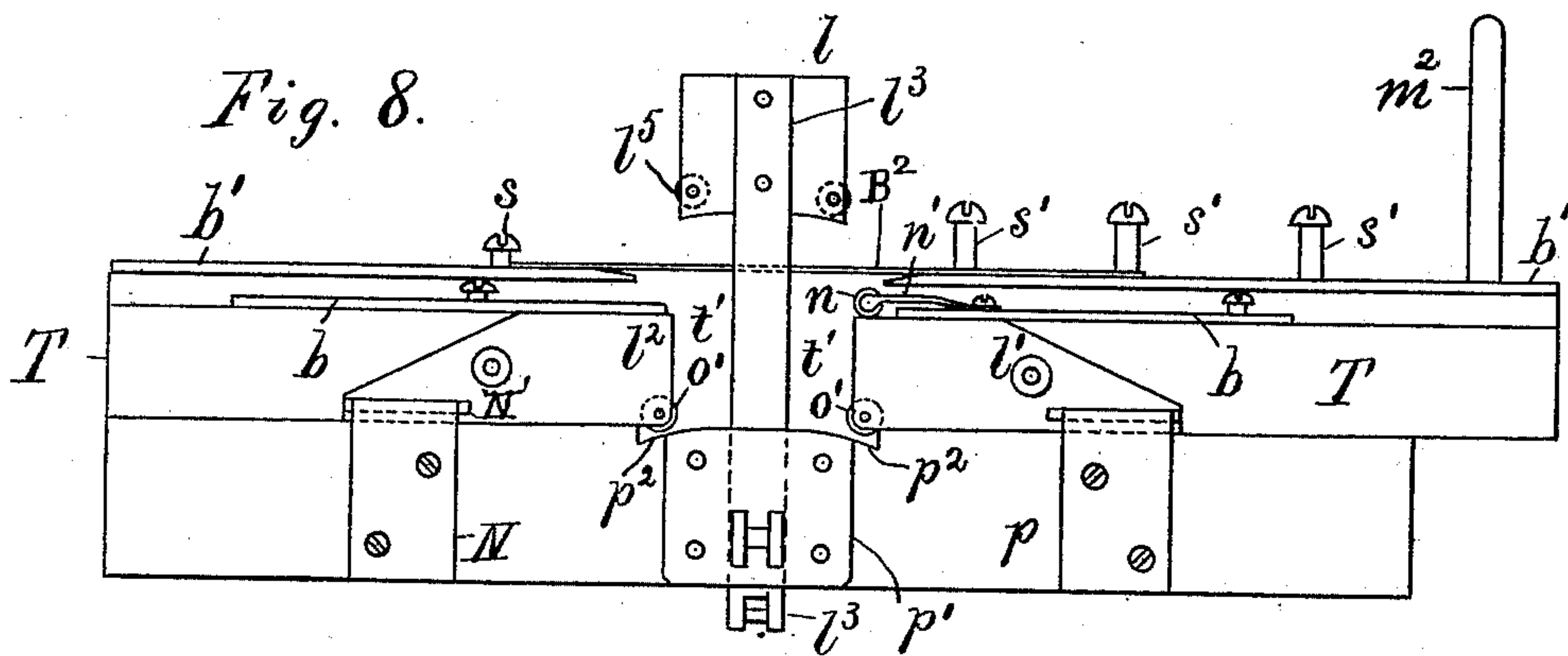
(No Model.)

6 Sheets—Sheet 5.

E. METZENAUR.
PAPER BAG MACHINE.

No. 434,939.

Patented Aug. 26, 1890.



Attest:
W. H. Ward.
F. C. Fischer.

Inventor:
E. Metzénaur, per
Ernst & Wille, Atty.

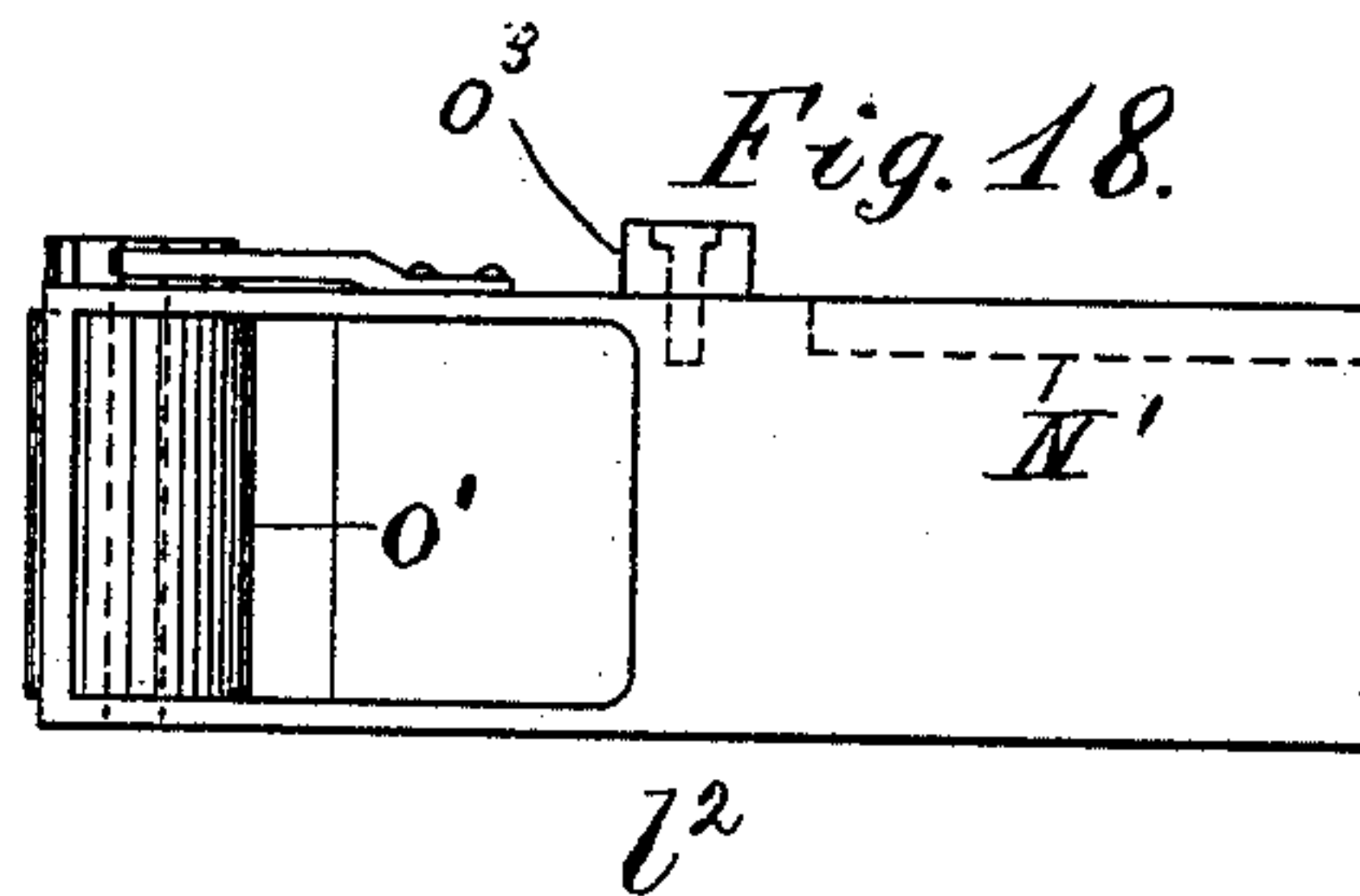
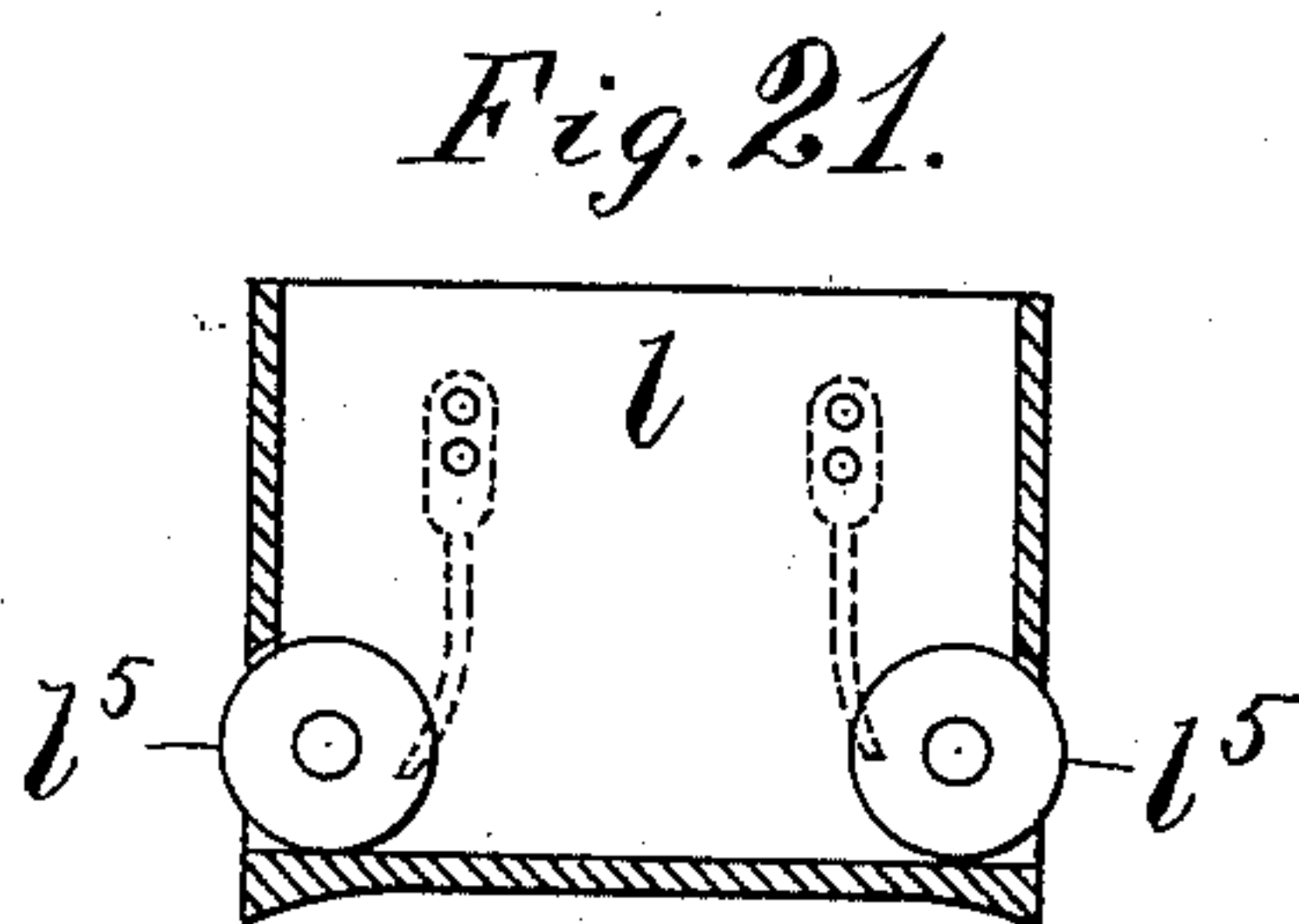
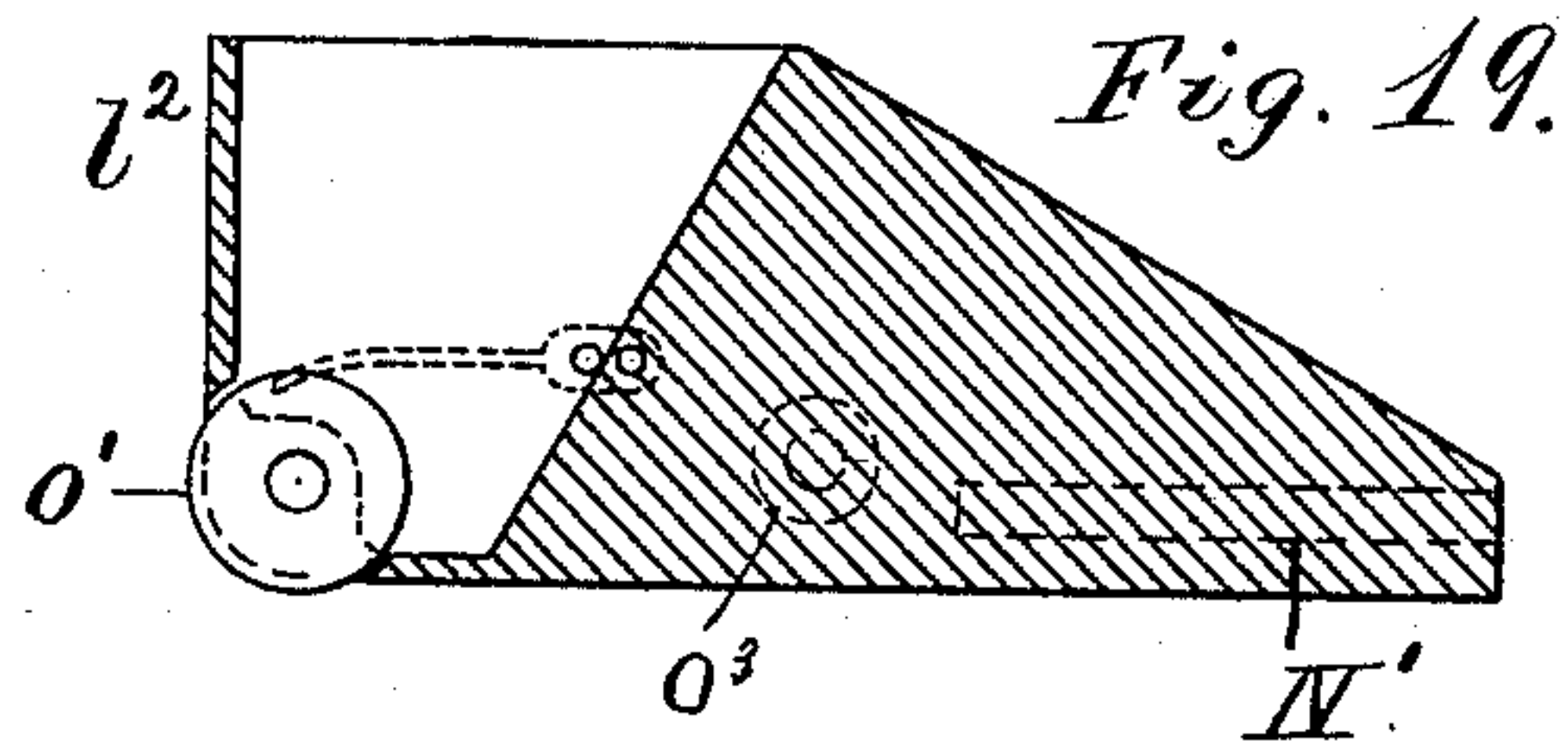
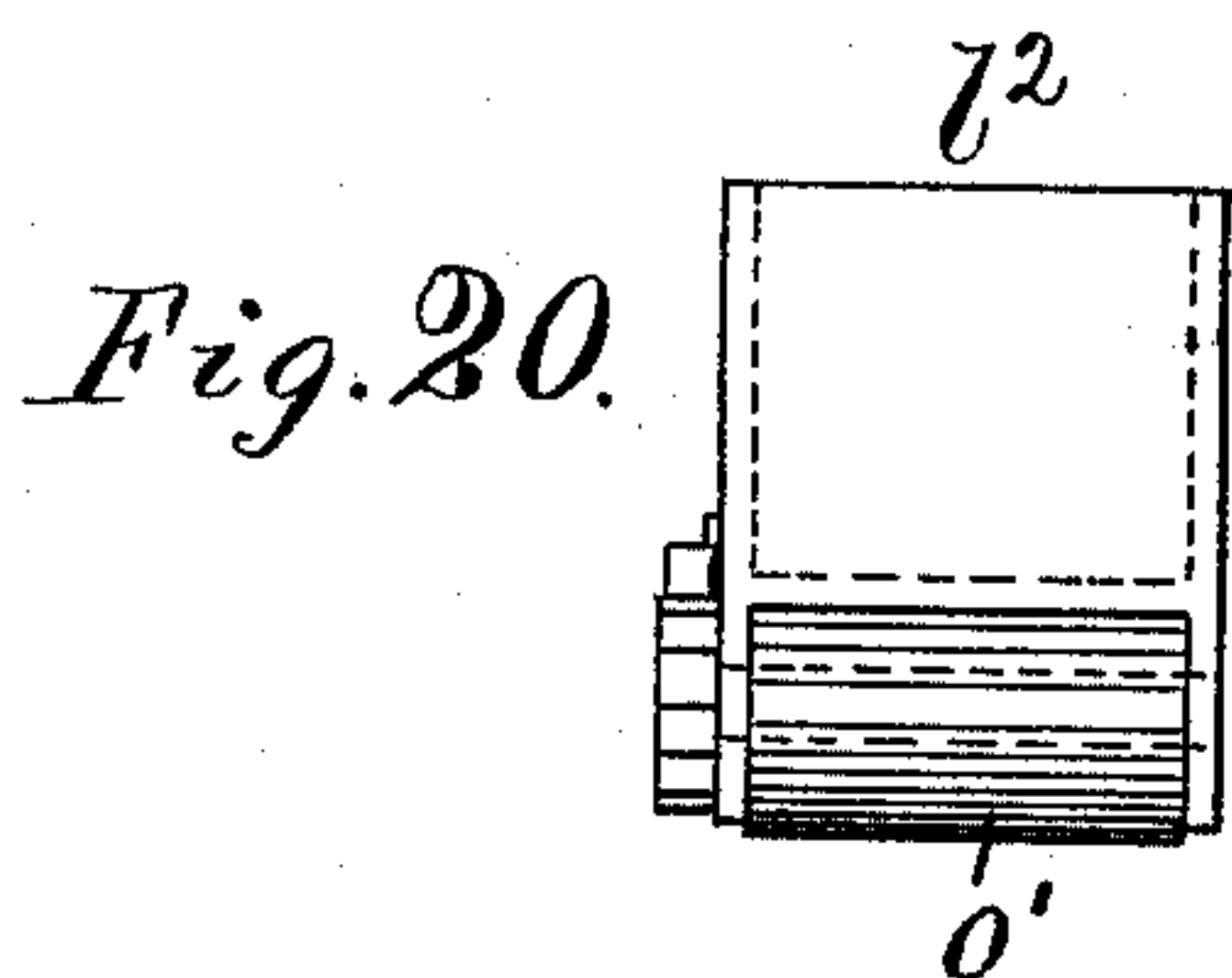
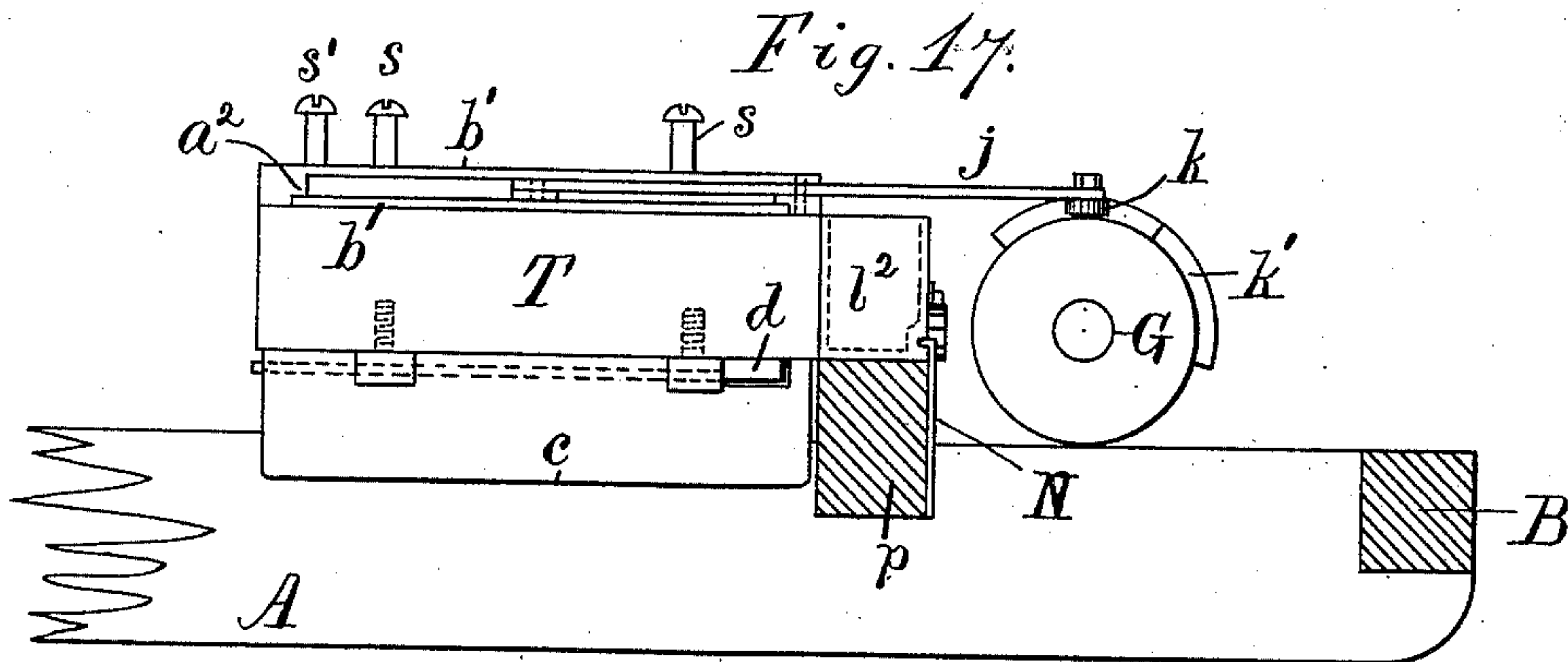
(No Model.)

6 Sheets—Sheet 6.

E. METZENAUR.
PAPER BAG MACHINE.

No. 434,939.

Patented Aug. 26, 1890.



Attest:
L. Lee.
F. C. Fischer.

Inventor.
E. Metzénaur, per
Crane & Miller, attys.

UNITED STATES PATENT OFFICE.

EMIL METZENAUR, OF LITTLE ROCK, ARKANSAS.

PAPER-BAG MACHINE.

SPECIFICATION forming part of Letters Patent No. 434,939, dated August 26, 1890.

Application filed September 10, 1889. Serial No. 323,494. (No model.)

To all whom it may concern:

Be it known that I, EMIL METZENAUR, a citizen of the United States, residing at Little Rock, Pulaski county, Arkansas, have invented certain new and useful Improvements in Paper-Bag Machines, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

10 This invention consists in a paper-bag machine, comprising a series of formers projected radially from an axle, a table with a transverse notch adapted to receive the paper blanks for the bag, the notch being adapted
15 to fold the blank about the former, a gage for setting the paper-blank over the end of the former, slides reciprocated over the notch to form the longitudinal seam of the bag, vertical and lateral folders reciprocated across the
20 end of the former to form the primary folds, and a seat contiguous to the end of the former at its lower edge to form the final fold upon the bottom.

It also consists in certain specific features
25 of such apparatus.

I employ a series of blocks or "formers" projected radially from an iron hub or wheel and rotated in succession adjacent to the folding and pasting devices, the formers being
30 then moved with their outer ends carrying the finished bag in contact with a surrounding belt adapted to press the pasted bottom together until it is sufficiently dried to remove from the former. The formers are
35 provided each with air-holes extending to the corners of the bag-bottom, and with an inlet adapted to connect with a blast-pipe for blowing each bag from the former when dry. By
40 providing a pneumatic conductor adjacent to the former, the air-blast may be utilized to carry the finished bag to any part of the building for immediate use.

The construction and operation of my apparatus will be understood by reference to
45 the annexed drawings, in which—

Figure 1 is a side elevation upon the left side of the machine, the front being that part toward which the radial formers move. Fig. 2
50 is a plan of the machine; Fig. 2^d, the cover of one transverse slide; Fig. 3, a front elevation; Fig. 4, a side elevation in section where hatched of part of the formers, with the mechanism for

making the first fold in the bag-bottom. Fig. 5 is a front elevation, in section where hatched, of the table, with yielding bottom below the notch, a pile of blanks thereon, with
55 paste-cup at their outer ends, and the former in readiness for the blank to be slipped under the same to be folded longitudinally. Fig. 6 is a view of the same parts, excepting the paste-
60 cup and pile of blanks, with the former in the "notch," and the longitudinal seam upon the bag formed by the transverse slide. Fig. 7 is a similar view, with the former pressing the yielding bottom downward to remove the
65 bag B' from the notch when finished. Fig. 8 is a front elevation, in section where hatched, of the table, the seat *p* for the lateral folders, a blank upon the table, and the vertical folder in readiness for operation when the longi-
70 tudinal seam of the bag is completed. Fig. 9 is a view of the seat with the vertical folder pressed down between the lateral folders to make the primary fold upon the bottom of the bag. Fig. 10 is an end view of the bag-
75 bottom at the close of the vertical fold, and Fig. 11 a side view of the same. Fig. 12 is an elevation of the seat with the vertical folder raised and one of the lateral folders advanced to form the first lateral fold. Fig. 13 shows
80 the bottom of the bag with such lateral fold completed. Fig. 14 is a side view of the same. Fig. 15 shows the bag-bottom when both the lateral folds have been made, and Fig. 16 an edge view of the same. Fig. 17 is a side ele-
85 vation in section on line *x x* in Figs. 3 and 8 of the table, the seat, and the appliances for operating the transverse slides. Fig. 18 is a plan of one of the paste-boxes which is operated as a lateral folder. Fig. 19 is a sectional
90 side view of the same, and Fig. 20 an end view of the same. Fig. 21 is a section of the vertical folder.

The frame of the machine is shown formed with two parallel beams A, transverse beams
95 B B² at the front and back, and legs C. The axle D, carrying the formers, is mounted in boxes D' upon the beams A, and the table T is formed adjacent to the beam B. The axle carries a wheel E, from which are projected
100 thirty wooden formers *e*, having each four air-holes *e'* connecting with a single hole *f* at the side of the wheel E. The table T is divided in the middle by a transverse notch *t'*,

Fig. 8, which forms a mold to shape the paper bag when the former is pressed therein, and a seat p is provided adjacent to the outer ends of the formers, with its top on a level with the bottom corner of the same, to carry the lateral folders and to form the final fold upon the bottom of the bag, as shown in the flap a' in Fig. 4. A shaft G is mounted upon the beams A adjacent to the seat and rotated by gears H and pulleys I . A blower J , provided with pulley J' , is actuated by a belt K and a pulley K' upon the shaft G , and the blast-pipe L is conducted from the blower to the side of the wheel E , adjacent to one of the blast-holes f . Slides b rest upon the table-top and are covered by plates b' , upon which the blanks b^2 are laid, as shown in Figs. 5 and 8. Gage-pins s are inserted in the plates to adjust each blank in the desired position in relation to the edges of the former to lap the pasted edge of the paper over the opposite edge of the blank to form the longitudinal fold. Other gages s' set the paper to project over the end of the former the required distance to fold over the same in forming the bottom of the bag. The gages are shown in the detail views as screws with button-heads inserted in the plates b' , and it is obvious that the plates may be furnished with other holes adapted to receive such screws for changing their position, if required.

A false bottom formed of hinged flaps c is provided under the notch t' to hold the paper up against the under side of the former during the making of the bag, the flaps being pressed upward normally by spring-hinges and yielding when the former e moves downward with the bag B' thereon, as shown in Fig. 7.

Ratchet-teeth h are formed upon the wheel or hub E , and an arm h' is pivoted upon the axle D and provided with a spring-pawl h^2 to shift the wheel and bring a fresh former into the notch in the table after the completion of each bag. The arm h' is oscillated by a spring A^6 and by a cam g , fixed upon the end of the shaft G and operating upon a lever g' and link g^2 , jointed to the arm h' .

To prevent the momentum of the wheel E from carrying the formers too far when moved into the notch, the bolt d is fitted underneath the table in a guide d' , and is actuated by a lever d^2 and a link d^3 , jointed to the arm h' . The rotation of the cam g thus brings the formers in succession down upon the paper-blank laid upon the table, as shown at B^2 in Fig. 8, and forces the bolt outward beneath the notch to arrest the former when its upper side is even with the under edge of the slides b . The slides b are reciprocated over the notch to form the longitudinal fold of the bag by means of levers j , pivoted by pins b^4 upon the front edge of the table, and provided at their outer ends with rollers k , fitted to cams k' , attached to the shaft G . The slides b are held close to the table-top by rabbeted guides a^2 , and one of the slides is provided with a

transverse roll n , attached to its forward end by springs n' , which operate to press the roll downward upon the paper as the slide is moved forward, as shown in Fig. 6.

The cams are constructed by attaching curved bars upon a cylindrical shell, each cam being provided with a bar v , adapted to move the slide over the notch, and a bar v' , adapted to retract the slide beneath the plate b' . The movement of the former downward into the notch carries the paper with it and leaves its edges projected above the table, as indicated by the dotted lines B^3 in Fig. 6, and the bars v on the cams k' are so proportioned that the slides are moved forward into the position shown in Fig. 2 as soon as the former has fully entered the notch.

In Fig. 5 the blanks b^2 are shown with a paste-cup m applied to their outer ends to provide one edge of each blank with gum or paste before it is moved against the gage s . The paste-cup is provided with a roll m' , fitted to a suitable aperture in the bottom, and is mounted movably upon vertical guides m^2 , so that its weight rests upon the paper beneath. The operator moves each blank in succession from the top of the pile shown in Fig. 5 to the position shown in Fig. 8, thus partly rotating the roll m' and bringing a fresh roll-surface, moistened with the paste, in contact with the succeeding blank upon the pile. The gage s is so arranged that the former presses nearer to one edge of the paper than the other and produces a longer flap B^3 upon the side where the roller n operates. From the position shown in Fig. 2 the slide, with the roll n attached, moves forward, while the opposite slide b is retracted, the wider flap of the paper with the paste upon its edge being thus pressed by the roll n hard upon the opposite flap and gummed securely thereto. The slide with the roll n is then held in the same position by its cam while the bottom of the bag is formed, which is effected by the projection of the paper over the end of the former and by the operation of three folders l , l' , and l^2 , the first pressing the paper downward over the end of the former, and the lateral folders l' and l^2 moving alternately over the end of the former to press the sides of the bag inward, while the final flap is turned upward to finish the bag-bottom by the movement of the end of the former past the seat p , upon which the lateral folders slide.

The lateral folders (shown separately in Figs. 18 to 20) consist in rectangular boxes movable across the end of the notch t' close to the end of the former by cams v^2 , fitted upon the shaft G , and constructed like the cams k' and operating upon pins o^3 , projected from the front side of the folders. These folders are weighted at their rear ends by a solid construction and recessed at their front ends to receive the paste, rolls o' being fitted in an aperture at the lower corner of the box adjacent to the side of the bag to apply paste to the paper during the folding operation.

A hooked gib N is fixed upon the seat p and fitted in a groove N' in the side of the folder to hold it upon the seat, the folder being removable when required by drawing the groove wholly away from the gib. The vertical folder l is mounted at the upper end of a carrier-bar l^3 , (see Figs. 3, 4, and 8,) which is guided by a bearing p' , fitted to the side of the seat p , and is actuated by a cam G' upon the shaft G , which is connected with the carrier by levers G^2 and links l^4 . The folder l is formed as a hollow rectangular box to contain paste, and rolls l^5 are fitted in apertures at opposite sides near the lower corners of the box to apply paste to the paper, and the same lower corners are slightly projected below its bottom to depress the paper into corresponding recesses p^2 in the top of the seat p when the folder is moved downward. The vertical folder operates first, after the longitudinal fold of the bag is formed, by the roll n being depressed by the cam G' to the position shown in Fig. 9, the rolls l^5 applying paste to the paper at each side in their descent, bending the paper downward to the line marked x in Fig. 10 and indicated by the dotted line x' in Fig. 11, which coincides with the end of the former. The paper is shown in Fig. 9 bent downward by the bottom of the former into the recesses p^2 to facilitate the subsequent lateral folding, and the rolls l^5 are shown pasting the inside of the paper laterally. The vertical folder is then moved upward to the position shown in Fig. 8, and the lateral folder l' is moved to the position shown in Fig. 12, thus pressing inward the paper at one side of the bag, which was previously pasted upon its inner side by the roll l^5 . The paper thus folded over is indicated by the line x^2 in Fig. 13 and the line x^3 in Fig. 14. The recesses permit the paper to fold without tearing. The folder l' then moves backward, and the folder l^2 is advanced, bending over the paper at the opposite side of the bag, as indicated by the line x^4 in Fig. 15, and leaving only a single tongue or flap projecting at the lower edge of the bag, as shown at x^5 in Fig. 16.

The roll o' upon each of the lateral folders distributes paste upon the paper beneath it, so that the next movement of the paper brings the adhesive surfaces into contact with one another to secure a complete union between the different folds. The tongue x^5 , being pasted internally by the folder l^2 , is then bent upward, as shown at a' in Fig. 4, by the downward movement of the former with the finished bag in moving out of the notch t' . The ends of the formers move close to a strap A^2 , which is shown in Fig. 1 stretched over the outer ends of nearly all the formers, being fastened at one end to the under side of the seat p and at the other end by means of clamps T' to standards T^2 adjacent to the table. The clamps T' afford the means of holding the strap with any desired tension to press the bag ends gently upon the ends of the formers. The flap a' thus comes into

contact with the strap as it is moved downward past the seat, and the bottom of the bag is thus held closely upon the end of the former during nearly a complete rotation of the wheel to prevent the flap from loosening before the paste is dry.

In Fig. 1 the blast-holes e' are shown in the former e adjacent to the standards T^2 , and the hole f , connecting with such blast-holes, is shown in the same figure coinciding with the end of the blast-pipe L , so that the bag would be blown from the former when it reached such position in the rotation of the wheel.

The operation of the machine is as follows: A pile of blanks is laid upon the table, as shown in Fig. 5, with the roll m' of the paste-cup m resting thereon. The blanks are then advanced one by one across the aperture t' in contact with the gages s and s' . The machine being then started, the former, as it moves downward into the notch, folds the paper, as shown in Fig. 6, and the slides b then operate to fold down the flaps B^3 and produce the longitudinal fold, as desired. The vertical and lateral folders l l' l^2 are then operated by their respective cams to form the end of the bag. The slides b are then retracted by the cam k' , and the operator advances another paper blank from the pile to its contact with the gages in readiness for the succeeding former. A single revolution of the shaft G produces all the required movements of the machine in an endless succession, including the intermittent rotation of the wheel E , the actuation of the bolt d , and of all the folding and pasting devices, the operator simply moving the blanks forward in turn as soon as the slides have formed their longitudinal flap upon the preceding blank, the paper being thus in readiness to receive the impression of the succeeding former when it descends into the notch.

In making bags with such a machine, it is preferable, as is common in other paper-bag machines, to use machines having formers of different sizes to produce bags of different cross-section; but bags of the same cross-section and different lengths may be readily made in the same machine by properly adjusting the gages s and s' in relation to the former.

By the use of my invention bags may be made with open mouth ready for filling with great rapidity and accuracy, and the bags are delivered without any folding or creasing of the body and are therefore superior in appearance to any bags that are folded or creased in the process of manufacture.

It is immaterial how the cams are constructed and their motion transmitted to the arm h' and to the several folding and pasting devices, as it is obvious that other mechanical equivalents may be substituted for those I have employed without departing from my invention.

The object of the recesses p^2 is to press the

paper which lies upon the seat *p* slightly below the surface of the seat, so that when the lateral folders are moved forward they will not press such portion of the paper edgewise so as to wrinkle and tear it, but will roll the paper at the side of the former gradually over such bottom portion into the position shown in Fig. 13.

The paste-boxes *l'* *l''*, which form the lateral folders, are made solid at their rear ends to overbalance the weight of the hollow portion at the forward ends where the rolls *o'* are projected, and thus prevent the rolls from pressing downward into the recesses, which would counteract the advantage gained by the construction.

Ratchet-wheels are provided upon the ends of the paste-rolls *o'* and *l'*, with spring-pawls pressed therein to prevent the rolls from turning backward in the reverse movement of the several folders after their movement to fold the paper, a fresh surface upon the roll, coated with paste, being thus secured each time that the folder is actuated and the roller moved over the paper.

The air-holes *e'* are shown in the drawings extended to the outer end of each former close to its edges and corners, by which construction the pressure of the air-blast, when operating to discharge the bag from the former, presses upon the paper where it will produce the least strain upon the bag-bottom, and thus prevent the rupture of the fresh paste in the folds.

Having thus set forth the nature of my invention, what I claim herein is—

1. In a paper-bag machine, the combination, with a series of formers projected radially from an axle, of a table with transverse notch adapted to receive the paper blanks, the notch being adapted to fold the blank about the former, a gage for setting the blank over the end of the former, slides reciprocated over the notch to form the longitudinal seam of the bag, vertical and lateral folders reciprocated across the end of the former to form the primary folds, and a seat contiguous to the end of the former at its lower edge to form the final fold upon the bottom.

2. In a paper-bag machine, the combination, with a series of formers projected radially from an axle, of a table with transverse notch adapted to receive the paper blanks, the notch being adapted to fold the blank about the former, a gage for setting the blank over the end of the former, slides reciprocated over the notch to form the longitudinal seam of the bag, vertical and lateral folders recip-

rocated across the end of the former to form the primary folds, a seat contiguous to the end of the former at its lower edge to form the final fold upon the bottom, and a belt pressed upon the ends of the formers to hold the pasted bottoms in place.

3. In a paper-bag machine, the combination, with a series of formers projected radially from an axle, of a table with transverse notch adapted to receive the paper blanks, the notch being adapted to fold the blank about the former, a gage for setting the blank over the end of the former, slides reciprocated over the notch to form the longitudinal seam of the bag, and folders provided with pasting appliances moved in succession over the end of the former to form the bottom of the bag.

4. The combination, with the series of formers *e*, mounted upon the axle *D*, and the table *T*, with transverse notch *t'*, for folding the paper blanks, of the slides *b*, operated to form the longitudinal seam of the bag, and a paste-cup moved transversely to the former at the end and provided with a corner to fold the blank and a roller at right angles to such corner to paste the adjacent flap, substantially as shown and described.

5. The combination, with the series of formers *e*, mounted upon the axle *D*, and the table *T*, with transverse notch *t'*, for holding the paper blanks, of the slides *b*, operated to form the longitudinal seam of the bag, and a paste-cup moved transversely to the former at the end and provided with a corner to fold the blank and rollers at right angles at opposite ends of the corner to paste the inner surfaces of the side flaps, substantially as shown and described.

6. In a paper-bag machine, the combination, with a rotary wheel *E*, provided with a series of holes *f* and a series of formers *e*, projected from the wheel adjacent to said apertures and provided with apertures *e'*, leading from the said holes *f* to the ends of the formers and terminated adjacent to the corners of the formers, of a blower and a blast-pipe having its end adjacent to the said wheel, as described, and suitable devices for pasting and folding the bottom of the bag upon the end of the former over such apertures, as and for the purpose set forth.

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

EMIL METZENAUR.

Witnesses:

THOS. S. CRANE,
L. LEE.