

No. 635,866.

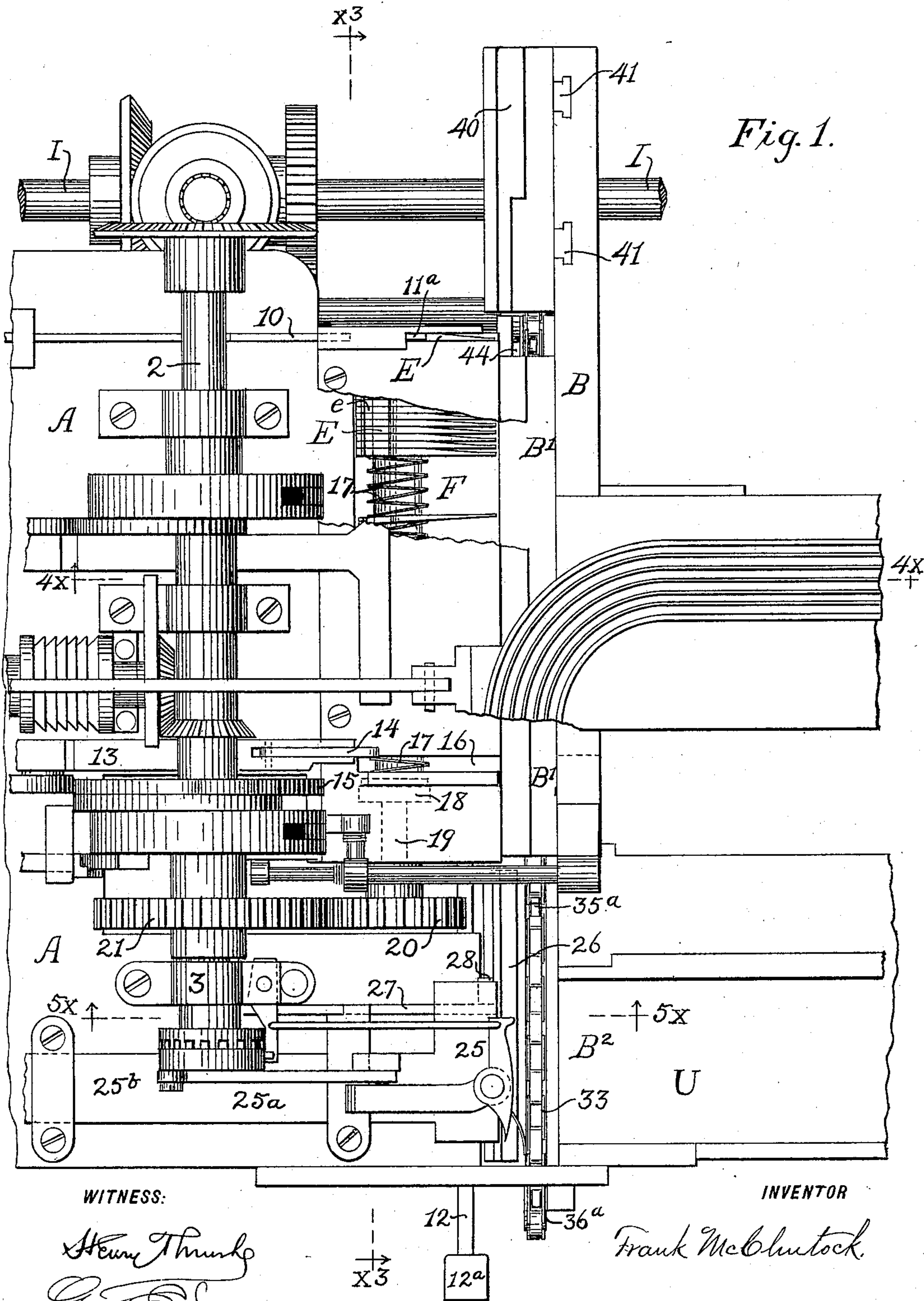
Patented Oct. 31, 1899.

F. McCLINTOCK.  
MACHINE FOR JUSTIFYING TYPE.

(Application filed Apr. 4, 1899.)

(No Model.)

4 Sheets—Sheet 1.



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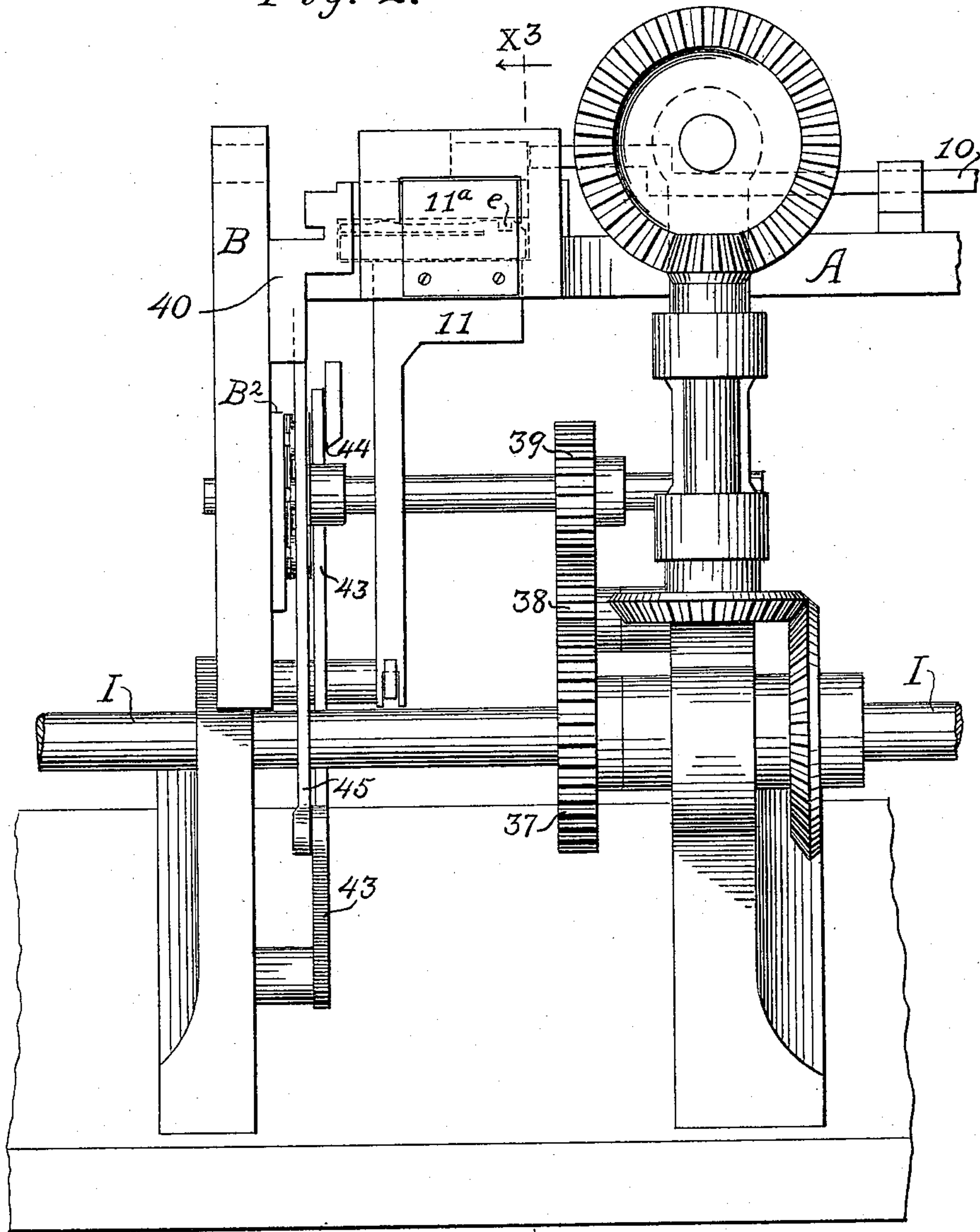
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Fig. 2.



WITNESS:

Henry Throck  
Geo. E. Jones.

INVENTOR

Frank McClintock



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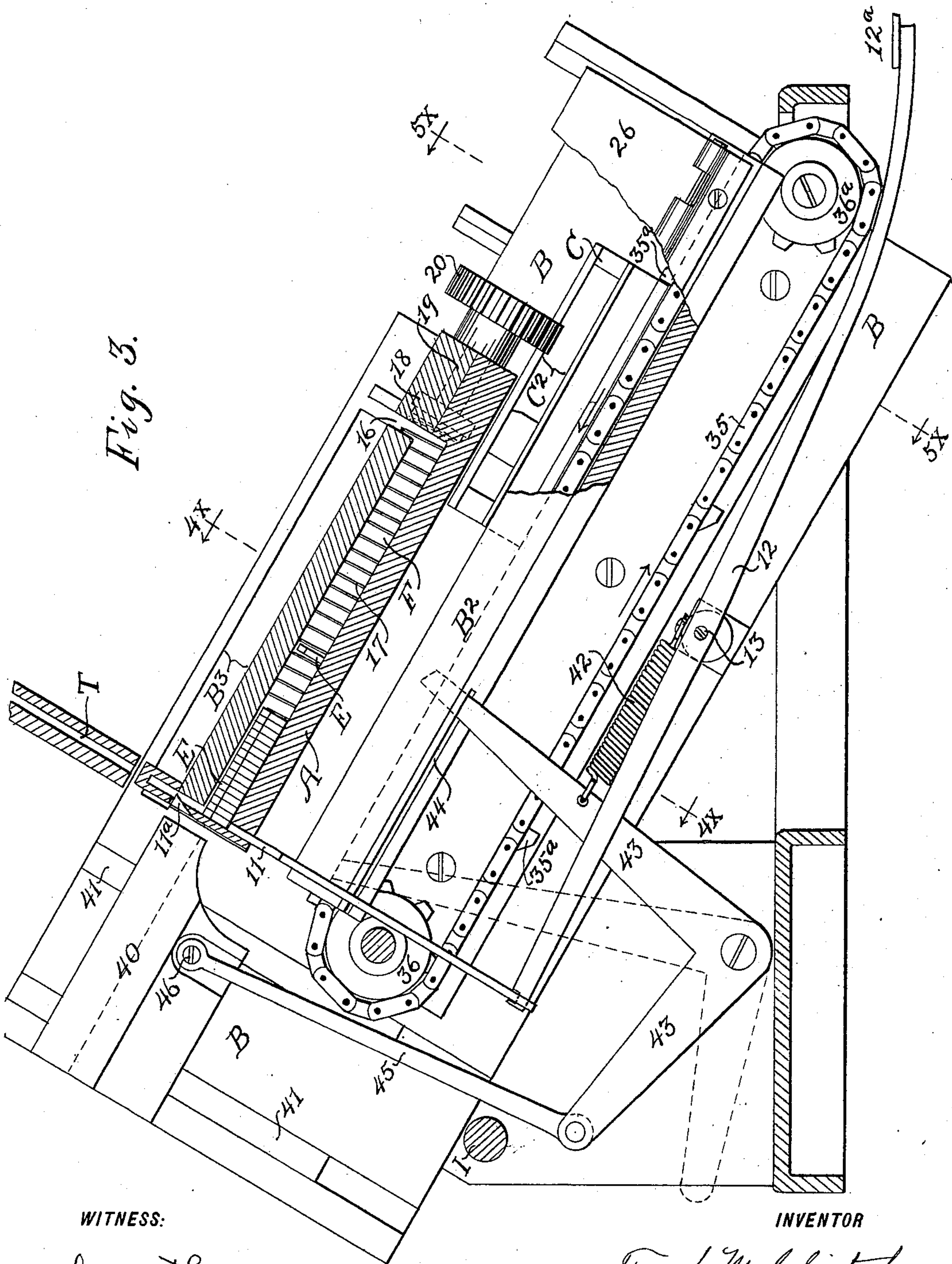
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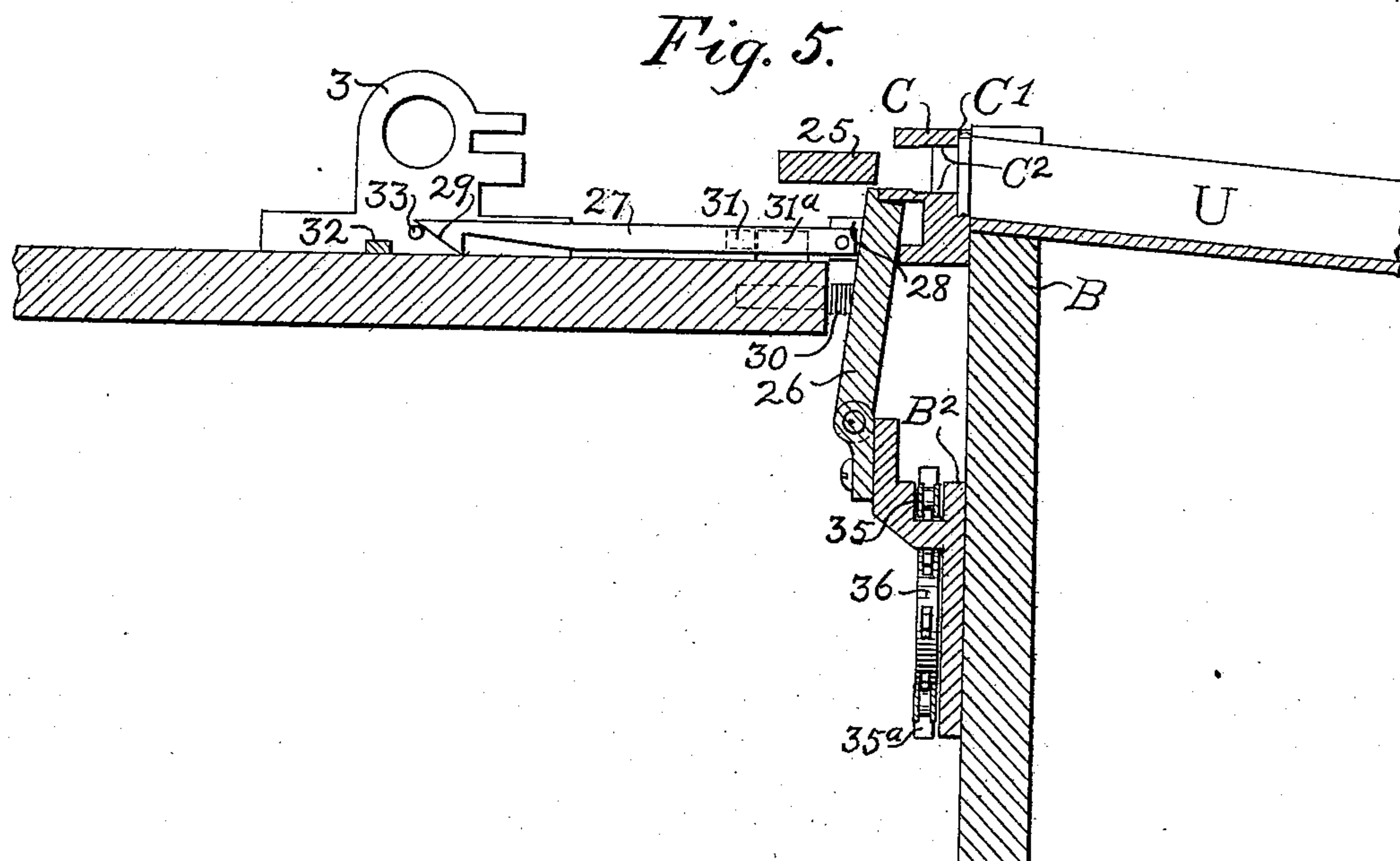
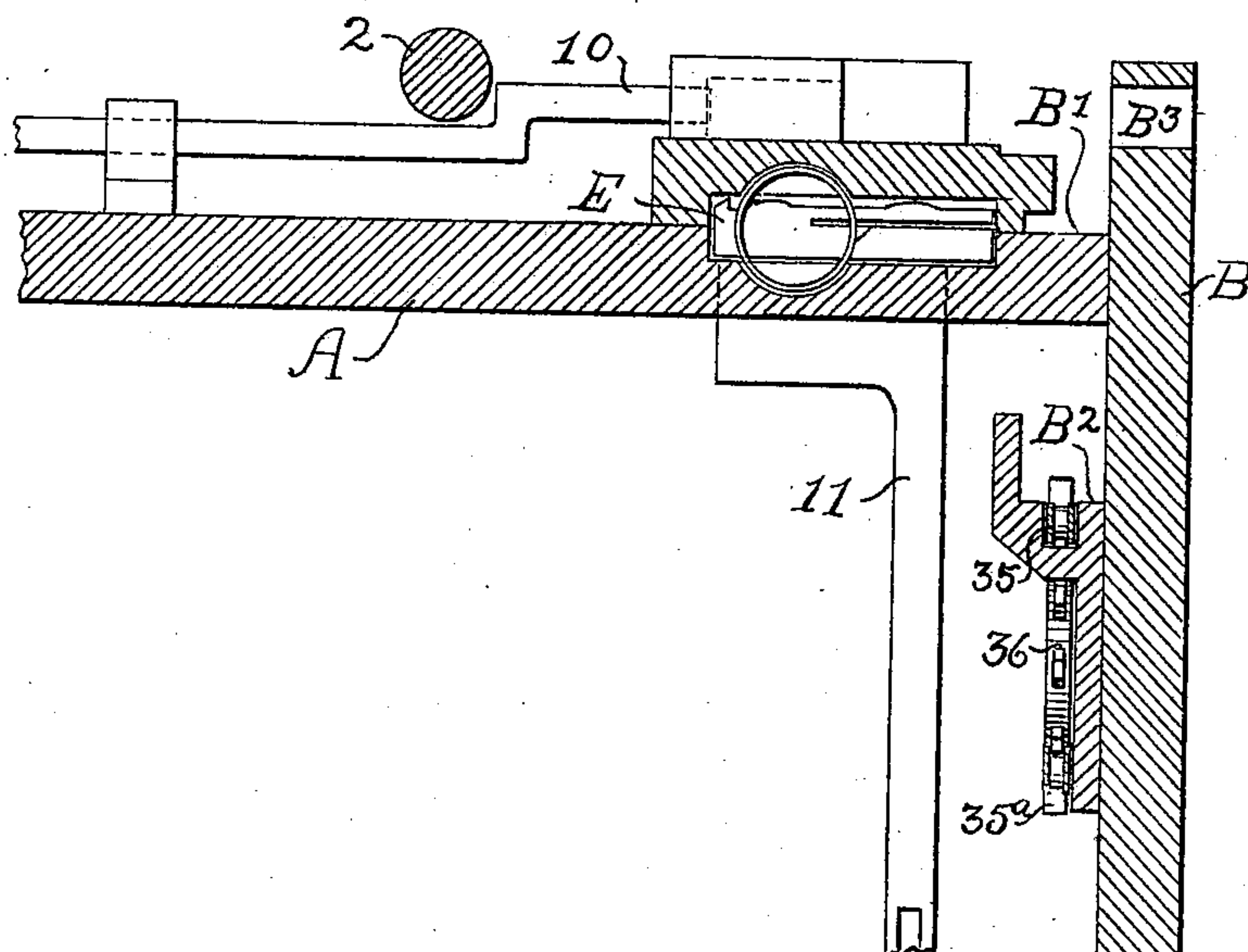
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**4 Sheets—Sheet 4.**



**WITNESS:**

Henry Throck  
Geo. E. Jones

**INVENTOR**

Frank McChitock.



# UNITED STATES PATENT OFFICE.

FRANK McCLINTOCK, OF COLORADO SPRINGS, COLORADO, ASSIGNOR TO THE  
EMPIRE TYPE SETTING MACHINE COMPANY, OF WEST VIRGINIA.

## MACHINE FOR JUSTIFYING TYPE.

SPECIFICATION forming part of Letters Patent No. 635,866, dated October 31, 1899.

Application filed April 4, 1899. Serial No. 711,679. (No model.)

*To all whom it may concern:*

Be it known that I, FRANK McCLINTOCK, a citizen of the United States of America, and a resident of Colorado Springs, in the county  
5 of El Paso and State of Colorado, have invented certain new and useful Improvements in Machines for Justifying Type, of which the following is a specification.

My improvements relate to that class of machines for automatically justifying type in which type and temporary spreading spacing devices are assembled in a traveling line-holder, which travels along a suitable track or way to a position where the temporary  
15 spacing devices are caused to expand the line of type to the full length of the line-holder, thence to a position where space-blanks are substituted for the temporary spacing devices as they are successively removed, and  
20 thence to a position where the line of type is removed from the line-holder to a galley and the empty line-holder transferred to a return track or way, along which it is carried back by suitable mechanism to the position for assembling another line of type and temporary  
25 spreading spacing devices, which are also by suitable mechanism returned from the point where they are removed from the line to the position for use again. In machines of this  
30 class heretofore constructed and to which my improvements are especially adapted, in which two or more line-holders are generally used, the removed temporary spacing devices and the empty line-holder are allowed to remain at the lower end of the return track or  
35 way until a second line-holder has been filled with type and spacing devices and started on its journey down the upper track by the depression by the operator of a line key or lever, which at the same time sets the mechanism in operation to return the empty line-holder and spacing devices back to the position for assembling another line. The time  
40 necessary for the proper operation of this mechanism is practically lost and materially reduces the output of the machine, since the operator cannot begin the composition of a second line until the empty line-holder is in position to receive the first type of the new  
45 line.

The object of my improvement is to provide

mechanism whereby the spacing devices, as fast as they are removed from the line, and the line-holder, as soon as the line of type has been removed to the galley, may be at  
55 once automatically returned to the position for use again, thus making the circulation of the line-holders and temporary spacing devices practically continuous, so that the operator may proceed with the composition without  
60 out any loss of time between the successive lines, and also to provide means for moving the spacing devices freely along their raceway without any liability of their binding or falling over on their sides during their journey  
65 and for retaining those not in use, whether few or many, compactly together at the upper end of the raceway and feeding the entire number forward whenever the foremost one is inserted into the line-holder.

The invention will be best understood by reference to the accompanying four sheets of drawings, which show the improvement as applied to that class of type-justifying machines shown and described in United States  
75 Patent No. 608,002, issued to me July 26, 1898, and especially to that construction of type-justifying machines shown and described in an application of Charles W. Dickinson, Serial No. 683,543, filed in the United  
80 States Patent Office June 15, 1898. Since this invention is only concerned with the circulation of the temporary spacing devices and line-holders, the drawings are limited to such parts as necessarily coöperate to this end and  
85 comprise the following views:

Figure 1 is a top plan view of the machine with a portion of the top of the space-bar raceway cut away to show the interior construction. Fig. 2 is a rear elevation of the  
90 machine. Fig. 3 is a longitudinal view, partly in section, looking in the direction of the arrows, on the line  $X^3 X^3$  of Fig. 2, with a line-holder on the lower track or way. Fig. 4 is a cross-section looking in the direction of  
95 the arrows along the line  $4^x 4^x$  of Figs. 1 and 3, showing the upper and lower tracks and the space-bar raceway. Fig. 5 is a cross-section looking in the direction of the arrows along the lines  $5^x 5^x$  of Figs. 1 and 3, showing  
100 a line-holder supported in a position for having the line of type removed to the galley



and the mechanism for lowering the line-holder to the lower or return track upon the removal of the line of type to the galley.

Similar letters and figures refer to similar parts in each of the views.

The essential features of the machine shown in the drawings are—

First. Two line-holders in which a single line of type may be alternately assembled and which determine and limit the length of the line. They are provided with longitudinal openings, into which the type are assembled one by one by means of a suitable composing-machine and travel from the place where the type are assembled along a suitable track or way to the spacing and justifying mechanism and thence to a galley, where the line may be removed.

Second. A number of tapering space bars or wedges contained in a raceway or channel and adapted to be inserted one by one, by suitable mechanism, between the words as they are set up in the line-holder to temporarily space out the line in lieu of ordinary space-blanks and suitable mechanism for withdrawing them from the line-holder after they have served their purpose and depositing them in the lower end of the raceway-channel, along which they are at once conveyed to the storage end and retained ready for use again.

Third. Mechanism for removing the line of type from the line-holder to a galley and then lowering the empty line-holder to the return track or way.

Fourth. Mechanism for automatically returning the empty line-holder along the lower return track or way immediately after it has been lowered thereto and elevating it to the upper track or way in position to receive another line of type and temporary spacing devices.

A is the bed-plate of the machine, and B the frame or track plate, to one or the other of which most of the operative mechanism is secured.

C is the line-holder, which is fitted to move freely along the upper or lower tracks B' and B<sup>2</sup>. It has a rabbeted longitudinal recess C' of sufficient width and depth to contain the size of type it is desired to use and of a length equal to the length of line it is desired to set, and when the line-holder is in its track the track-plate B closes the open side, thus retaining the type securely therein. An opening C<sup>2</sup> through the line-holder allows the tapering space-bars E to be inserted cross-wise between the type in the line-holder, while the slot B<sup>3</sup> in the track-plate allows them to be pushed farther through the line in order to spread it out in the usual manner. The type may be set in the line-holder by any suitable composing-machine, a chute T serving to guide them down foot foremost into the open top of the line-holder, while suitable mechanism feeds the type as fast as they are assembled, and also the line-holder, along the

track or way B'. The temporary spacing devices preferred are wedges E, having a thin parallel portion at one end and a thick parallel portion at the other end. The tapering portion varies in thickness from the thinnest space-blank it is desired to use up to the thickest, and when first inserted through the line only the thin parallel portion corresponding to the thinnest space-blank is between the type. In most machines of this class it has heretofore been usual to support the supply of space-bars by suitable means at a level with the opening through the line-holder, so that the foremost one is always in the proper position in the line-holder, a spring-actuated mechanism immediately forcing the entire number along, so as to bring another in position for insertion. In the machine shown the supply of the space-bars is contained in the upper or storage end of their return raceway or channel F, which is below the level of the opening through the line-holder. In order to raise them successively to the position from which they may be inserted into the line-holder in the usual manner by inserting-rod 10, an elevating device 11 is employed, which normally rests, as shown in Figs. 2 and 3, with its top on level with the bottom of the raceway. A key-lever 12 is pivoted at the point 13, having its key end 12<sup>a</sup> convenient to the operator, and its rear end, connected to the lower end of the elevating device, enables the operator, by depressing the key 12<sup>a</sup>, to elevate the foremost space-bar up to a level with the opening through the line-holder, where it is retained by means of the spring-step 11<sup>a</sup> until it is pushed the proper distance into the line by the rod 10, which may be actuated by a suitable wedge inserting and retarding mechanism in the usual manner. Such mechanism is ordinarily set in operation by means of a suitable key or lever and is adapted to operate a wedge-inserting rod 10, and usually is arranged so that a certain predetermined interval elapses between the depression of the key and the insertion of the space-bar, such interval corresponding to the time required for a type to slide from its starting-point down the chute T into the line-holder. Any of the various devices heretofore used for this purpose may be applied to this machine to force in the rod 10, and the mechanism may be set in operation by means of the key-lever 12, which serves to elevate the foremost space-bar, instead of providing a key-lever especially for that purpose. After the line-holder has been filled the depression of the usual line key or lever sets in operation certain automatic mechanism whereby the line-holder is caused to travel down along the track or way B' to the point where the space-bars are all driven in simultaneously to expand the line to entirely fill the length of the line-holder, thence to the point where the space-bars are removed, and to the point where the completed line of type is removed to a galley. Since the automatic justification and



spacing of the line of type contained in the line-holder forms no part of and is not essential to this invention, the mechanism for accomplishing the result will not be described herein.

The space-bars are withdrawn from the line-holder one by one at the proper time by means of a hook 14, which is secured to a reciprocating bar 13, and the forward movement of the bar 13 and the hook 14 to engage the notch *e* in the large end of the space-bar E and its retraction to withdraw the space-bar is controlled by a cam 15 in the usual manner. Immediately upon being withdrawn from the line-holder the space-bar drops down into the raceway or channel F through the opening 16. An open coil of spring-wire 17 is contained in an annular longitudinal recess in said raceway, having the distance between the convolutions greater than the thickness of the individual space-bars, but not so far apart as to allow them to fall over on their sides. This coil is secured to a wheel or disk 18 on the shaft 19, which by means of the gear-wheels 20 and 21 is kept in continuous rotation from the shaft of the justifying mechanism. The coil 17 thus acts as a fixed screw, and a space-bar when dropped into the raceway between the convolutions of the coil will be carried along to the upper or storage end. The coil 17 is of sufficient length so as to be at all times under compression, and being made of spring-wire it will operate exactly as an ordinary spring to retain the space-bars at the upper end of the raceway and to advance the entire number the thickness of an individual space-bar each time one is elevated and inserted in the line-holder and will also expand or contract to accommodate itself to the variable number of space-bars in storage at any time. Since the individual space-bars are thus started on their return up the raceway at once on their removal from the line-holder, a less number will be required than if they were retained until the entire number have been withdrawn and then returned to the place of assembly in a body, as has been done heretofore.

After the space-bars have all been withdrawn and replaced by space-blanks the line-holder is allowed to continue its travel along the track B' to a point directly in front of the galley U, into which the line of type is removed by means of the bunter-head 25, which is operated intermittently from the constant revolving shaft 2, being automatically set in operation in the usual manner by the line-holder when it reaches the lower end of the track B'. The bunter-head 25 is thus caused to advance toward the right hand through the longitudinal opening C<sup>2</sup> in the line-holder by means of the link 25<sup>a</sup> a sufficient distance to remove the line of type to the galley and is then retracted to its normal position of rest.

The lower end of the upper track B' is cut away for a distance equal to or slightly greater than the length of the line-holder. In order that the line-holder may not be allowed to drop

to the lower track B<sup>2</sup> through the opening thus made before the removal of the line to the galley, a hinged plate 26 is provided, (see Figs. 1 and 5,) which normally stands in the position shown and forms a temporary support or track for the line-holder. A sliding bar 27 is pivoted to a lug 28 and is provided with a beveled termination in the form of a hook 29. A spring 30 is recessed into the plate A and bearing against the hinged plate 26 keeps it normally thrown forward to the positions shown in Figs. 1 and 5. A lug 31 on the sliding bar 27 engages a fixed stop 31<sup>a</sup>, thus preventing the hinged plate from being forced too far by the spring 30. A lug 32 on the side of the bunter-plate 25<sup>b</sup> projects out a sufficient distance so that when it moves to the right as far as the bunter ejects the line of type to the galley it will come under the beveled end 29 of the bar 27, lift it up, pass under it, and permit the bar 27 to drop. As the bunter-plate moves backward to its position of rest the lug 32 engages the inner face of the hook 29 and draws the bar 27 and the plate 26 a sufficient distance to the left to allow the line-holder C to drop freely to the lower track. A pin 33 is so placed on the bearing 3 that the beveled surface of the hook 29 will ride up upon it and lift the point of the hook clear of the lug 32 and allow the spring 30 to return the plate 26 and bar 27 to their normal positions after the line-holder has dropped to the lower track.

The mechanism for automatically returning the empty line-holder along the lower track or way and elevating it to a position for having another line of type and spacing devices assembled therein is shown in Figs. 2 and 3. An endless link chain or a belt 35 passes around the wheels 36 and 36<sup>a</sup>, and its upper portion runs in a groove or channel 37 in the lower track B<sup>2</sup>. This link chain has projecting lugs 35<sup>a</sup> secured to it at suitable intervals, one of which will engage the line-holder, as shown in Fig. 3, soon after it drops to the lower track. The link chain 35 is kept in continuous motion in the direction of the arrows by means of the gear-wheels 37, 38, and 39, which connect with the main driving-shaft I of the justifying-machine, or any other suitable gearing or belting may be used. The line-holder elevator 40 consists, essentially, of a section of the line-holder track or way, which is secured to guides 41 and is adapted to be moved up and down a limited distance. In its upper position, as shown in the drawings, it forms a continuation of the upper track or way B', while in its lower position it forms a continuation of the lower or return track or way B<sup>2</sup>. It is normally held in its upper position by a spring 42. A bell-crank lever 43 is pivoted at or near the junction of its two arms to the base of the machine. One arm of the lever extends up through a slot 44 into the lower track B<sup>2</sup>, so that it will be engaged by the end of the advancing line-holder C, while the other arm is pivoted to one



end of the link 45, the other end of which is pivoted to the line-holder elevator at 46. As the line-holder is moved up along the lower track or way B<sup>2</sup> it engages the end of the free arm of the lever 43 and carries it over to the position shown by the dotted lines, which thus draws the elevator 40 down to its lower position, where it is held while the line-holder is passing over the top of the free arm and onto the elevator. As soon as the advancing line-holder has cleared the rear end of the upper track B', so it will be free to rise, the spring 42 will immediately return the lever 43 to its normal position, and thus raise the elevator to its upper position, with the front end of the line-holder directly under the type-chute T, in position to receive the first type of the line. Should the line-holder elevator, with the empty line-holder, be thus released before the other line-holder has been entirely filled and started down to the justifying mechanism, it can only rise until the lower line-holder strikes the bottom of the upper one, and the complete elevation of the empty line-holder will be delayed until the upper filled one has been started down the upper way B', when the elevator will at once rise the remainder of the distance to its upper position. By properly arranging the speed of the justifying mechanism and of the chain 35, so that the empty line-holder may be carried up the return-track B<sup>2</sup> and onto the elevator 40 within the time required by the operator to compose a line, the empty line-holder will always be in position immediately after the filled line-holder has been started down the track toward the justifying mechanism, thus allowing the operator to proceed continuously with the composition of the type.

40 The invention herein shown and described is in the form best adapted for the type-justifying machine of Charles W. Dickinson, above referred to; but it is evident that various modifications may be made to apply it to other type-justifying machines of that class, which will be evident to those skilled in the art.

Believing myself to be the first to use an open coil of spring-wire to return the spacing devices along their raceway and retain them at the storage end, as described, I shall therefore claim that feature broadly.

What I claim as my invention is—

1. The device for conveying the spacing devices along a track or raceway and retaining them compactly at the storage end, consisting essentially of an open coil of spring-wire extending longitudinally along said raceway with its convolutions separated sufficiently to receive individual spacing devices and adapted to retain them in an upright position, and means for causing the rotation of the coil in the direction that will carry the spacing devices along said raceway.

2. The combination with a traveling line-holder adapted to receive a line of type and temporary spacing devices, of means for in-

serting said spacing devices into and through the line-holder crosswise of the types contained therein, a return raceway or channel for the spacing devices, means for withdrawing the spacing devices and depositing them in the raceway after they have accomplished the purpose for which they were inserted in the line-holder, and a continuously-rotating spring-coil contained within the raceway adapted to receive spacing devices between its convolutions and by its rotation convey them to the storage end of the raceway and retain them there compactly until required for use again, said spring-coil also being adapted to force or feed the stored spacing devices constantly toward the elevating device.

3. The combination with a traveling line-holder adapted to travel along a track or raceway to positions where a line of type and temporary spacing devices may be assembled therein, where the line of type may be automatically justified and spaced and then removed to a galley, of a lower or return track, means for transferring the empty line-holder to said lower or return track, continuously-operating mechanism for causing the line-holder to travel along said return-track and means actuated by the advancing line-holder for elevating it to the position for again receiving a line of type and spacing devices immediately on reaching the end of its travel on the lower or return track.

4. The combination with a traveling line-holder, of an upper track or way, a lower return track or way, an endless chain or belt having projecting lugs and moving continuously longitudinally along said return-track, and means actuated by the advancing line-holder for elevating the line-holder to the position for receiving a line of type and spacing devices immediately upon reaching the limit of its return travel.

5. The combination with a traveling line-holder of an upper track or way a lower return track or way, continuously-operating means for causing the line-holder to move along the return-track, an elevating device normally forming a continuation of the upper track and adapted to be lowered to form a continuation of the lower track, means operated by the advancing line-holder for lowering the elevating device, and means for automatically returning it to its normal elevated position when the line-holder has reached the end of its return travel.

6. The combination with a traveling line-holder adapted to travel along a track or way to positions where a line of type and temporary spacing devices may be assembled therein and the line of type may be automatically justified, spaced and removed to a galley, of a lower or return track or way, means for lowering the line-holder to said lower track, an endless chain or belt moving continuously longitudinally along said lower track, projecting lugs on said chain or belt, an elevat-



ing device normally being in position to form a continuation of the upper track and adapted to be lowered to a position where it will form a continuation of the return-track, means for  
5 lowering the elevating device consisting of a lever pivoted to the base of the machine and having one arm extending into the path of the advancing line-holder and the other arm suitably connected to said elevating device

and a spring for normally retaining the elevating device in its normal position substantially as specified.

Signed by me, at Colorado Springs, Colorado, this 26th day of November, 1898.

FRANK McCLINTOCK.

Witnesses:

HENRY THRUSH,  
GEO. E. JONES.