

(No Model.)

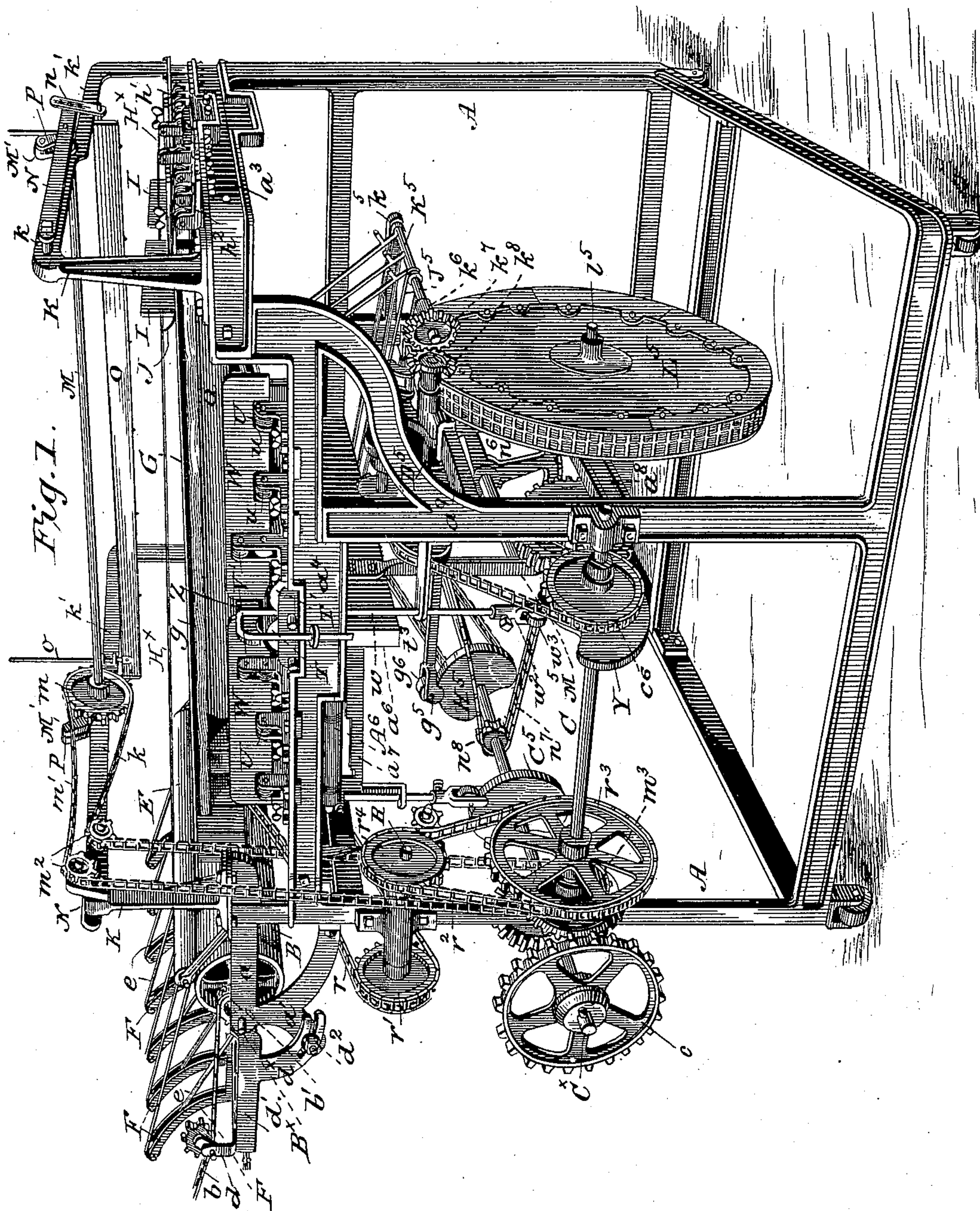
6 Sheets—Sheet 1.

C. N. WALLS.

AUTOMATIC NEWSPAPER FOLDING AND ADDRESSING MACHINE.

No. 590,733.

Patented Sept. 28, 1897.



WITNESSES:

Fred G. Dietrich
W. H. Glouzel.

INVENTOR

Cyrus N. Walls
BY *Munn & Co.*

ATTORNEYS.

(No Model.)

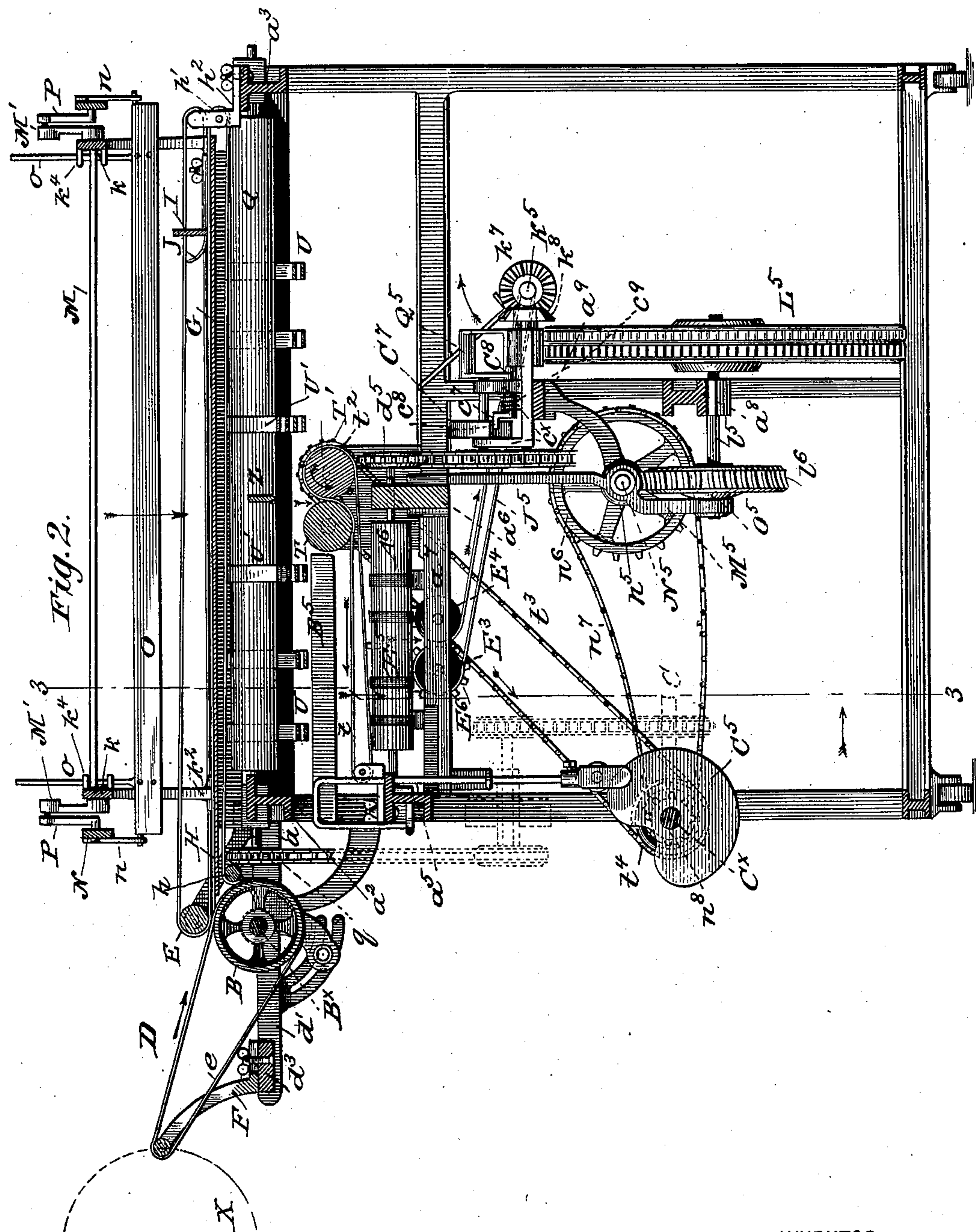
6 Sheets—Sheet 2.

C. N. WALLS.

AUTOMATIC NEWSPAPER FOLDING AND ADDRESSING MACHINE.

No. 590,733.

Patented Sept. 28, 1897.



WITNESSES:

Fred G. Dieterich
W. B. Blondel

INVENTOR

Cyrus N. Walls
BY *Munn & Co*

ATTORNEYS.

(No Model.)

6 Sheets—Sheet 3.

C. N. WALLS.

AUTOMATIC NEWSPAPER FOLDING AND ADDRESSING MACHINE.

No. 590,733.

Patented Sept. 28, 1897.

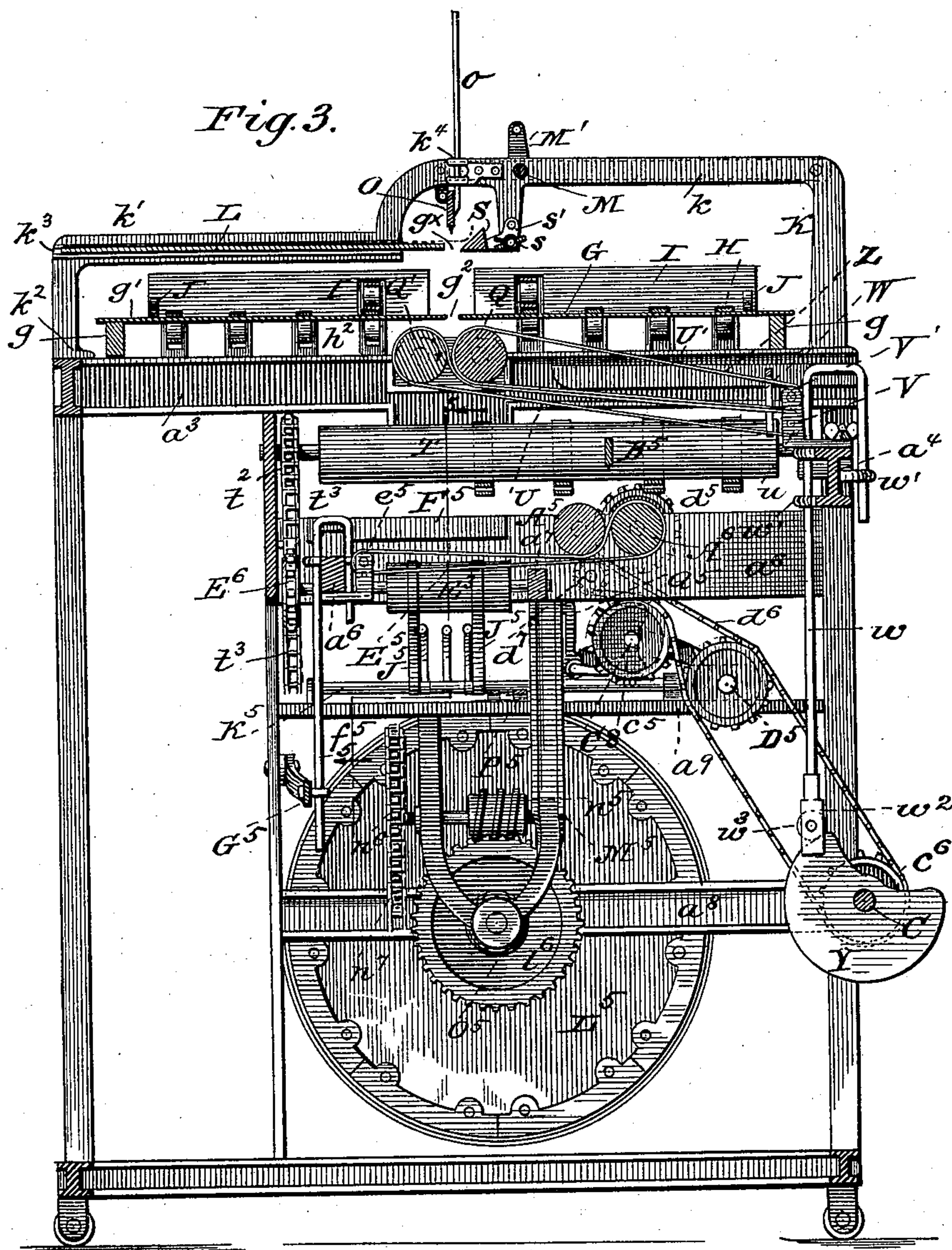
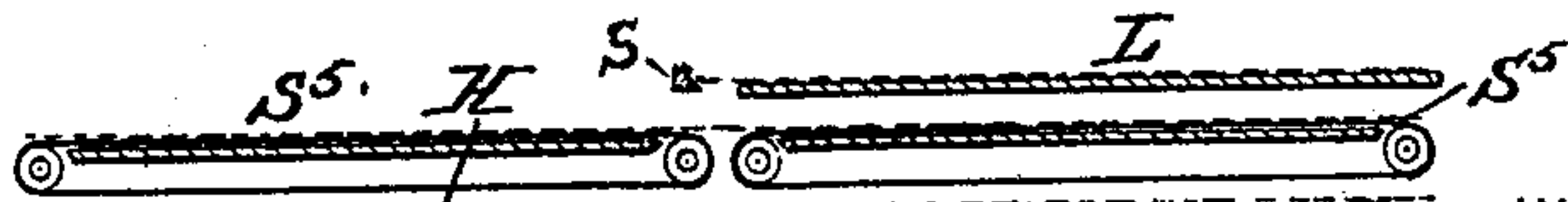


Fig. 11.



WITNESSES:

Fred G. Dieterich
W. D. Plouffe

INVENTOR

Cyrus N. Walls

BY

Munn & Co.

ATTORNEYS.

(No Model.)

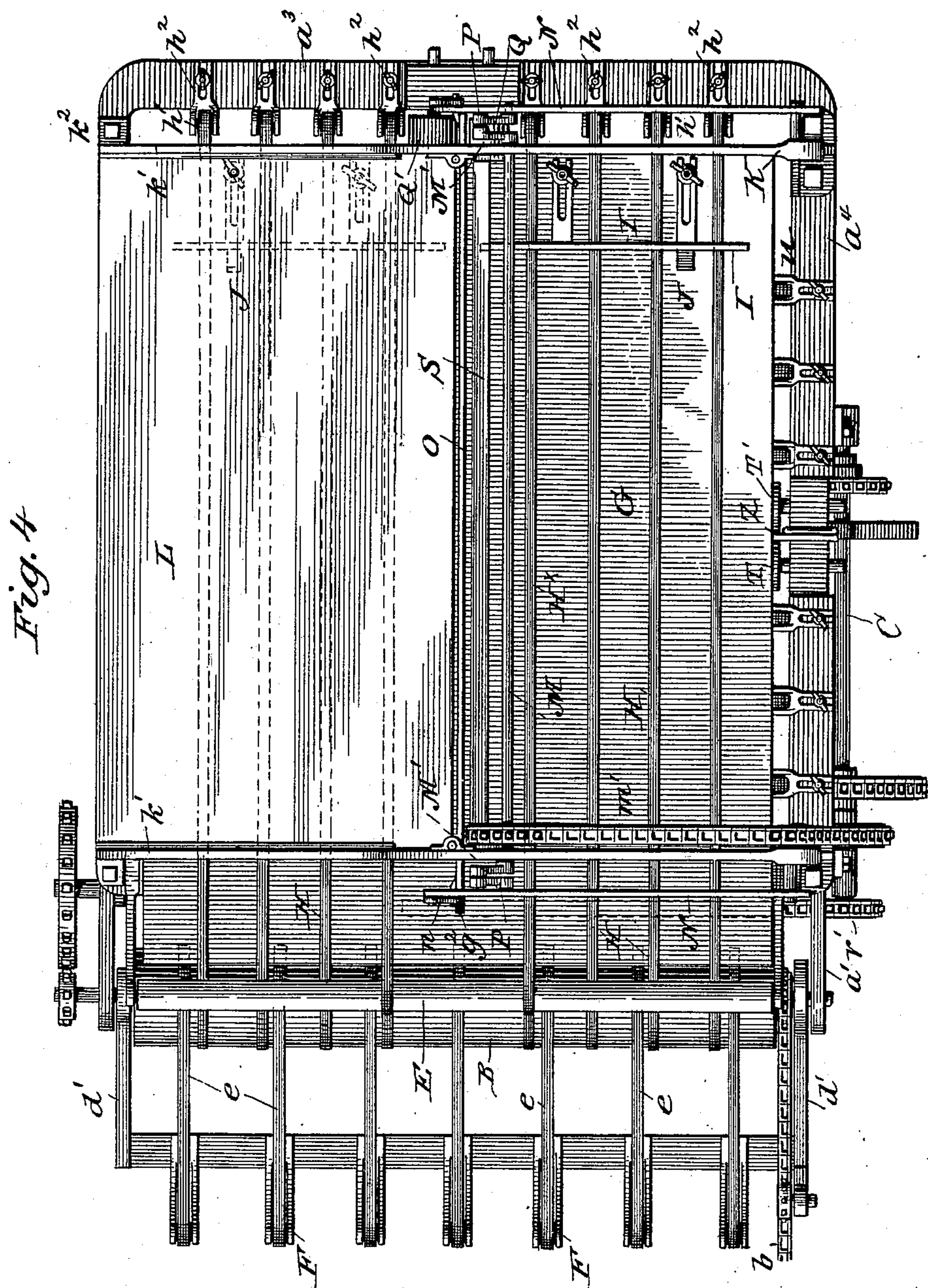
6 Sheets—Sheet 4.

C. N. WALLS.

AUTOMATIC NEWSPAPER FOLDING AND ADDRESSING MACHINE.

No. 590,733.

Patented Sept. 28, 1897.



WITNESSES:

Fred G. Dietrich
W. P. Blondel

INVENTOR

Cyrus N. Walls

BY *Munn Co*

ATTORNEYS.

(No Model.)

6 Sheets—Sheet 5.

C. N. WALLS.

AUTOMATIC NEWSPAPER FOLDING AND ADDRESSING MACHINE.

No. 590,733.

Patented Sept. 28, 1897.

Fig. 5

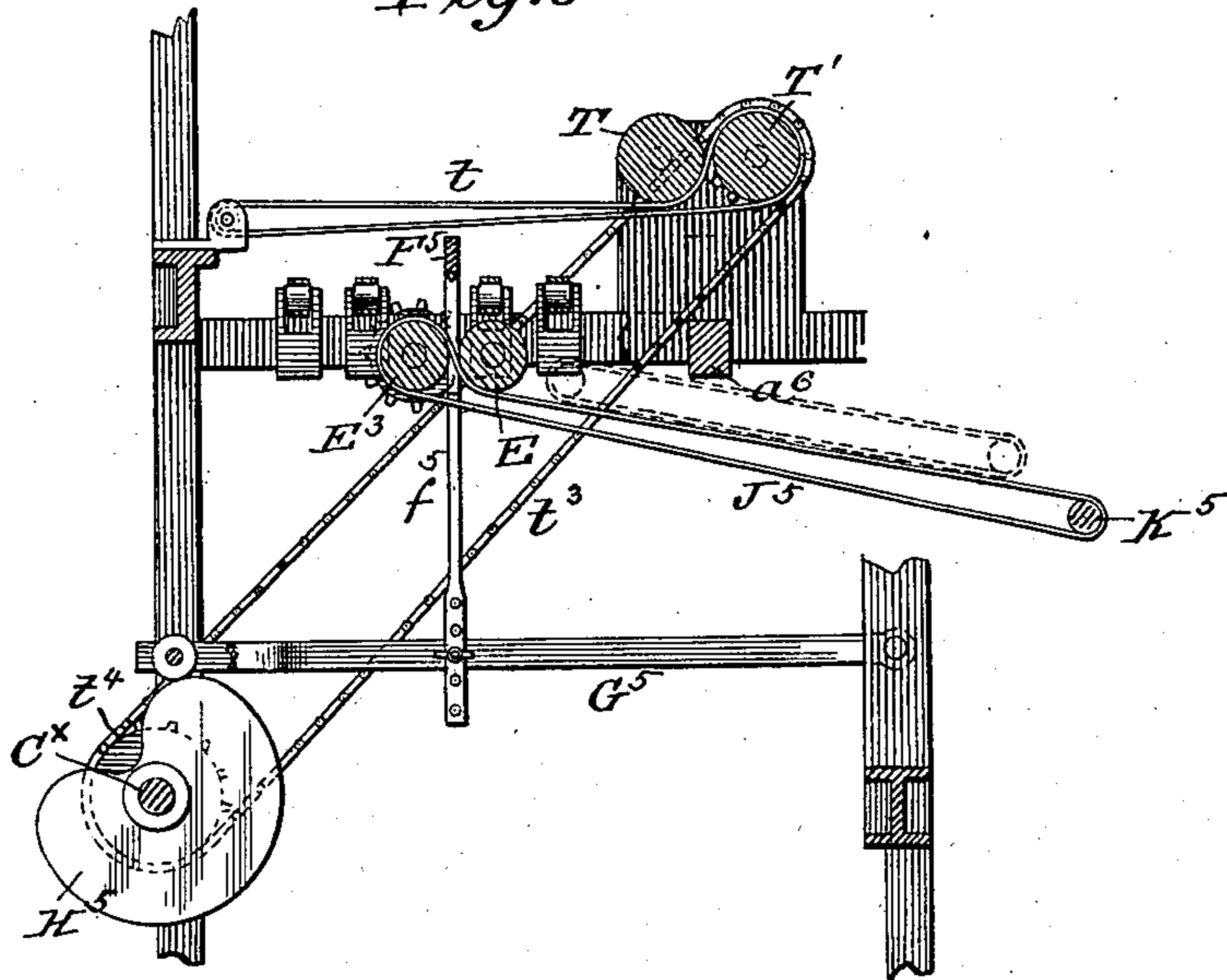


Fig. 6

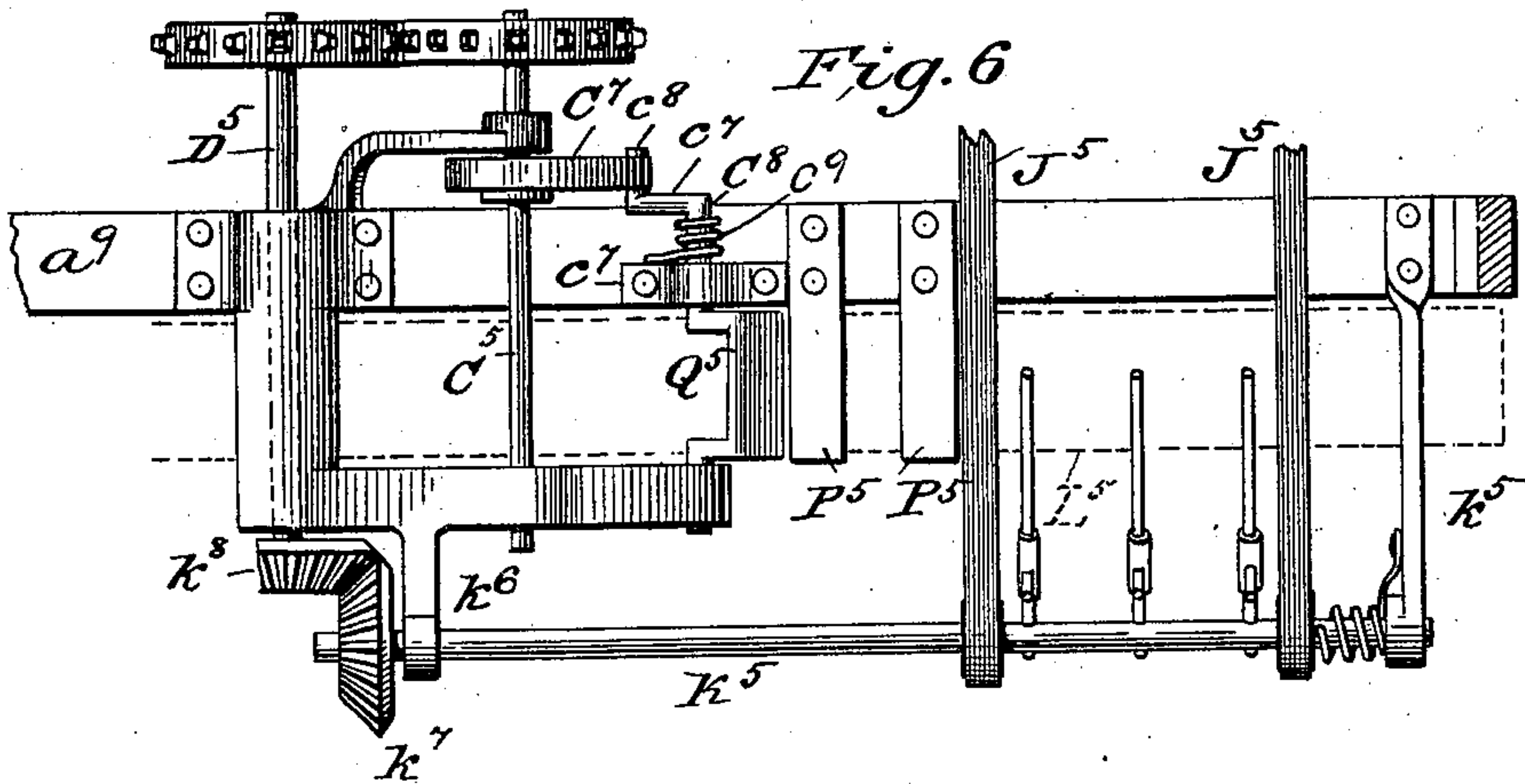
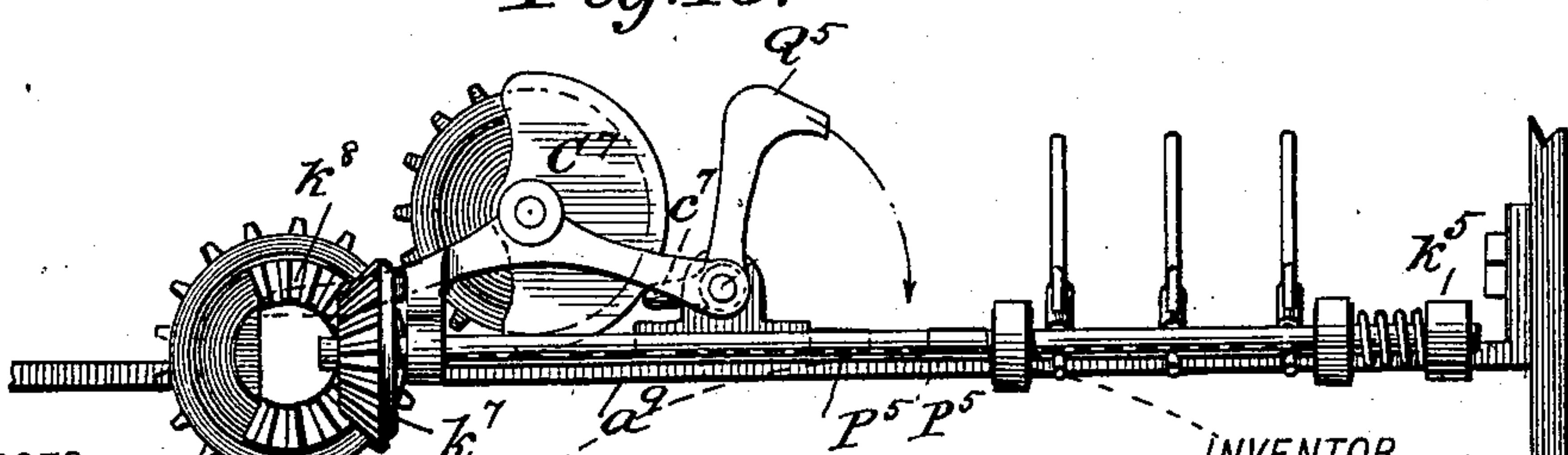


Fig. 10.



WITNESSES:

Fred G. Dietrich

W. D. Blondel

INVENTOR

Cyrus N. Walls

BY Mann & Co.

ATTORNEYS.

(No Model.)

6 Sheets—Sheet 6.

C. N. WALLS.

AUTOMATIC NEWSPAPER FOLDING AND ADDRESSING MACHINE.

No. 590,733.

Patented Sept. 28, 1897.

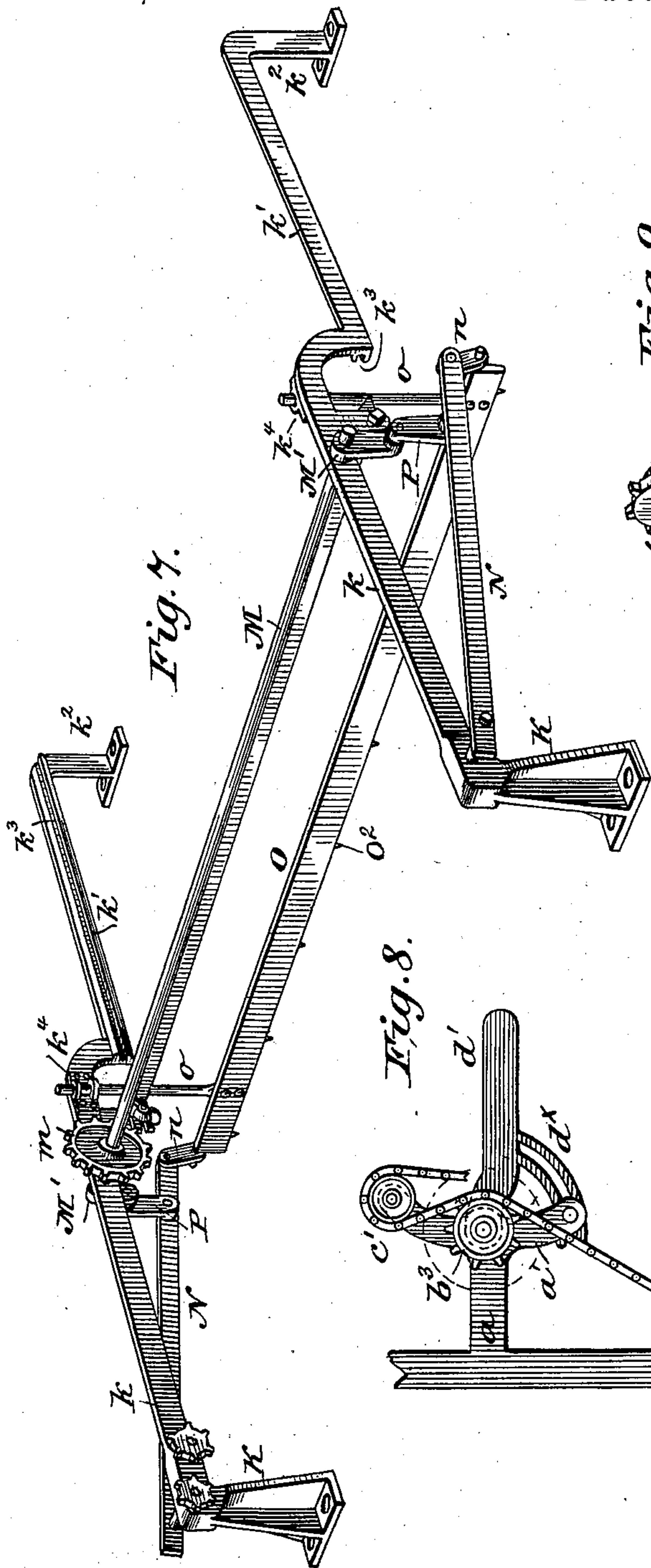


Fig. 4.

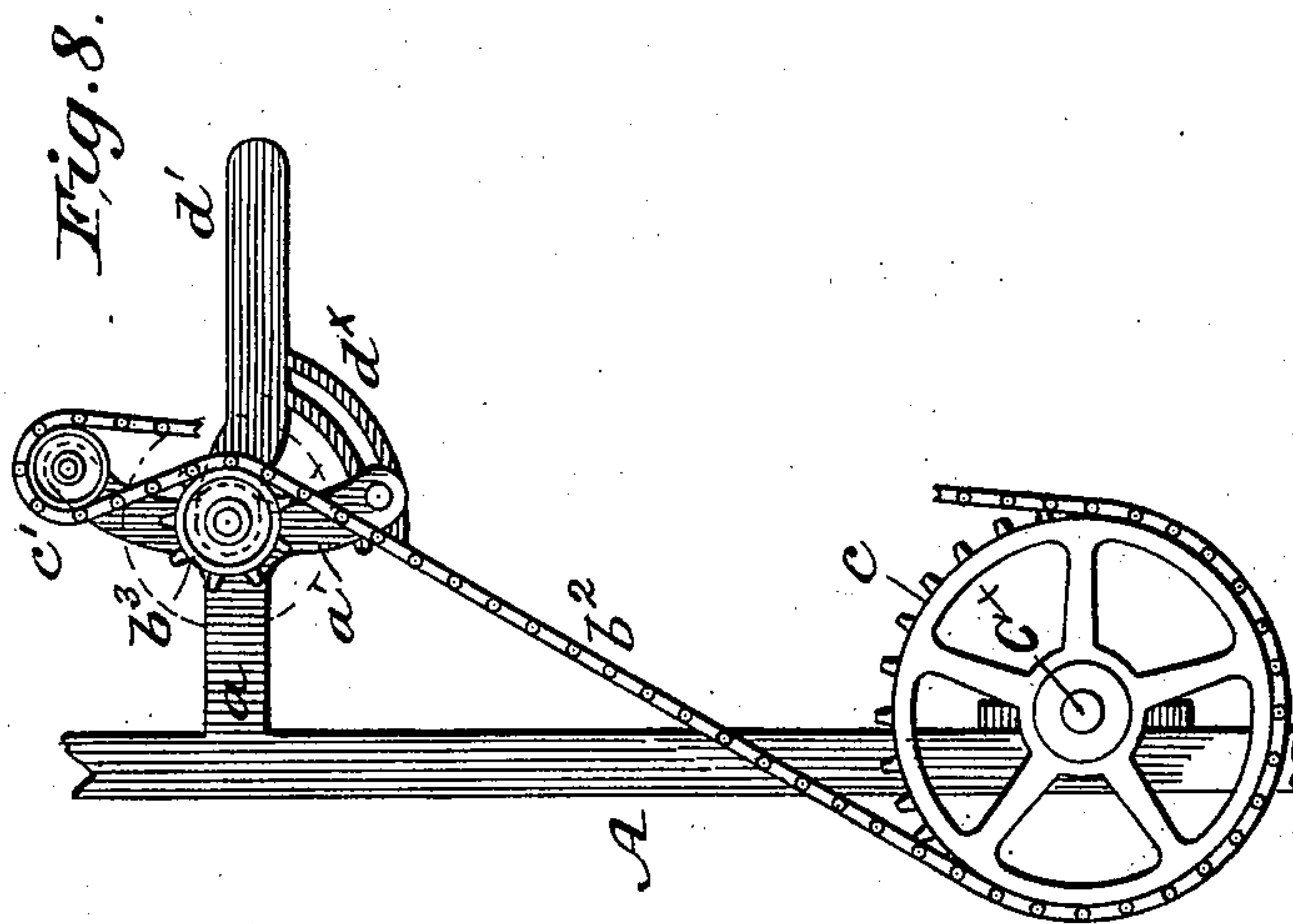


Fig. 8.

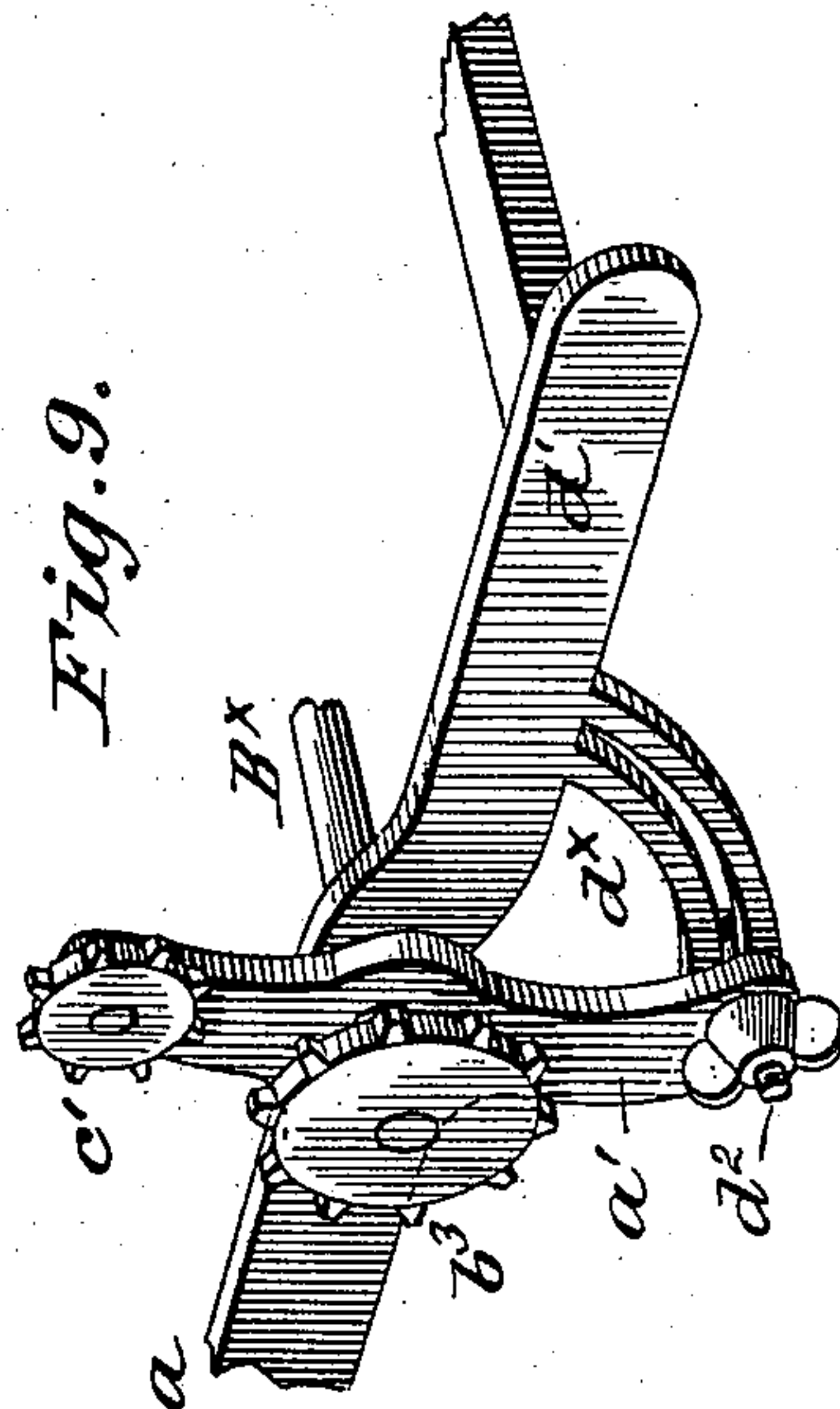


Fig. 9.

WITNESSES:

Fred G. Dietrich

W. H. Bloumel

INVENTOR,

Cyrus N. Walls

BY

Wm. La

ATTORNEYS.

UNITED STATES PATENT OFFICE.

CYRUS N. WALLS, OF TAYLORVILLE, ILLINOIS.

AUTOMATIC NEWSPAPER FOLDING AND ADDRESSING MACHINE.

SPECIFICATION forming part of Letters Patent No. 590,733, dated September 28, 1897.

Application filed May 17, 1893. Serial No. 474,571. (No model.)

To all whom it may concern:

Be it known that I, CYRUS N. WALLS, residing at Taylorville, in the county of Christian and State of Illinois, have invented a new and Improved Automatic Newspaper Folding and Addressing Machine, of which the following is a specification.

My invention relates to a combined folding and addressing machine adapted for use in connection with the modern newspaper-printing presses, from which it receives the printed sheet and in successive operations folds it and delivers it to the addressing devices, from which it is fed to the wrapping mechanism or is discharged onto a suitable receiving-table.

The features of novelty will be hereinafter pointed out.

In accompanying drawings, Figure 1 is a perspective view illustrating the general construction and arrangement of parts of the machine. Fig. 2 is a vertical longitudinal section of the machine. Fig. 3 is a transverse section of the same, taken on the line 3 3, Fig. 2. Fig. 4 is a top plan view thereof. Fig. 5 is a detail vertical section of the same, taken on the line 5 5, Fig. 3. Fig. 6 is a detail plan view of the addressing mechanism. Fig. 7 is a perspective view of the first-fold blade and its operating mechanism. Fig. 8 is a detail view illustrating one way of driving the upper or feed cylinder shaft. Fig. 9 is a detail perspective view of the feeder-frame-adjusting devices. Fig. 10 is a detail view of the addressing mechanism. Fig. 11 is a diagrammatic view of a modification hereinafter referred to.

To clearly set out the operation of the machine and to render its construction the more readily understood, I shall in describing such construction begin at the point where the printed sheet enters and describe the several parts and the operation thereof successively, following as closely as possible the course of the sheet through the machine until it is finally discharged from the addressing mechanism.

Referring to the accompanying drawings, and at this time more particularly to Figs. 1 and 2, it will be noticed the operating mechanism is mounted on a suitably-constructed iron frame A, in practice of substantially the

shape shown, at the upper front end of which is journaled what I term the "main" or "feed" cylinder B, it being mounted in bracket-arms *a a* and may be driven from the printing-press drive mechanism by means of a chain belt *b*, which passes over a sprocket-wheel *b'* on the cylinder-shaft B, as shown in Fig. 1, or by a chain belt *b''*, which passes from the printing-press drive mechanism over a drive-wheel *c* on the main drive-shaft, up over an idler *c'* on the main frame, and held to engage a sprocket-wheel *b''* on the cylinder-shaft, as clearly shown in Fig. 8, the latter arrangement of drive devices being preferred.

The feeder devices D comprise a main frame having side arms *d' d'*, pivotally supported at their inner ends on the cylinder-shaft B^x (see Fig. 9) and formed with downwardly-projecting slotted sector-arms *d''*, with which engage set-screws *d''*, held on the lower end of pendent extensions *a* of the main frame, such construction being provided to permit the receiving end of such platform being adjusted vertically relatively to the discharge-reel X of the printing-press.

It will be noticed by reference to Fig. 2 the outer ends of the arms *d'* are connected by a transverse bar *d''*, and to such bar is adjustably connected a series of upwardly and outwardly curved bifurcated standards F, in the outer ends of which are journaled guide-pulleys, over which pass endless tapes *e*, which extend down and pass over the cylinder B.

I desire to state that from practical experience I have found that to take the sheet from a tapeless delivery-press it is necessary that the receiving tapes or fingers of the feeder project into the delivery-cylinder between the wheels thereof, beyond the outer rim of said wheels, so as to bisect the circumference in order to turn or divert the sheet toward the folder and prevent it from following the contour of the wheels until it falls to the floor between the press and the folder.

Heretofore the receiving fingers or tapes of a folder have been set close up to or against the peripheral edge of the delivery-wheels. In such arrangement, however, the paper cannot be uniformly and successfully delivered. It will thus be seen that by projecting the bifurcated arms beyond the end of the frame D such arms can be projected between

the wheels of the cylinder, as shown in Fig. 2, to a desired degree without being in the path of the ordinary gripper devices of such cylinder.

5 G indicates the main table or platform, formed of transverse bars g g , supported at their ends on the end bars a^2 a^3 of the main frame, and a metal sheet g' , centrally slotted, as at g^2 . Endless bands H pass over this
10 platform and at the front end over the cylinder B, then over a guide-roll h , back under the said platform, and then over a series of pulleys h' h' , mounted in bearings h^2 h^2 , adjustably secured on the end beams a^3 , as most
15 clearly shown in Fig. 2.

At the outer end of the main table or platform G are adjustably secured a pair of stops I I, at the outer end of each of which is secured and projected inward a spring or clamp
20 guide-finger J, the purpose of which will presently appear. At each end the main frame has upwardly-extending standards K K, with which are formed transverse arms k , which project horizontally over the ends of the plat-
25 form G to a point beyond the slotted way g^2 , then curve downward and extend in a lower horizontal plane, as at k' , and terminate in foot portions k^2 , the latter portion k' of the side arms forming bearings for the supple-
30 ment-platform L, the special construction and arrangement of which will appear later on.

M indicates a drive-shaft journaled in the side arms k , which in the practical construction is mounted for a continuous rotation during the operation of the machine, it having
35 a sprocket m , over which passes an endless sprocket-chain m' , which in turn passes over idlers m^2 m^2 , journaled on the inner standard K, and down over a sprocket m^3 on the main
40 drive-shaft C. This shaft M operates the first or main folding-blade, and such blade, it should be stated, to accomplish its purpose must have a vertical intermittent reciprocating motion over and through the slotted way
45 g^2 . To transmit such motion from the continuously-rotating shaft M in a positive, simple, and effective manner, I employ the intermediate connections shown most clearly in Fig. 8, by reference to which it will be
50 seen that to the outer faces of the standards K are pivoted swinging arms N, the outer ends of which have link connections n n with the blade O, which blade has guide-arms o o , held for vertical movement in guideways k^4 k^4
55 on the inner faces of arms k , such arms N being also provided near their outer ends with crank members P on their inner face, which are pivotally connected with crank members M' on the ends of the shaft M.

60 By providing operating devices for the folder-blade O in the manner shown and described it will be manifest that at each complete rotation of the shaft M the arms N will be carried up and down and temporarily
65 held in their horizontal position, and while they will freely reciprocate at a point below the axis of the shaft M they will not be car-

ried above same. Thus should the blade O be in its lowermost position, as shown in Fig. 7, the cranks M' will be at their lowest thrust. 70
Now as such cranks rise they will carry the arms N up with them until they (the cranks M') reach their horizontal position, at which time the axis of the cranks M' and P will be in alinement, and the blade O being at this 75
time under the arm k the axis of the crank P becomes a fixed fulcrum until the cranks M' and P pass beyond their uppermost thrust and they reach their opposite horizontal po- 80
sition, when the blade and its arms will descend. It will thus be seen that during approximately each half-rotation of the shaft M the blade O will be held to its upper position. It will also be readily understood that by connecting the blade O to the arms N by 85
the link connection a vertical movement of the blade is obtained from the swinging or arc movement of the arms N.

Journaled longitudinally under the platform G are a pair of rollers Q Q', which form 90
the first folders and are arranged one at each side of the slot or way g^2 to receive the sheet as it is pressed down through such way g^2 in the manner hereinafter stated. These rollers Q Q', which extend entirely under the 95
platform G, as most clearly shown in Fig. 3, are journaled in bearings in the side beams a^2 a^3 , and the shaft of one of such rollers Q, which forms the drive-roller, is extended and provided with a sprocket q , which receives 100
motion from the chain r , which also passes over a sprocket r' on a short shaft R, journaled on the main frame and driven by the belt r^2 , which passes over a drive-wheel r^3 on the main shaft C and a sprocket-wheel r^4 on 105
the shaft R.

The operation of the machine so far as described is explained as follows: The printed paper sheet, which we will assume is an eight-
110 page sheet, as it passes from the press is carried down over the platform D, under the roll E, between the tapes H and upper guide-tapes H^x, over the main platform G, which carry it across until the front edge thereof strikes the stops I I, the ends of such edge passing under 115
the clamp-guides J, which clamp-guides hold the sheet from rebounding. At this time the blade O will have been lowered to engage the paper sheet to force its central portion down into the slotted way g^2 , and as it does so it 120
pushes the folded edge between the rolls Q Q'. Before following the course of the paper further, I will describe the supplement-feeding devices, as the supplement and the main sheet are carried through the succeeding operations 125
together.

The supplement-table L is mounted on lateral flanges k^3 , formed on the inner faces of the arms k' , its front edge being close up to the path of the blade O. At a point in front 130
of the blade and parallel with the front edge of the table L is an adjustable stop S, formed with an upwardly inclined or beveled face, it being held for adjustment by the set-screws

s s and the arms s' s', pivoted to the arms k. It will be noticed by reference to Fig. 3 the stop-bar S is so arranged relatively that the supplement-sheets, which lie on the platform L and which are fed by hand, as they are fed forward will pass over the way g^x between the platform L and the bar S, and as the end of the paper engages the bevel-face of such bar it is arrested and curls slightly upward, as shown, to form a lap or fold edge, with which the blade O engages on its downward thrust. When a supplement is to be run through the machine, the blade is provided with spur-fingers o^2 , which grip the end of the sheet and carry it positively down inside the main-sheet center fold. By making the stop S adjustable a longer or shorter lap-fold on the supplement may be provided for.

Referring now to Fig. 3, it will be readily apparent that after the paper has received its first or central fold and the supplement fed inside it it passes with its fold end between the rolls Q Q', which complete the first fold, and which serve to start such sheet onto the next set of rollers, which are indicated by T T, and are arranged at right angles to the rollers Q Q' and centrally of the machine. Endless bands U are passed over the roll Q', under the roll Q, and over guide-pulleys U on the front bar a^4 of the main frame, in advance of which stop-plates W are provided, which limit the movement of the paper as it is fed toward the second-fold rolls. To hold the paper down and even against the carrier-tapes U, a pair of endless guide-tapes U' are provided, which pass over rolls V' on the inner pair of standards V and over the roll Q, as clearly shown in Fig. 3.

Projected inward from the front side and centrally over the second-fold rolls T is a gravity folding-blade Z, which is secured at its outer end to a vertically-movable rod w, guided in eyes or bails w' on the front bar a^4 , and which has at its lower end a bifurcated socket w^2 , in which is journaled a friction-roller w^3 , which rides upon a cam Y, mounted upon the main drive-shaft C, as clearly shown in the drawings. This cam, it should be stated, is so adjusted relatively to the feed of the paper that when the first-fold sheet reaches the stops W the blade Z will drop and double the first-fold sheet up and force its fold between the second-fold rolls T, after which it (the blade) is again moved up by the cam and held up until the next folded sheet comes in its proper place. So far as described it will be seen the paper as it receives its first fold is carried at right angles toward the front side of the machine and is brought into contact with rolls T T'. These rolls also comprise a drive-roll T', over which endless bands t pass, and a guide, under which the bands pass, the front ends of such bands passing over guide-pulleys adjustably mounted on a cross-bar a^5 at the front end of the machine. The drive-roll T' has a sprocket t^2 , over which passes a chain belt t^3 , which re-

ceives motion from a sprocket t^4 on a drive-shaft C^x, mounted on the frame A at right angles to and geared with the main drive-shaft C, as shown in Fig. 2.

It will be noticed by referring to Fig. 3 that the folded paper as it passes between rolls T T' has its second fold completed and is carried at right angles to its previous feed over the third-fold rolls A⁵ A⁶, journaled in the end bar a^5 and a cross-bar a^6 . Projected centrally over the rolls A⁵ A⁶ is the third-folder blade B⁵, which is constructed similar to blade Z and is operated by a cam C⁵ on the shaft C^x.

The drive-roll A⁶ has a sprocket-wheel d^5 , which receives its motion by the chain d^6 , which passes over an idler d^7 and engages the sprocket d^5 and passes over a sprocket c^5 on the address-printing or plunger-operating cam-shaft C⁸ and a sprocket-wheel on the fly-operating drive-shaft D⁵, presently referred to, and receives motion from a sprocket-wheel c^6 on the main drive-shaft C, as most clearly shown in Fig. 3.

E⁵ indicates the bands which pass over the rolls A⁵ A⁶ and over guide-rolls e^5 , adjustably secured on a cross-beam a^6 of the frame, and such tapes lead the triple-folded sheet over the fourth-fold rolls E³ E⁴, mounted in the cross-beam a^6 and a cross-beam a^7 .

F⁵ indicates the fourth-folder blade, which is constructed similar to blades Z and B⁵, except that its rod f^5 is connected to a transversely-pivoted arm G⁵, the front end of which has a bifurcated bearing g^5 , in which is journaled a roller g^6 , which engages an operating-cam H⁵ on the drive-shaft C^x. The drive-roll E³ has a sprocket E⁶, which receives motion from the sprocket-chain t^3 , as clearly shown in Fig. 2.

The paper, after it receives its fourth and final fold, is carried to the outer end of the machine by the endless bands J⁵, which pass from the drive-roll E³ to the fly-shaft K⁵, which is located adjacent to and operates in connection with the addressing devices, which are most clearly shown in Figs. 1, 2, and 6.

Journaled on a bar a^8 on the main frame is an addressing-wheel L⁵, on the peripheral edge of which are secured the address-types, which are secured in any well-known manner, but preferably in sections, as shown. The inner end of the shaft l^5 of the wheel L⁵ is also journaled in a depending yoke-frame M⁵, and on such shaft is fixedly held a worm-gear l^6 , with which meshes a worm-pinion n^5 on a shaft N⁵, which shaft has a sprocket-wheel n^6 , which is driven by a chain n^7 , which engages a sprocket-wheel n^8 on the shaft C^x, and to hold the wheel L⁵ from a too free movement and also to serve to tighten the chain a friction-disk O⁵ is placed between the worm-gear l^6 and the yoke-frame, as clearly shown in Fig. 2.

It will be manifest that in the practical construction of the machine the several drive mechanisms are so adjusted and constructed

relatively to each other that each set of devices will operate at predetermined intervals, whereby to successively fold and feed the sheet and deliver it to the addressing mechanism, the addressing-wheel-operating devices being so adjusted as to turn it (the wheel) one address as each folded paper is fed onto the fly.

Projected out from a cross-bar a^9 is a bed-plate consisting of parallel arms P^5 , which project centrally over the upper central point of the wheel L^5 , between which arms the proper address-type appears at each movement of the plunger or printing arm Q^5 . This plunger-arm is mounted on the rock-shaft C^8 , journaled in bearings c^x , and such rock-shaft has a crank-arm c^7 , formed with a lateral finger c^8 , such rock-shaft being held to rock in the direction indicated by the arrow in Fig. 10 by means of a torsion-spring c^9 . The cam-shaft C^5 , before referred to, is also journaled in the bearing c^6 and has a cam c^7 , which engages the finger c^8 and serves, when its concentric face engages it, to hold the plunger Q^5 up, it being understood that when the cam portion comes in place the spring c^9 will force the plunger down between arms P^5 .

The fly-shaft K^5 , before referred to, is journaled in front of the upper edge of the wheel L^5 at one end in an arm k^5 and at its other in a bearing-block k^6 , secured upon the bar a^9 , and carries at such end a pinion k^7 , which meshes with a mutilated pinion k^8 on the drive-shaft D^5 , before referred to. It will be noticed by reference to Fig. 6 that the bands which lead the paper to the fly-shaft and the fly-fingers are so arranged that the four-fold sheet will be carried onto the fly with its marginal edge projected over arms P^5 . In the practical construction the fly-shaft is held rocked in one (inward) direction by a spring or other equivalent device, whereby when its drive-pinion becomes disengaged from the mutilated drive-gear the fly-fingers will be thrown inward and down to receive the folded sheet and is held down during the time the mutilated and drive gears are disengaged. At this time the plunger Q^5 is released and is thrown down to make the imprint on the paper, after which it again rises through the medium of the cam-lifting mechanism before referred to. After the impression is made the mutilated gear engages the fly-shaft and rocks it outward to discharge the paper with the address printed thereon onto a suitable platform or to wrapping devices, if desired.

The type on the addressing-wheel is in practice inked by a ribbon or with a brayer by hand before the wheel is placed on the shaft, if desired. After the paper issues from the last-fold rolls it passes upon the fly, on which are the three projections or stops. (Plainly shown in Fig. 1.) The instant the paper stops the printing-arm Q^5 , Fig. 10, descends upon the paper, presses the paper upon the type, and thereby prints the address. The print-

ing-arm is immediately lifted, and the fly piles the paper on a suitable table or box.

In Fig. 11 I have shown in a diagrammatic view an additional feed-table, which is used in connection with the construction above described when it is desired to fold a twenty-page paper. In such construction a feed-table S^5 , arranged at right angles to the platform D , is employed, from which a full sheet (eight pages) is fed onto a carrier S^5 , arranged beneath the supplement-table, and which is arranged to feed the paper-sheet transversely to the main sheet. By this construction it will be seen that as the first folder-blade lowers it carries the main eight-page sheet and supplemental eight-page sheet, as also the supplement two or four page sheet.

From the foregoing description, taken in connection with the drawings, the complete operation of my improved machine will be readily understood.

It will be noticed that by arranging the first folder-blade-operating mechanism in the manner described a very positive, effective, and simple means is provided for the purposes stated. It will also be observed that while the first and third folder-rolls are operated from the main shaft C the second and fourth rolls are operated from the shaft C^x .

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A newspaper folding and addressing machine comprising a feed or receiving table, a main folding-platform centrally slotted, feed-tapes passing over such platform from the receiving-table, a reciprocating folder-blade operating over and through the slotted platform, a rotary addressing-wheel, an intermittently-operating arm, an intermittently-operating fly-shaft, a series of folder-rolls arranged in pairs, transversely to each other and to successively receive and fold the paper, folding-blades, operating to double up the paper between the folder-rolls, endless tapes connecting the several folder-rolls, the tapes of the last set passing over the fly-shaft, and intermediate gear mechanism between the feed-tables, the tapes, folder-rolls, printing-plunger and fly-shaft and folding-blades, all arranged substantially as shown and for the purposes described.

2. In a newspaper-folding machine, the combination with the main folding-platform, guide-rolls at the outer end thereof, arms extended from the feed side of said main frame, the main feed-cylinder B , journaled therein and the endless tapes passed over such cylinder and guide-rolls, of an outwardly-extending frame composed of side arms d' connected at their outer ends by a bar d^3 , hung at their inner ends on the cylinder-shaft, the means for holding such arms to their adjusted positions, the vertically-extending arms F adjustably held on the bar d^3 having guide-rolls in their upper ends and the endless tapes passed over such outer guides and the feed-

cylinder all arranged substantially as shown and for the purposes described.

3. In a newspaper-folding machine, the combination with the centrally-divided main platform G, the supplement-platform L and the reciprocating folder-blade and first-fold rolls arranged substantially as described, of the stop S, having a front beveled face, arranged parallel with the discharge edge of the supplement-platform, said stop having a rear pivotal support whereby its front face can be adjusted to change the angle of its bevel portion with the platform L and means for holding it to its adjusted positions, as and for the purposes set forth.

4. In a paper-folding machine substantially as described, the combination with the main frame, the standards K, the rotary shaft M, the main drive-shaft C geared with the shaft M, the slotted platform G and the first-fold rolls Q Q', of the folder-blade O, the swinging arms N N, pivoted to the standards K, the link connections *n n* between the arms and the ends of blade O, the crank members M' on shaft M and crank members P on the arms N, said cranks connected and arranged substantially as shown and for the purposes described.

5. In a paper-folding machine, in combination, a feed-table, a main folding-platform centrally slotted, tapes operating over it to feed the paper thereon, from the feed-table, a primary set of supplemental tables, arranged over the main platform one at each side of the slot, endless tapes on such supplemental tables arranged to feed the sheets toward the said slot and at right angles to the main sheet-feed, a secondary supplement-table over one of the primary tables, transverse stops at the

inner ends of each of the supplemental tables, a pair of folding-rolls under the slotway in the main platform, a folder-blade vertically movable between the stops and the ends of said table and through the slotted platform, between the rolls, whereby it will draw the ends of the supplement-sheets down between the rolls as the main sheet is doubled up between them all substantially as shown and described.

6. In a paper-folding machine the combination with the paper-folding rolls, the drive-shafts C and C^x, a fly-shaft gear mechanism for effecting an intermittent rocking motion thereto, operated by shaft C, feed-tapes extending from the last-fold rolls to such shaft, a continuously-rotating addressing-wheel, operated from the main shaft C^x and an intermittently-operated presser-arm operated by the drive-shaft C all arranged substantially as shown and described.

7. The combination with the main drive-shaft C, the folding-rolls arranged substantially as shown, the fly-shaft, the intermediate operating mechanism between such shaft and shaft C, of an addressing-wheel, the feed-tapes from the last rolls arranged to pass over the fly-shaft, the paper supports or rests P⁵ P⁵, the spring-actuated presser or printing-arm Q⁵, and a cam mechanism for elevating such arm Q⁵, and the intermediate gear connections between the said cam and the drive-shaft C, all arranged substantially in the manner shown and described.

CYRUS N. WALLS.

Witnesses:

JESSE F. BOLEN,
R. C. HARNER.