

No. 610,454.

Patented Sept. 6, 1898.

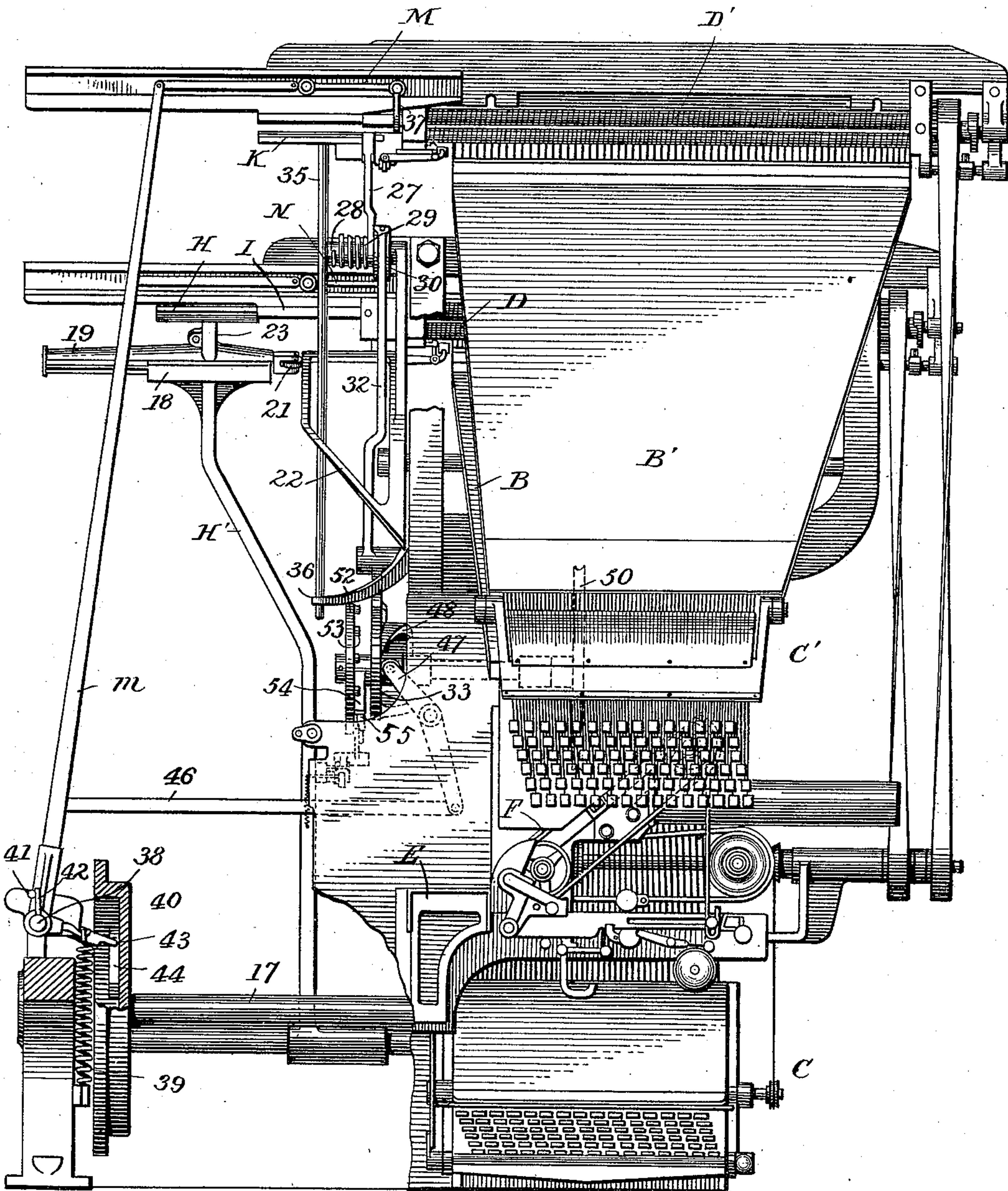
C. MUEHLEISEN.
LINOTYPE MACHINE.

(No Model.)

(Application filed Sept. 22, 1897.)

9 Sheets—Sheet 1.

Fig. 1.



Witnesses

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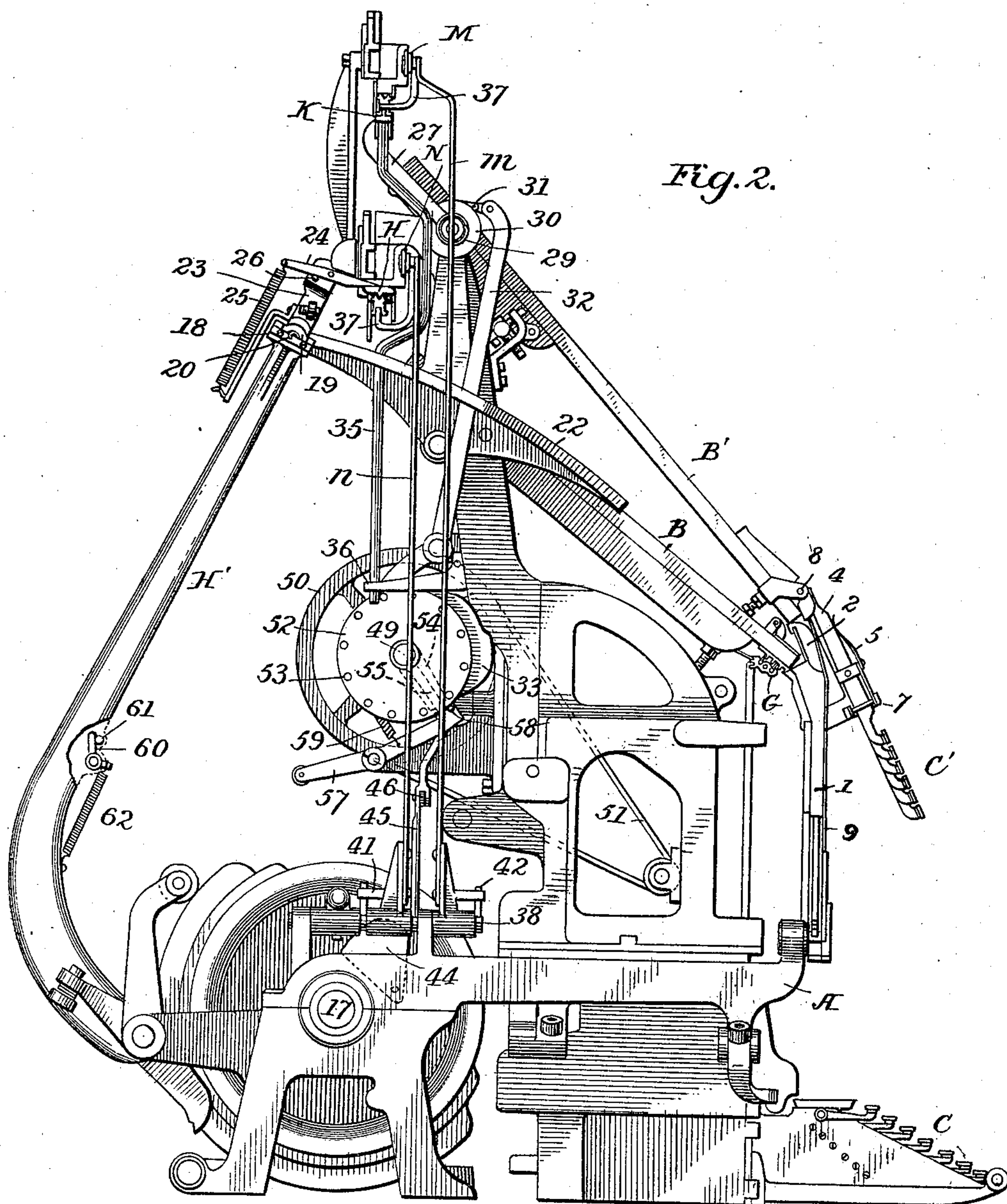
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LINO TYPE MACHINE.

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9 Sheets—Sheet 3.

Fig. 3.

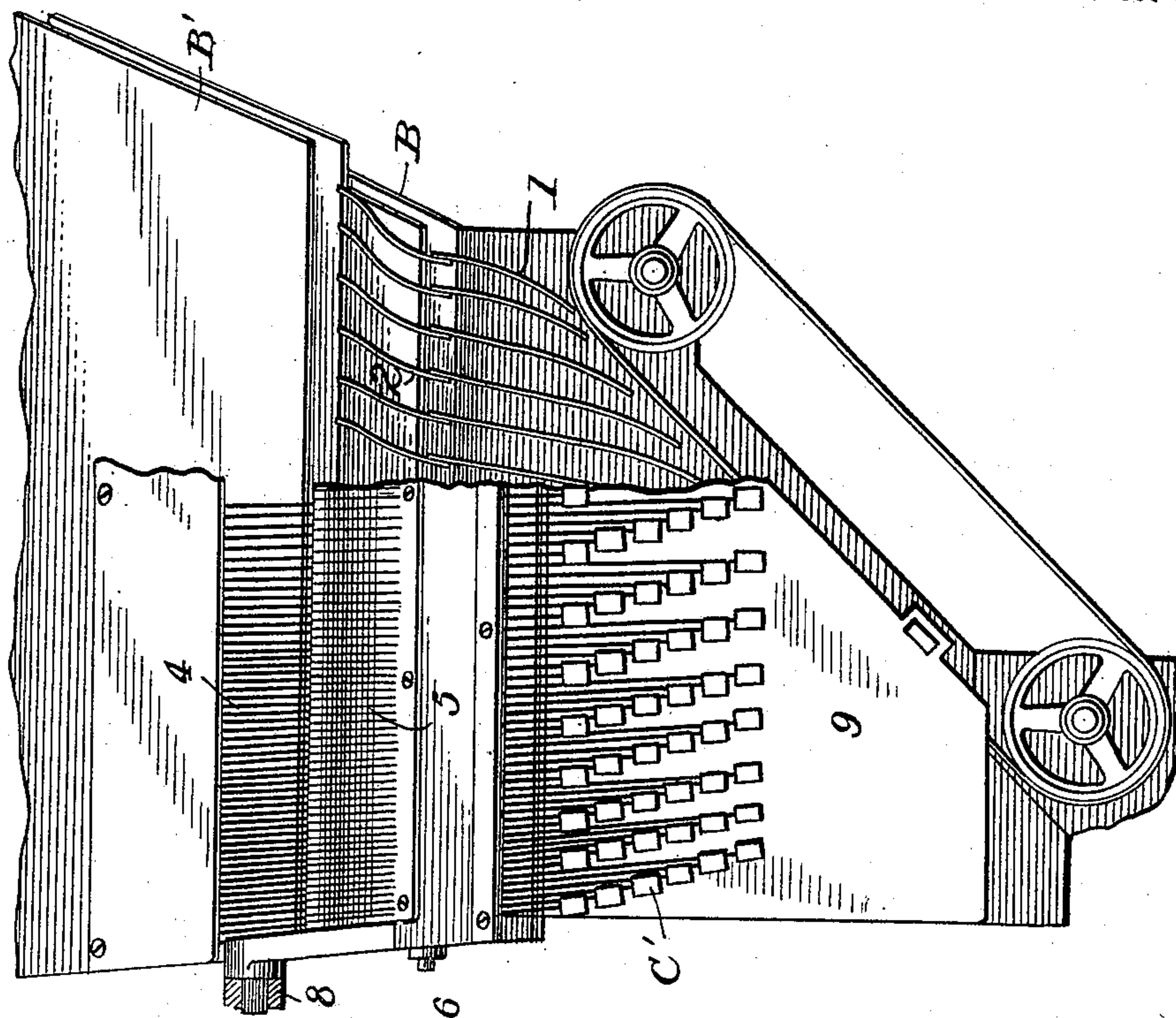
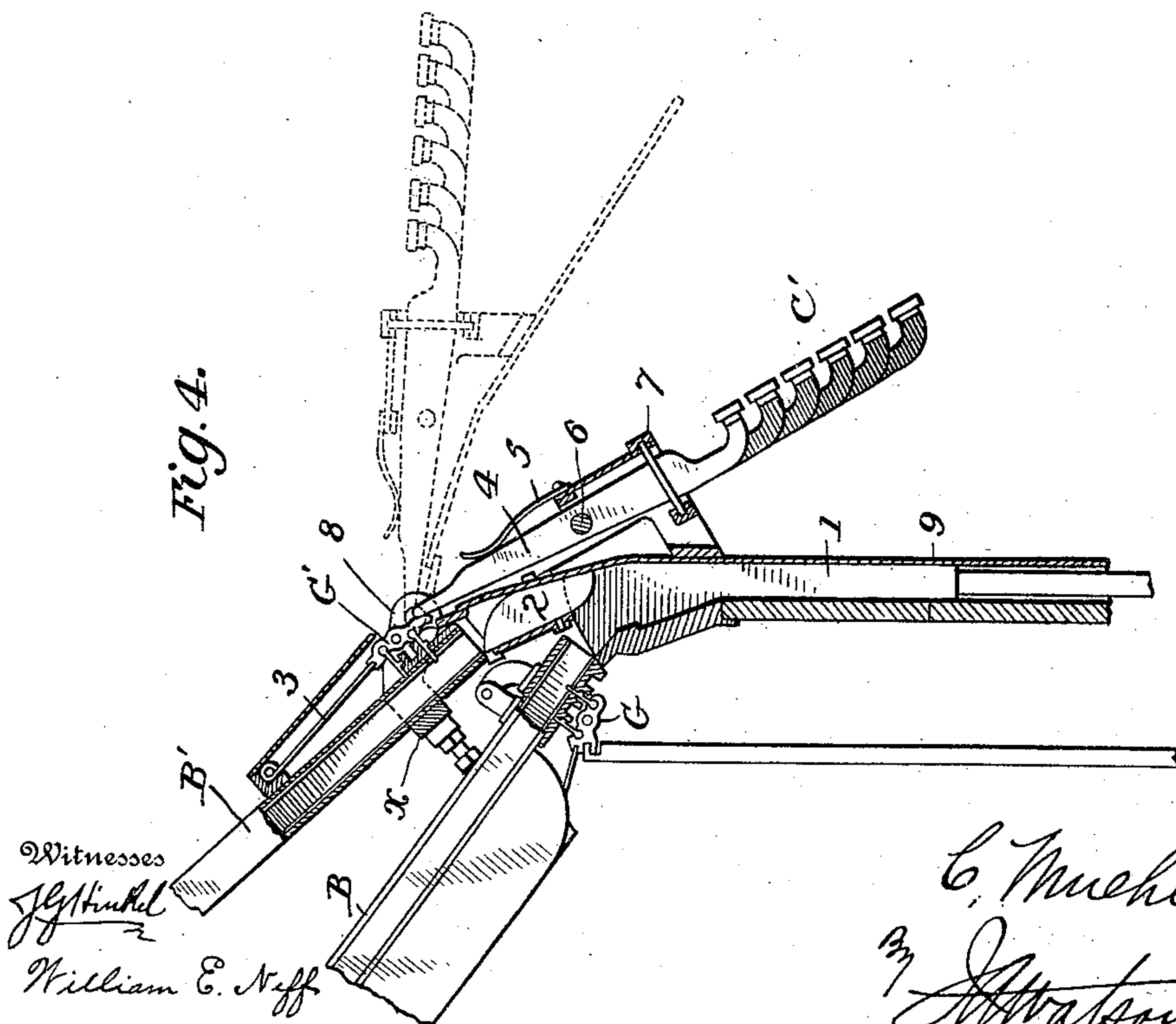


Fig. 4.



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9 Sheets—Sheet 4.

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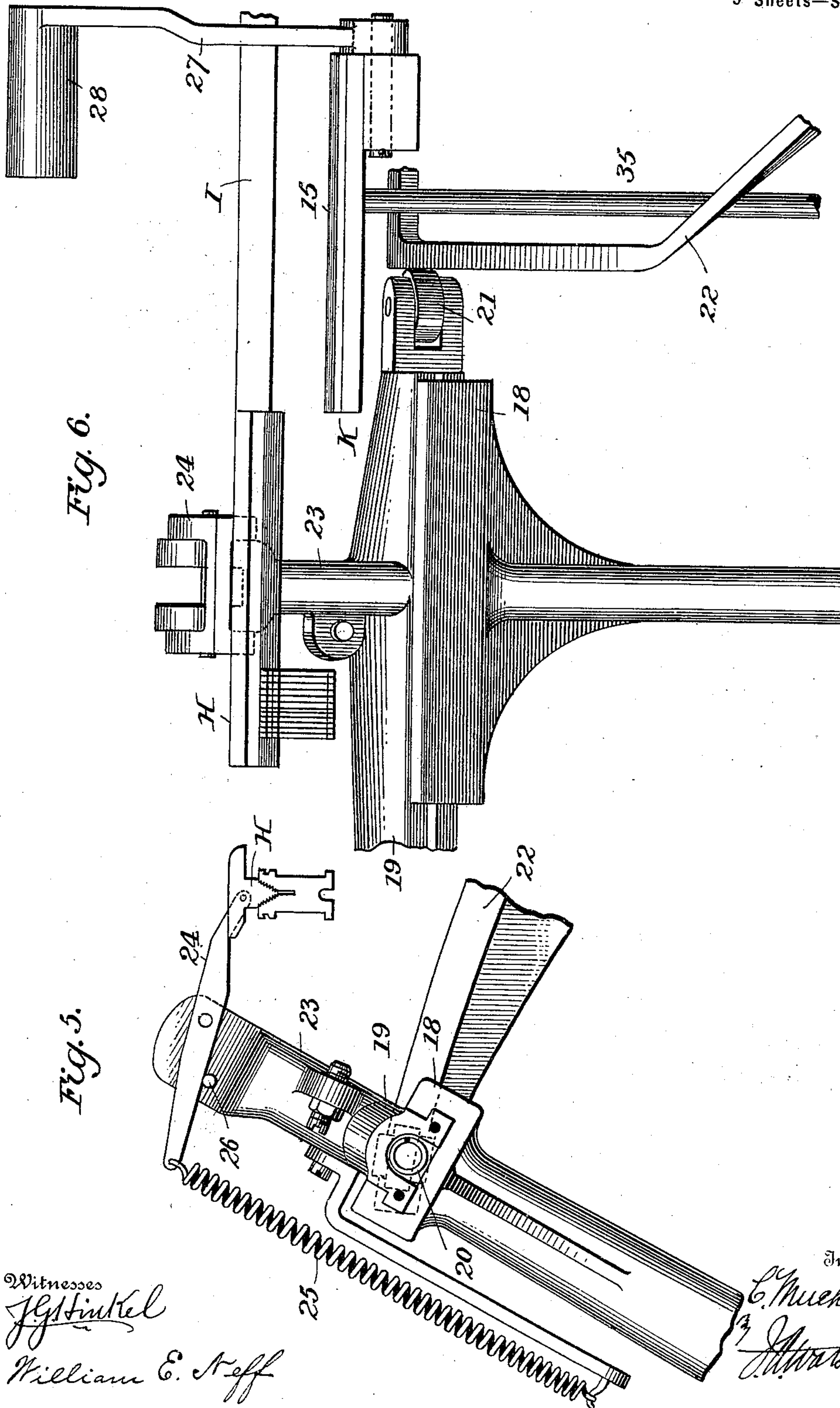


Fig. 6.

Fig. 5.

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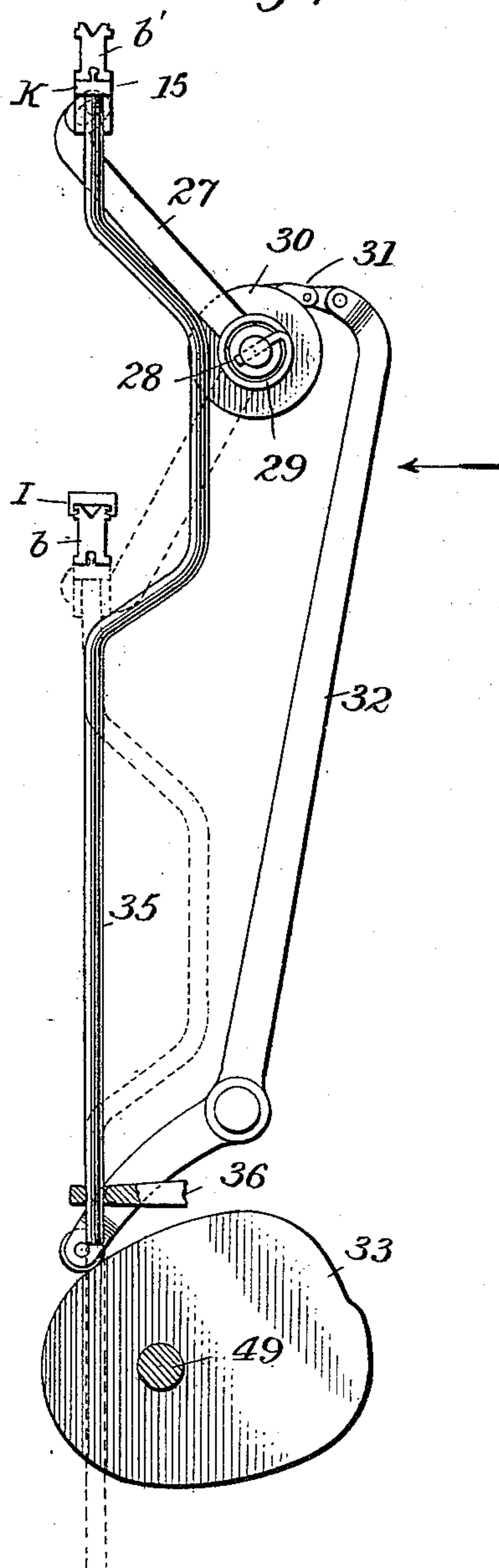
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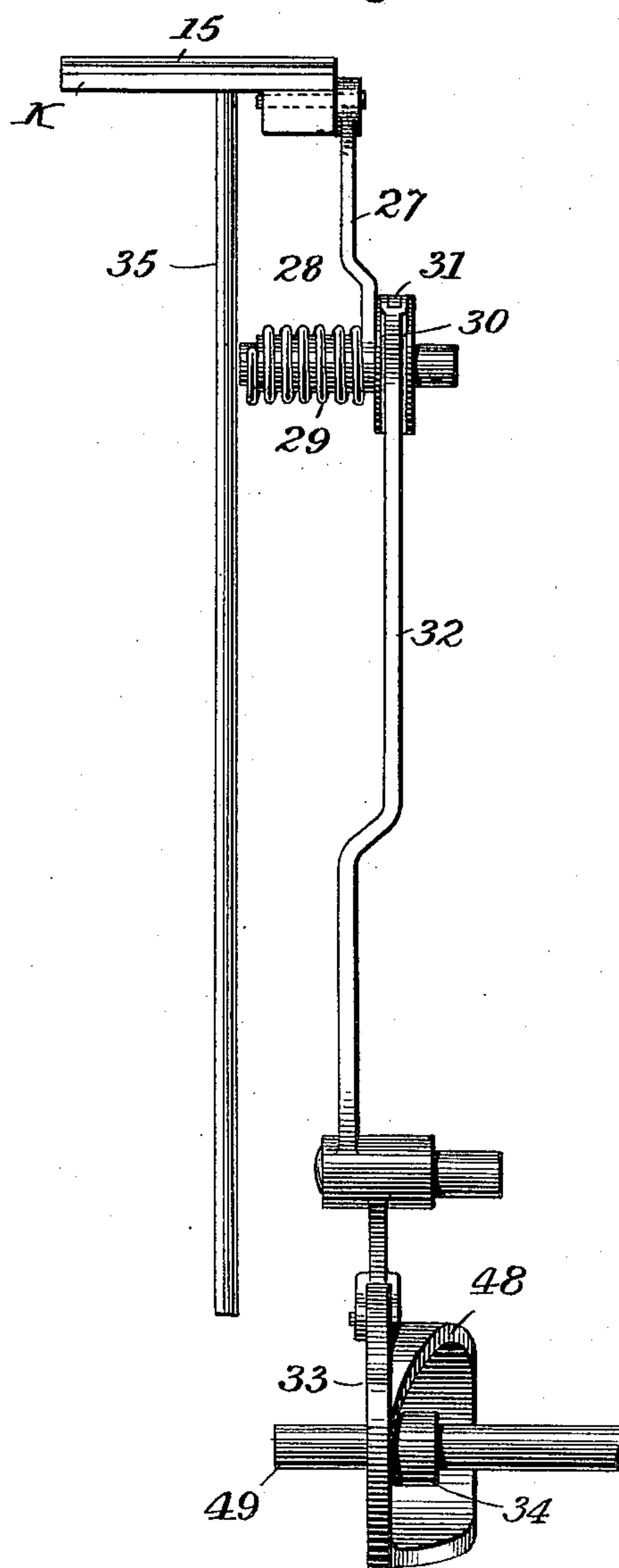
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Fig. 7.



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Fig. 8.



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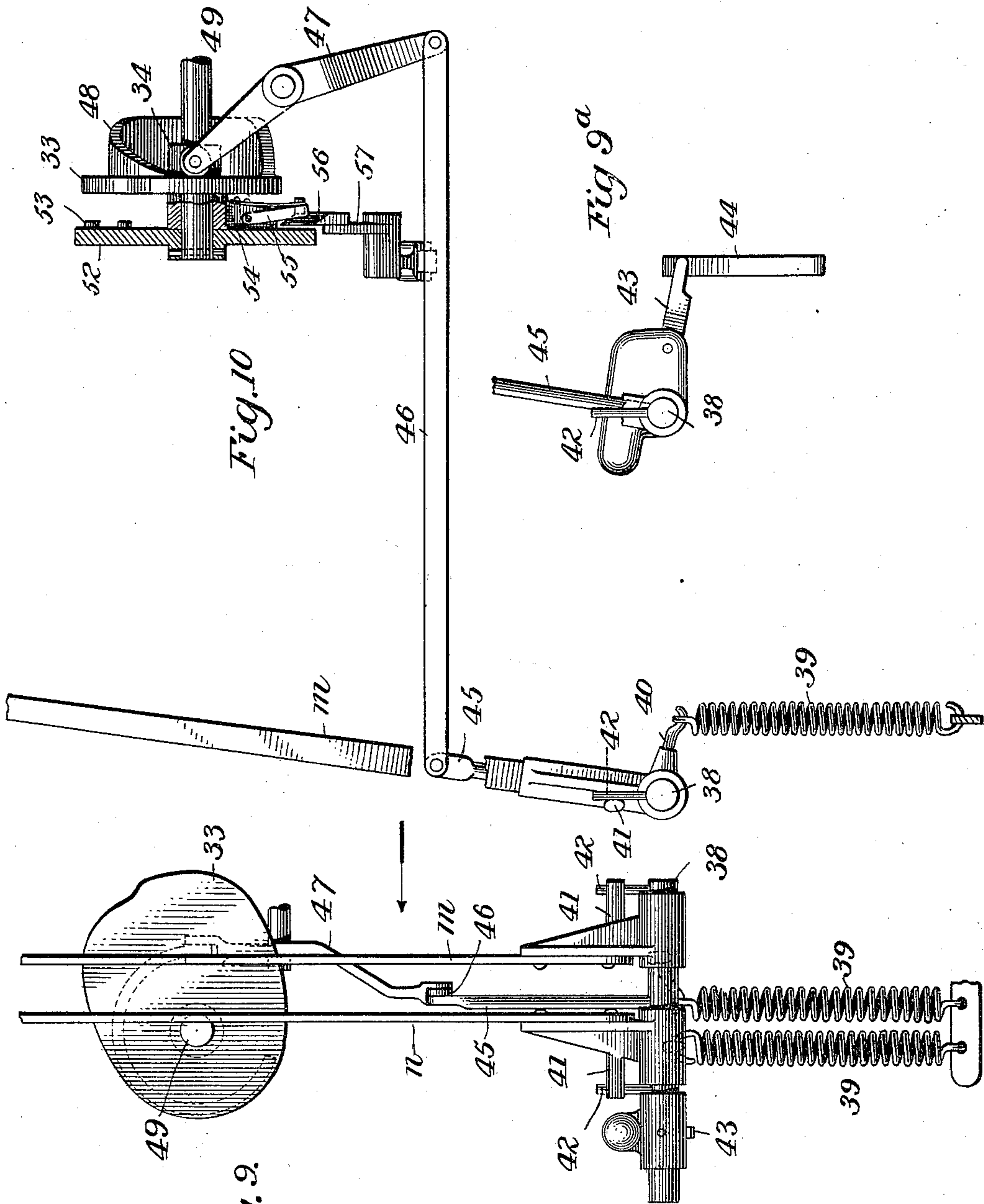
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9 Sheets—Sheet 6.



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Fig. 9.

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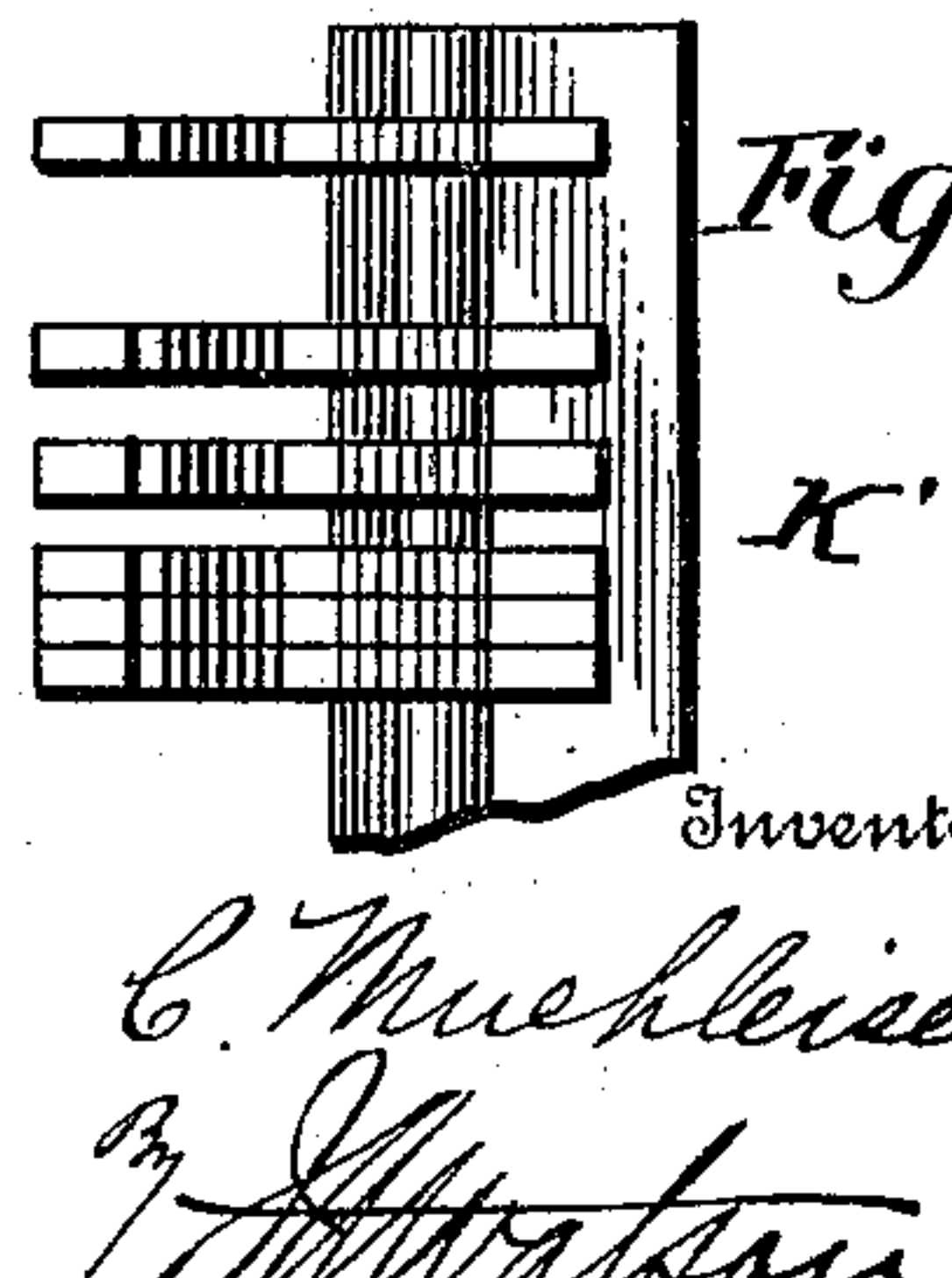
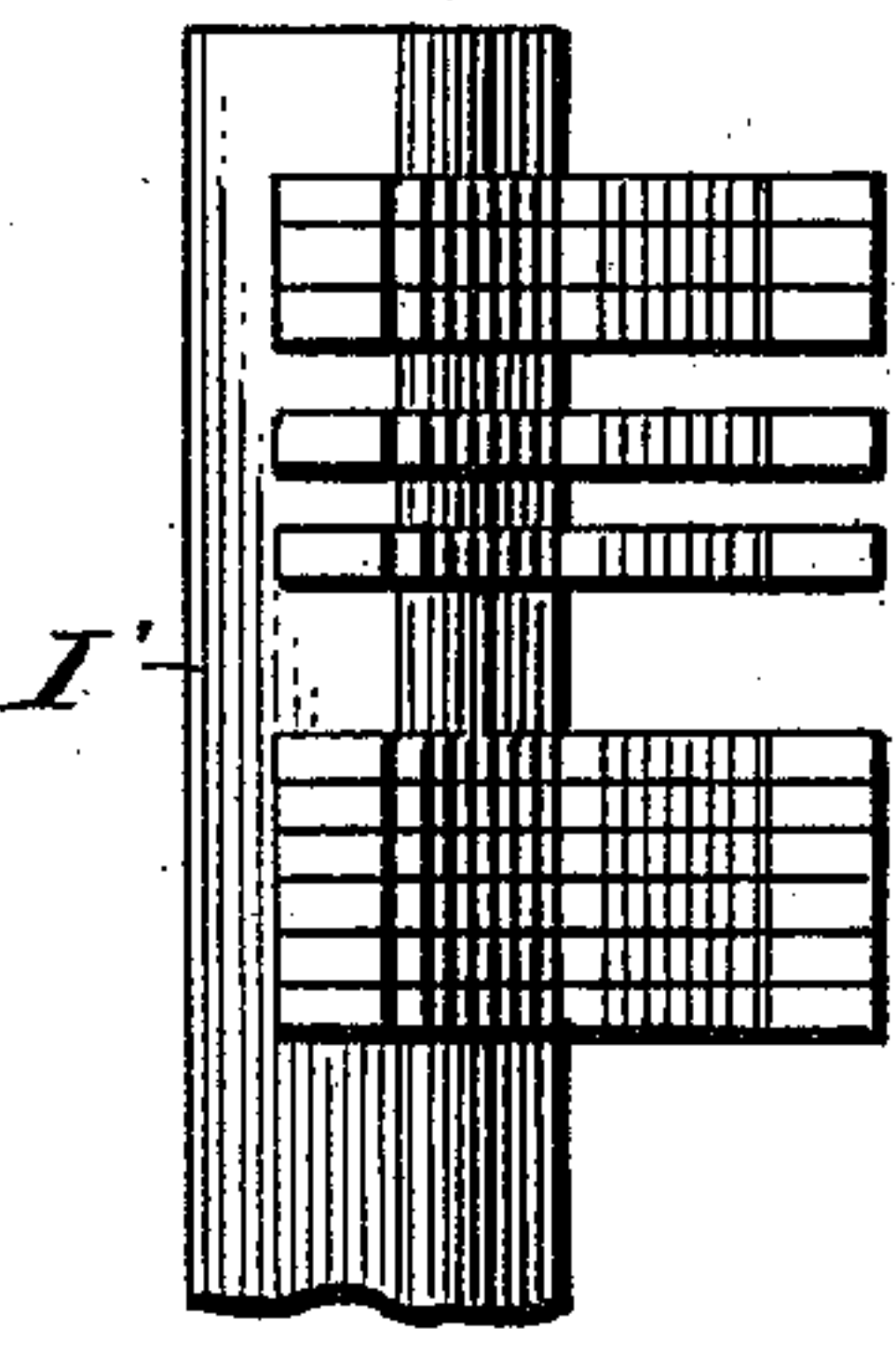
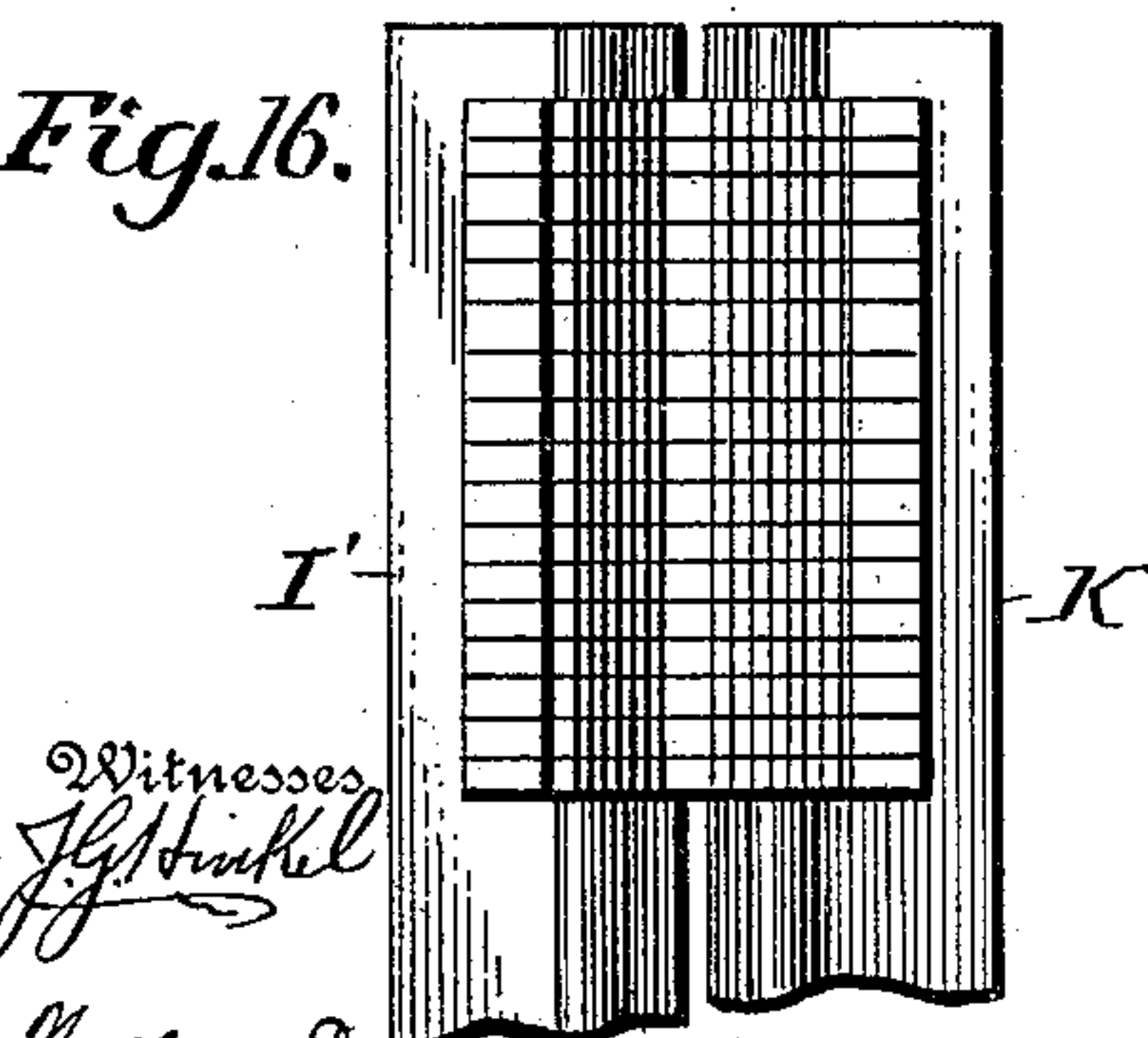
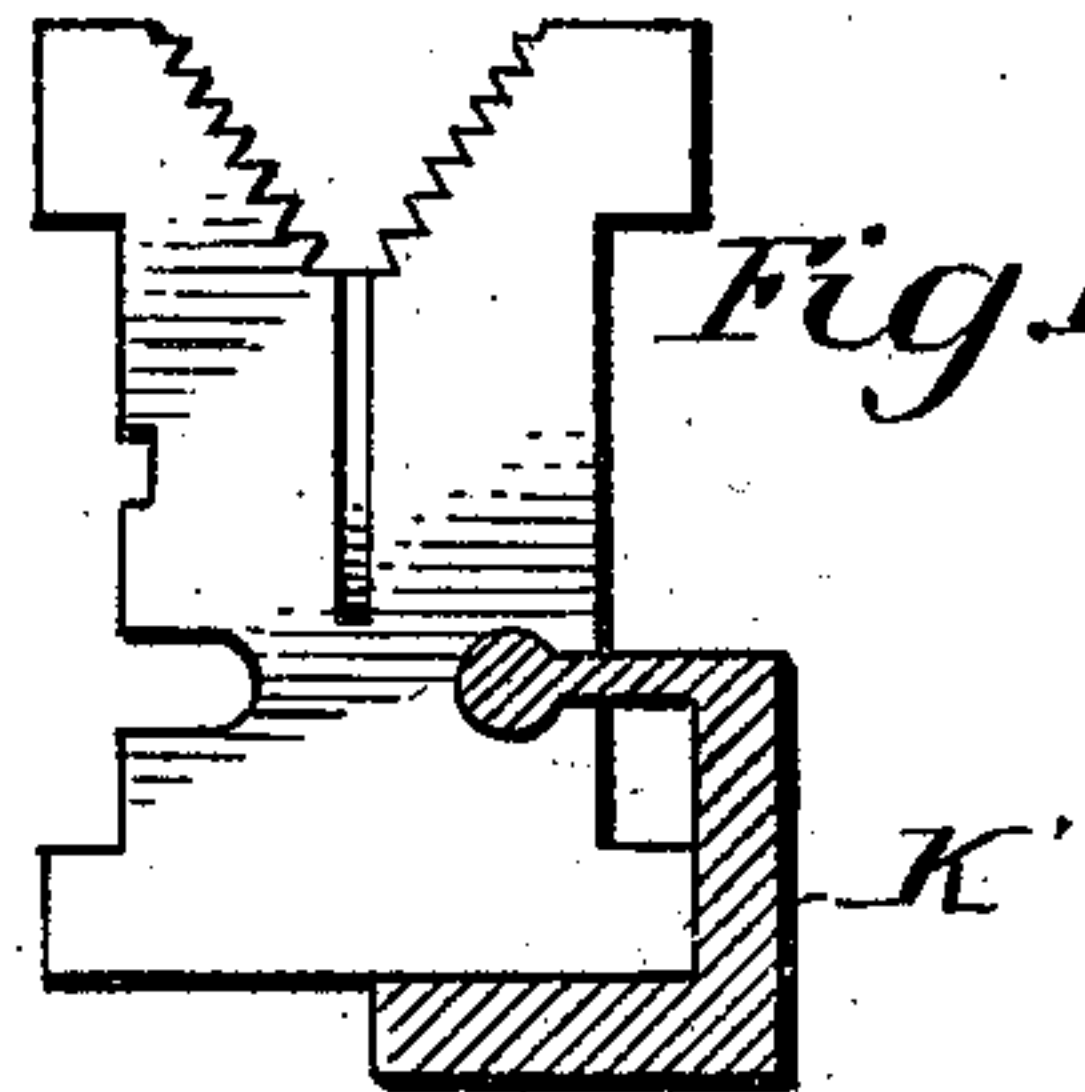
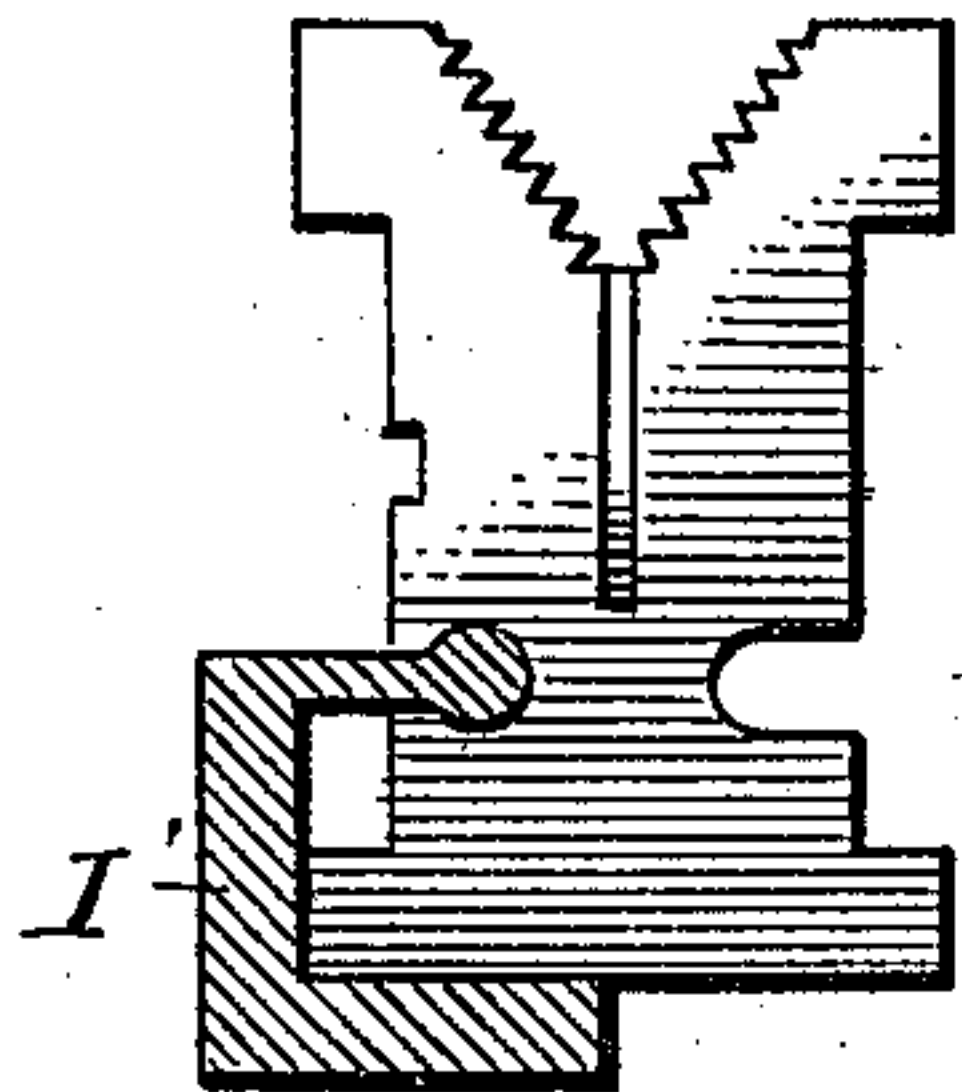
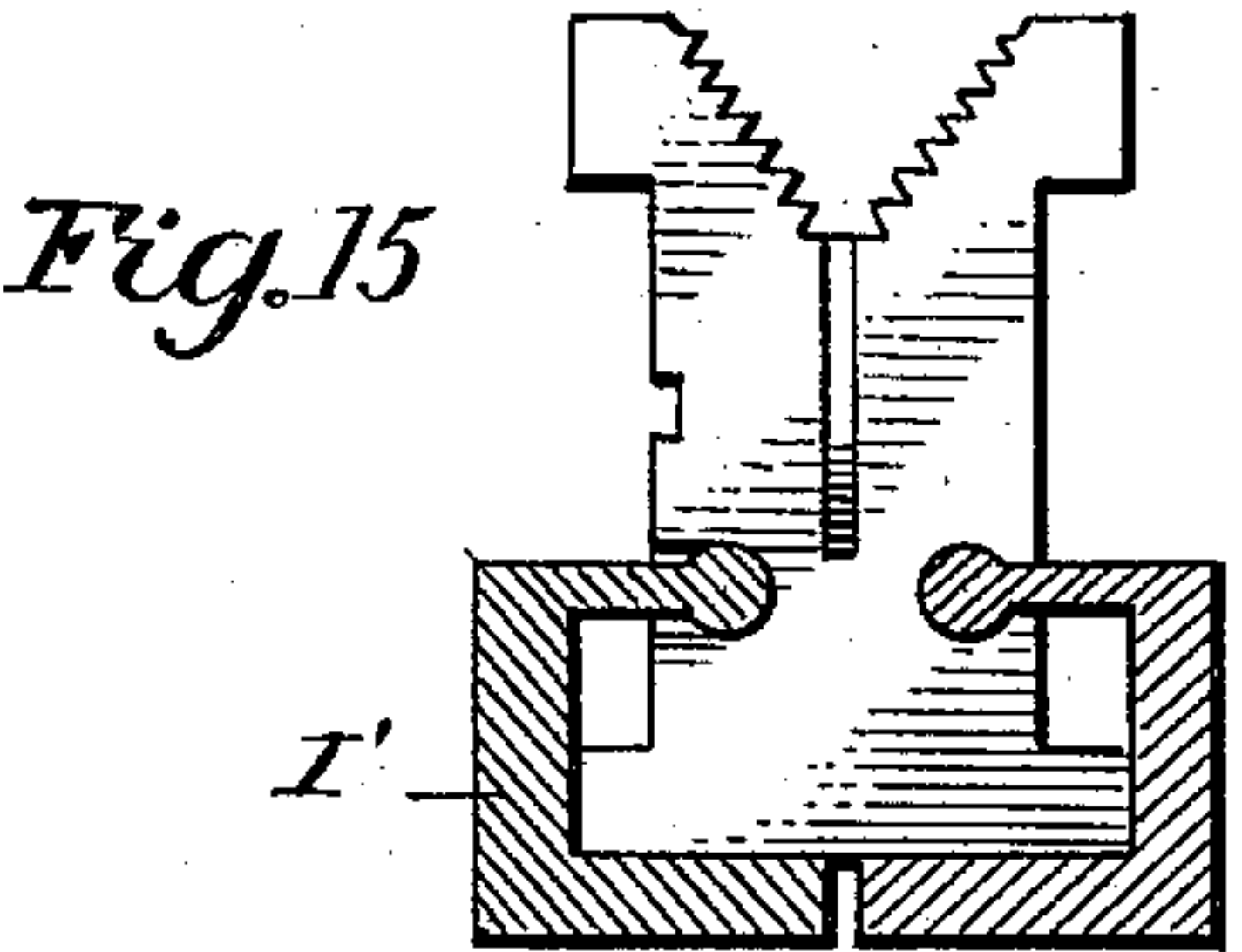
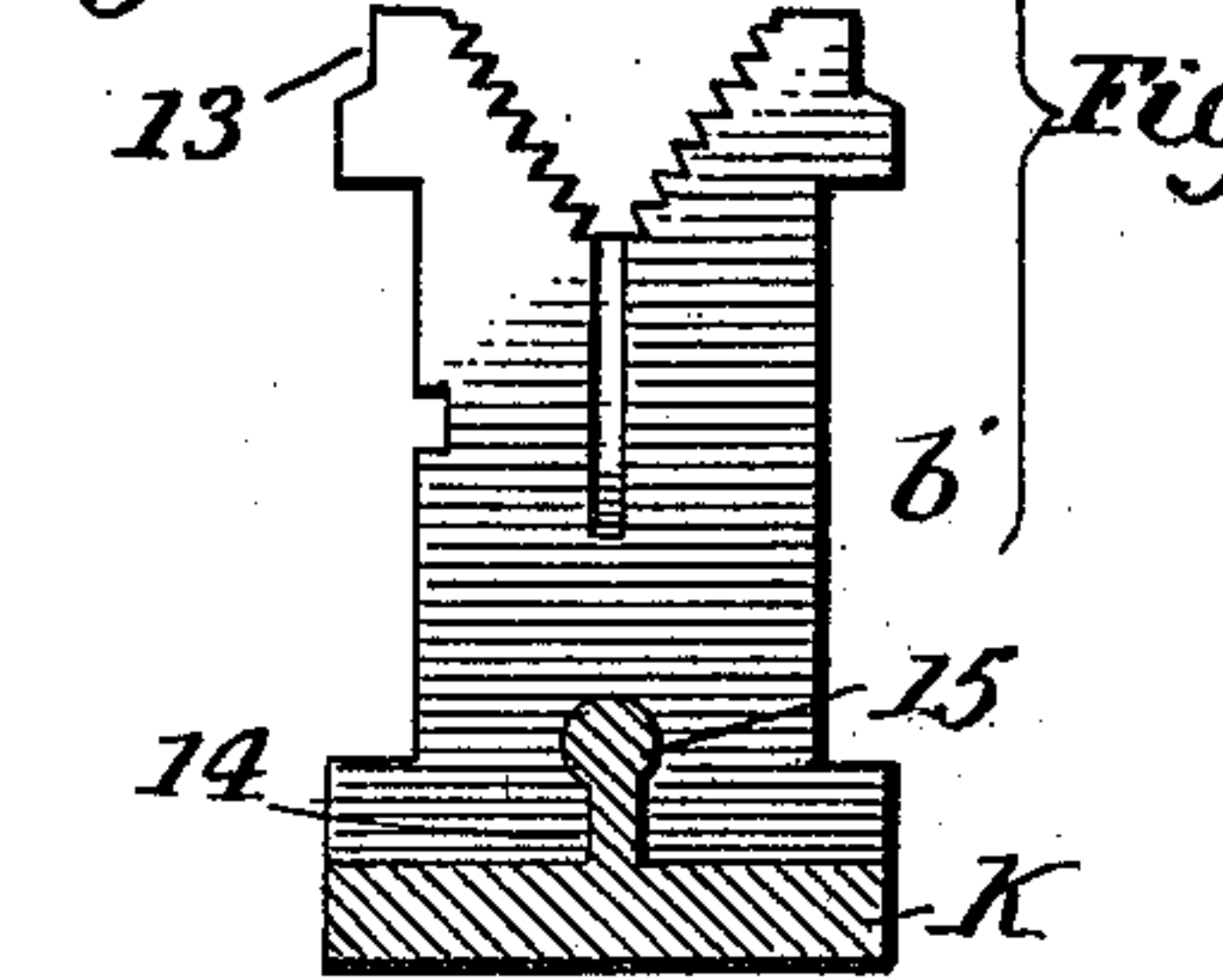
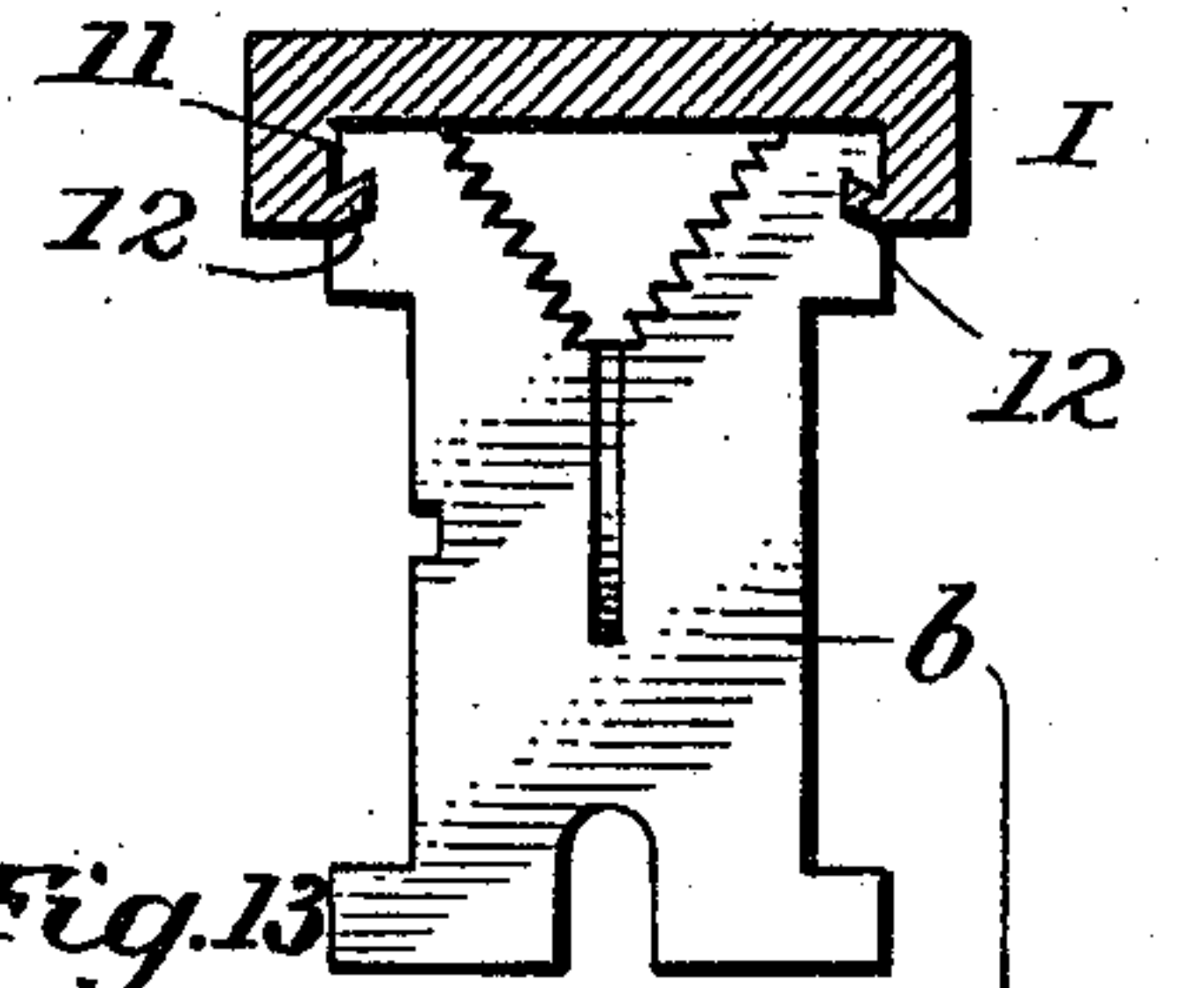
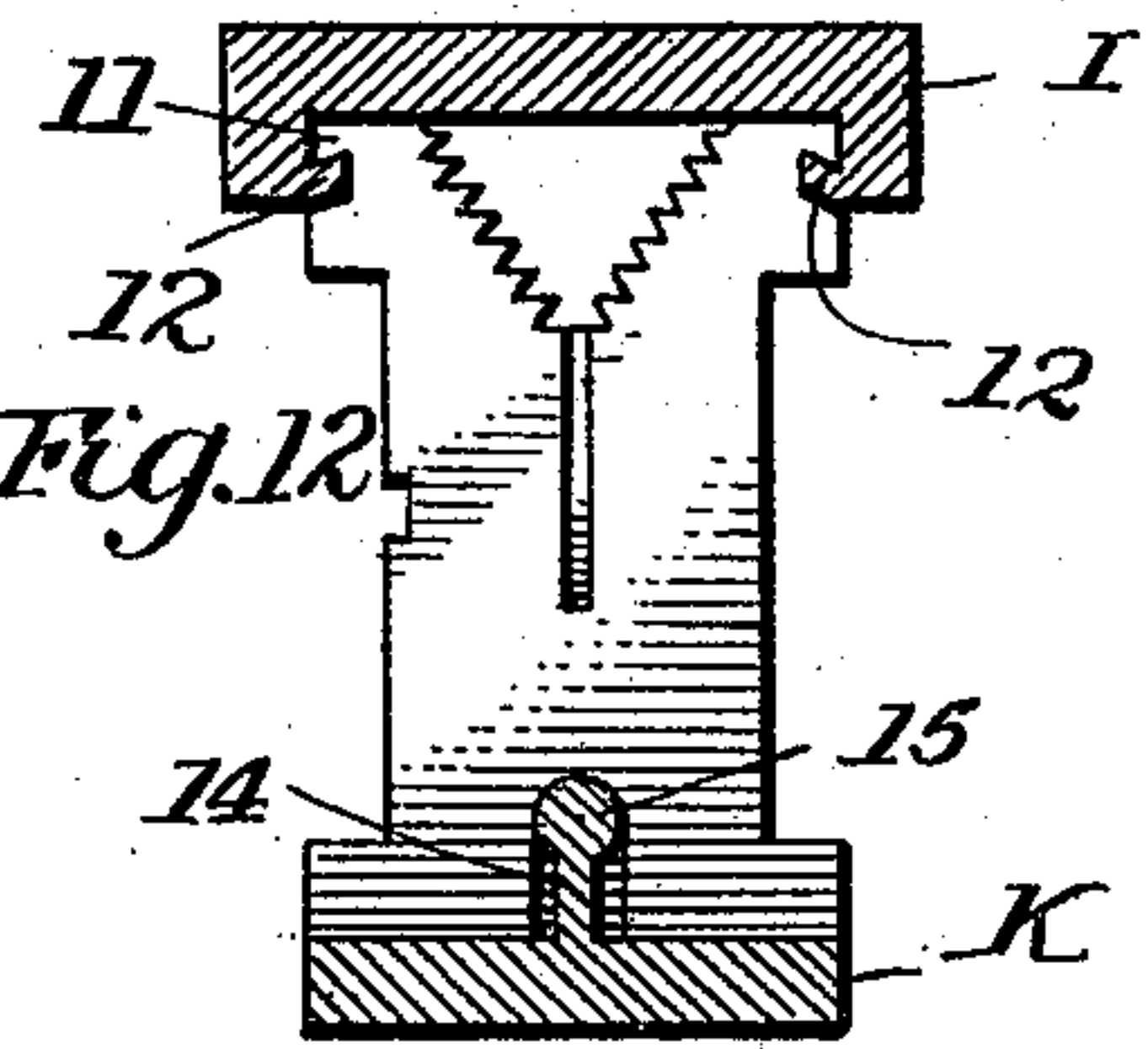
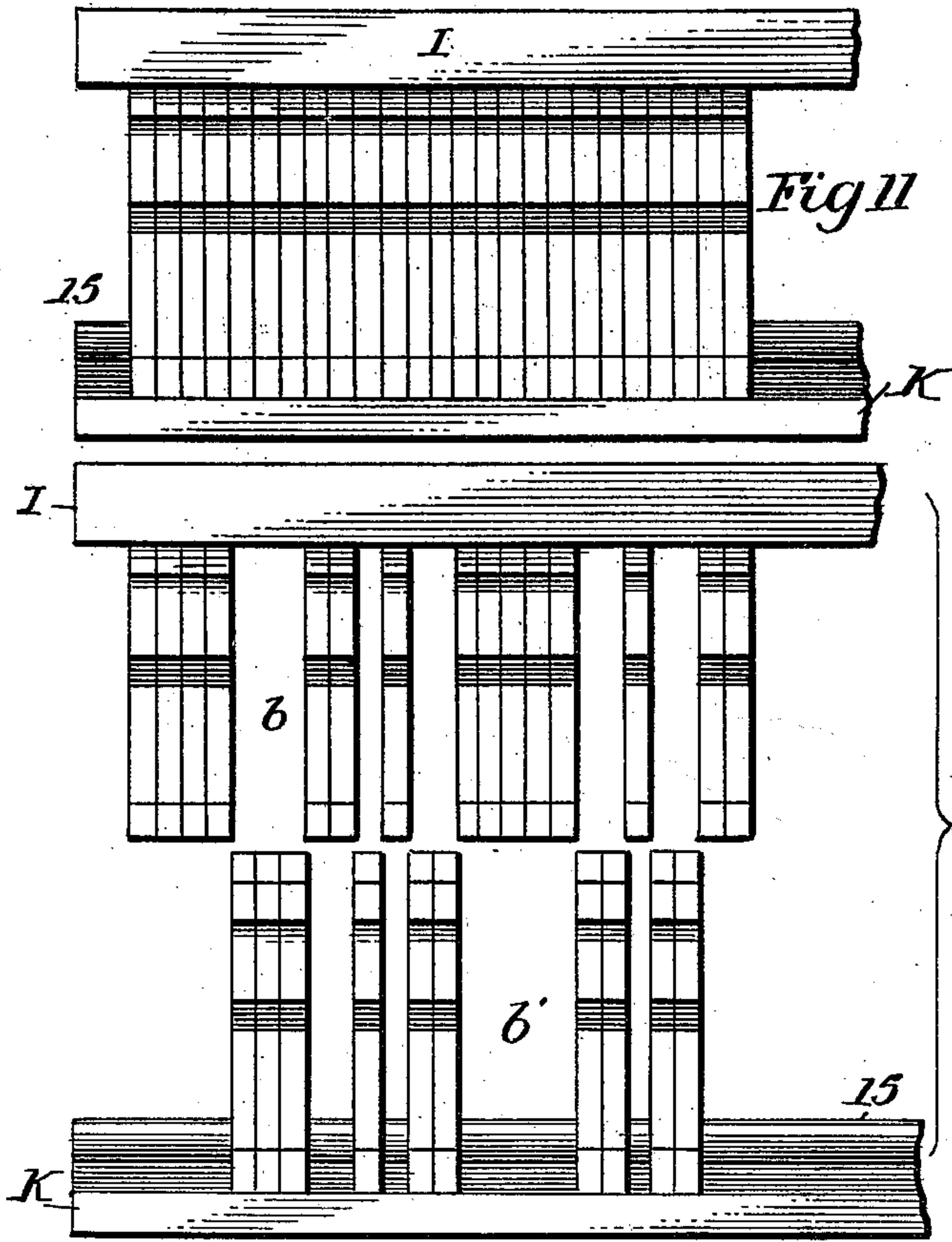
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9 Sheets—Sheet 7.



Witnesses
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Fig. 19.

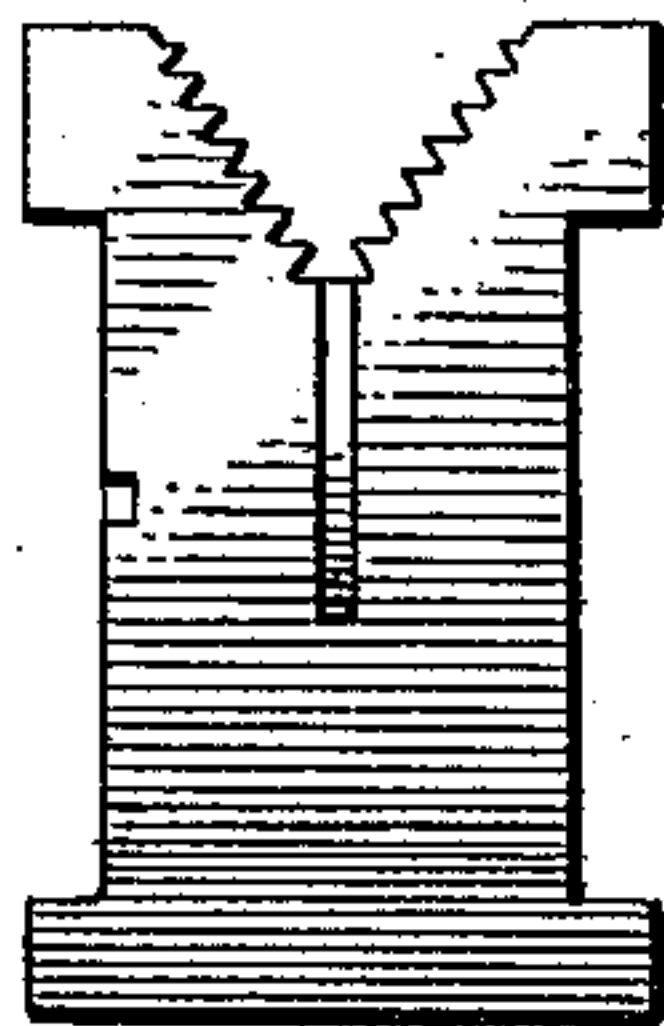


Fig. 20.

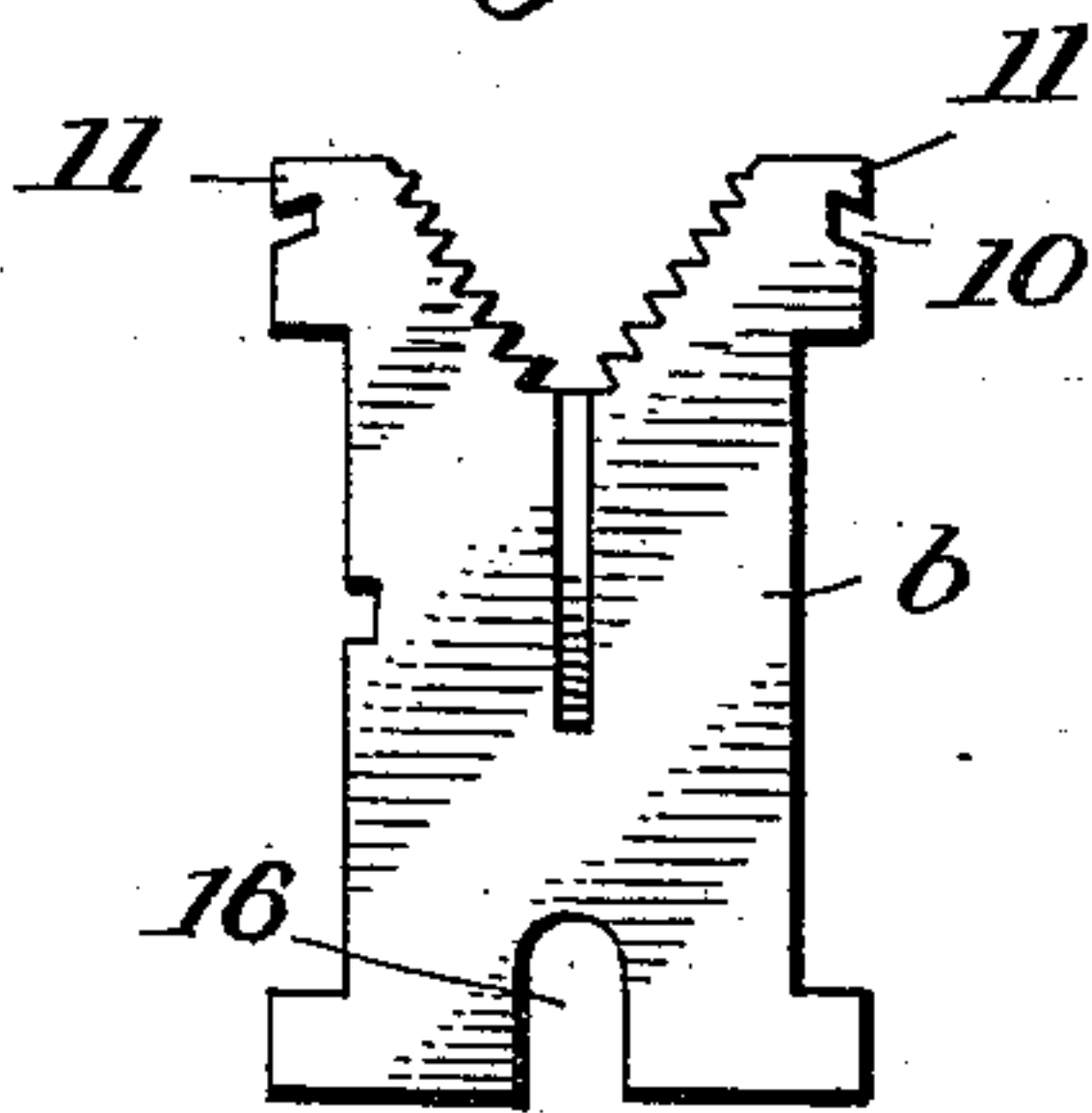


Fig. 21.

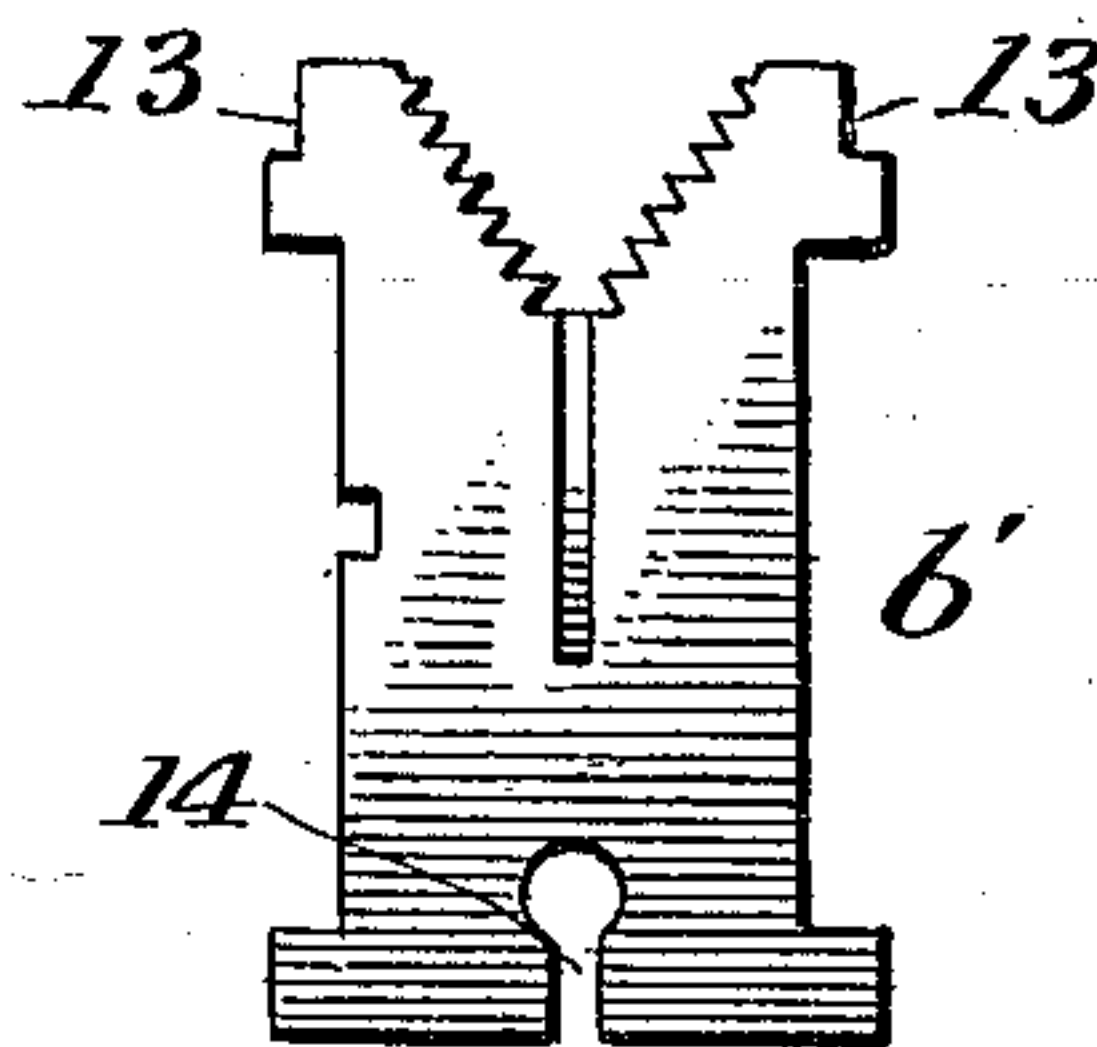


Fig. 22.

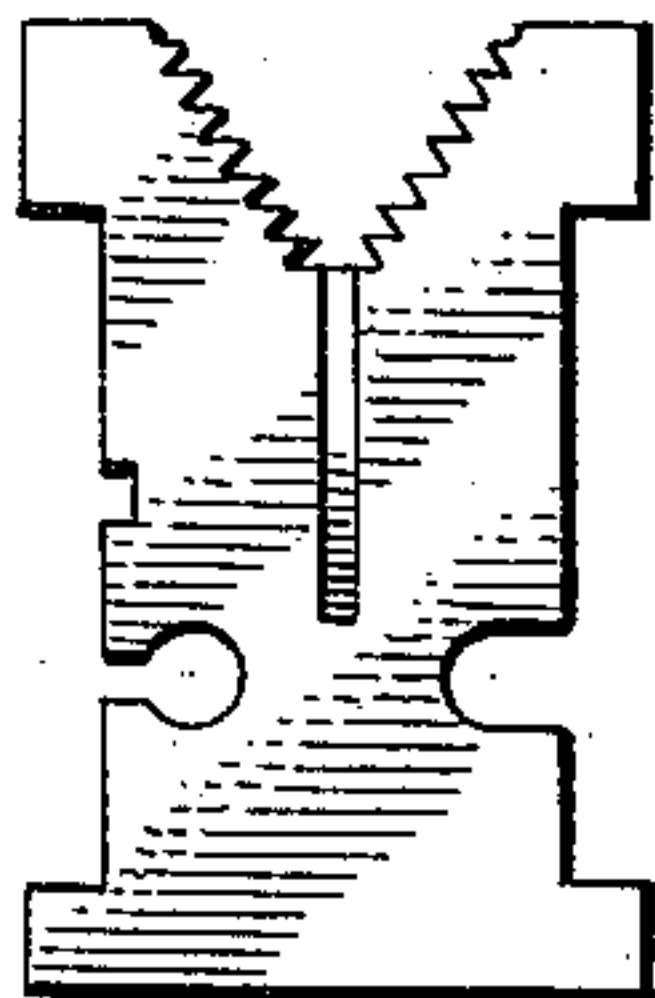


Fig. 23.

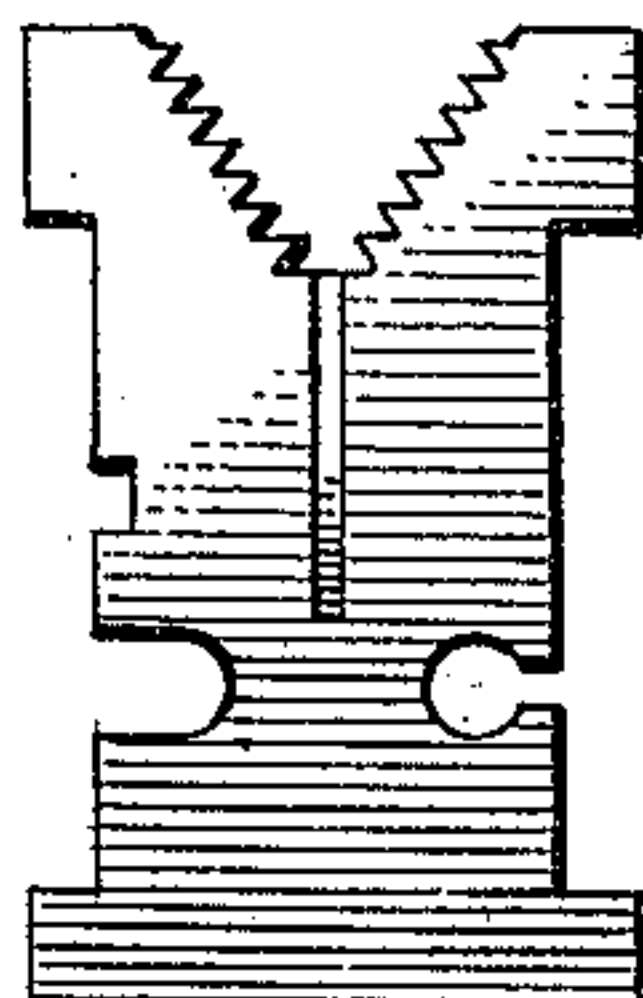


Fig. 24.

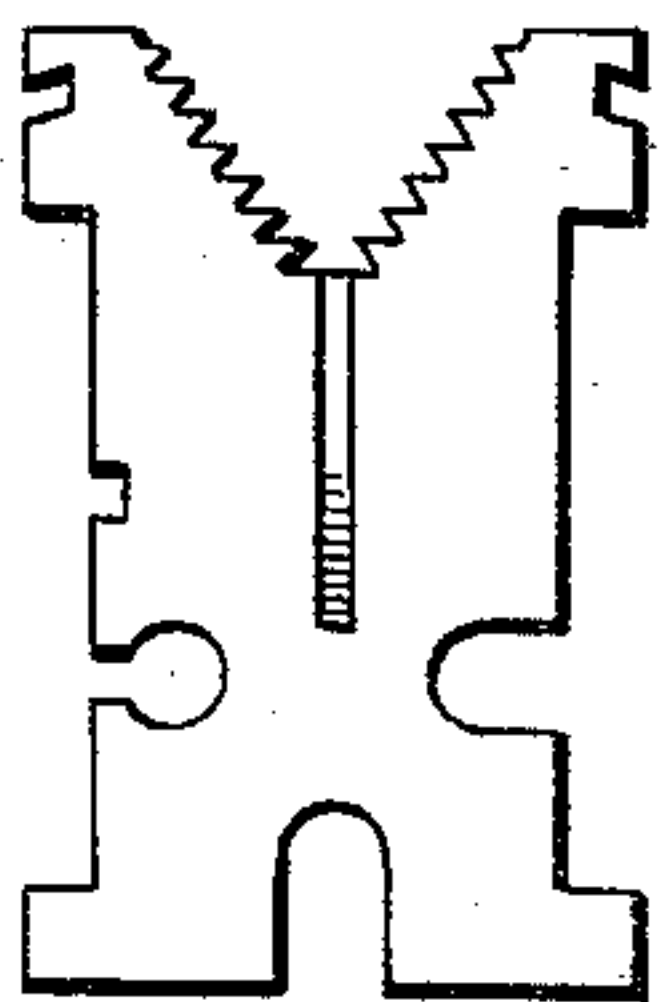


Fig. 25.

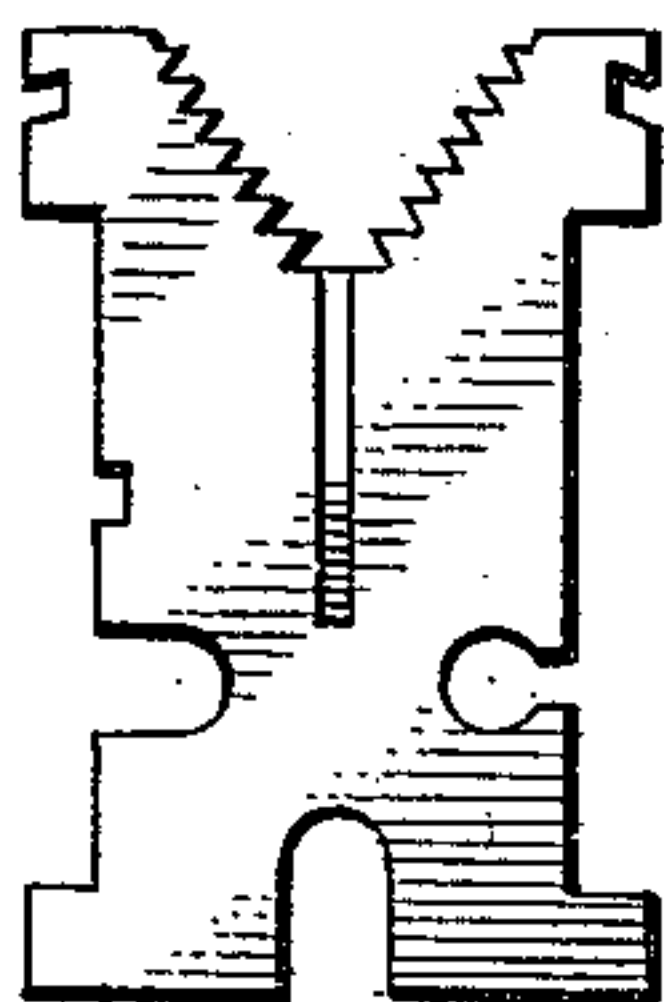


Fig. 26.

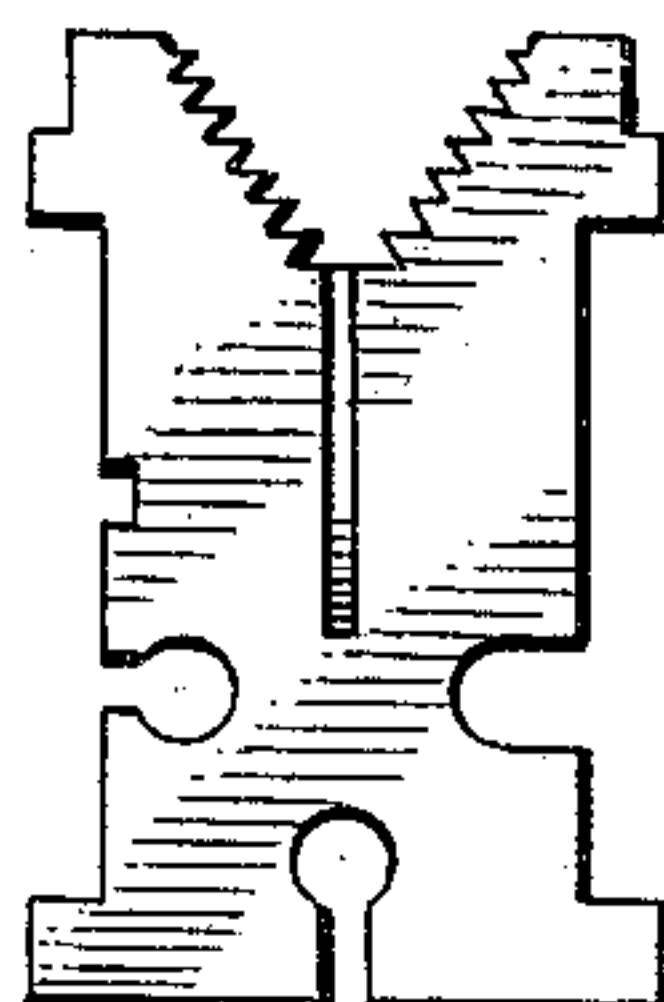
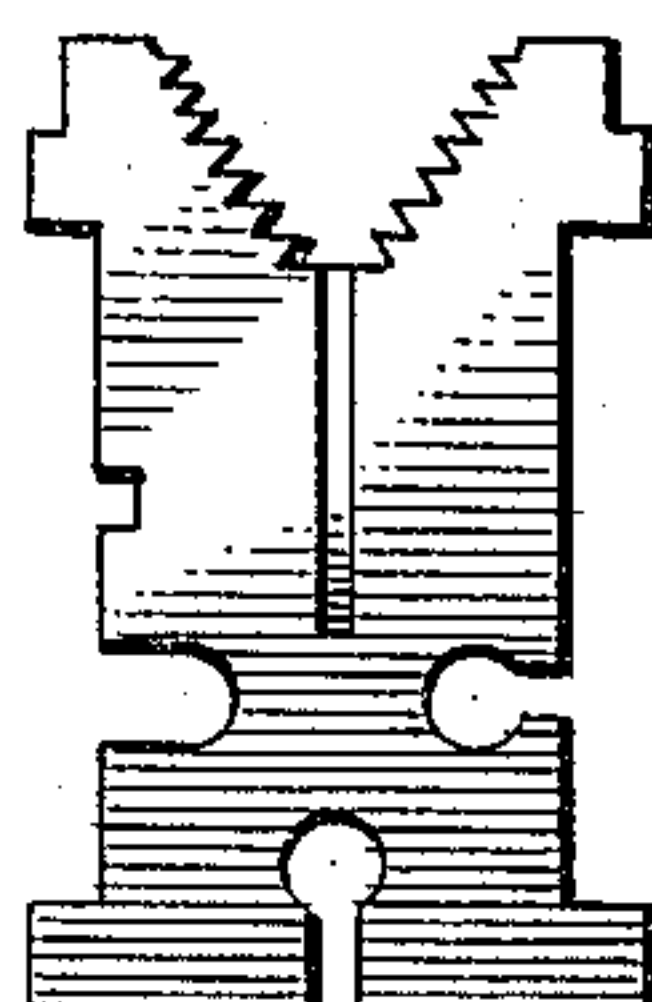


Fig. 27.



Witnesses

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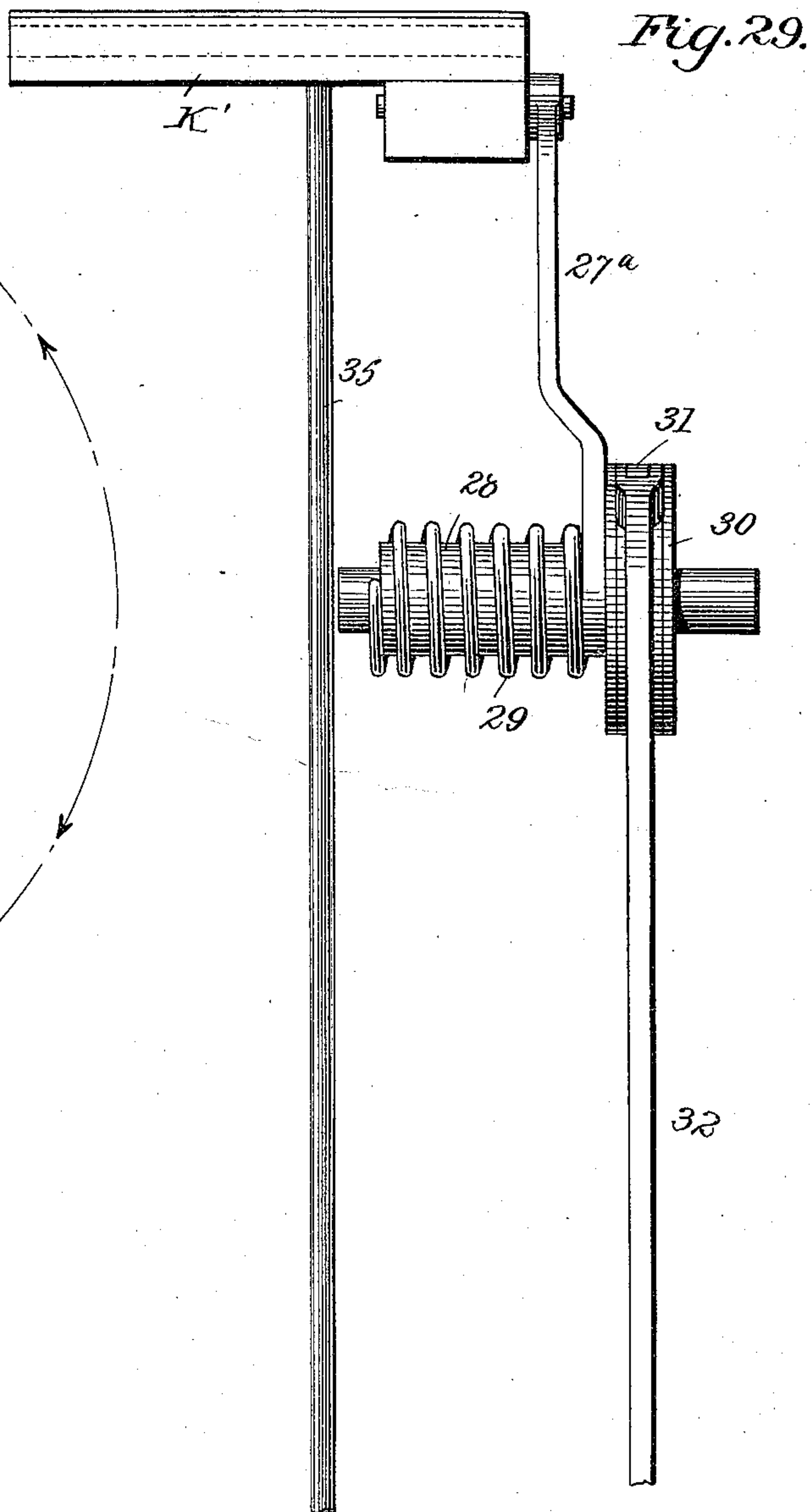
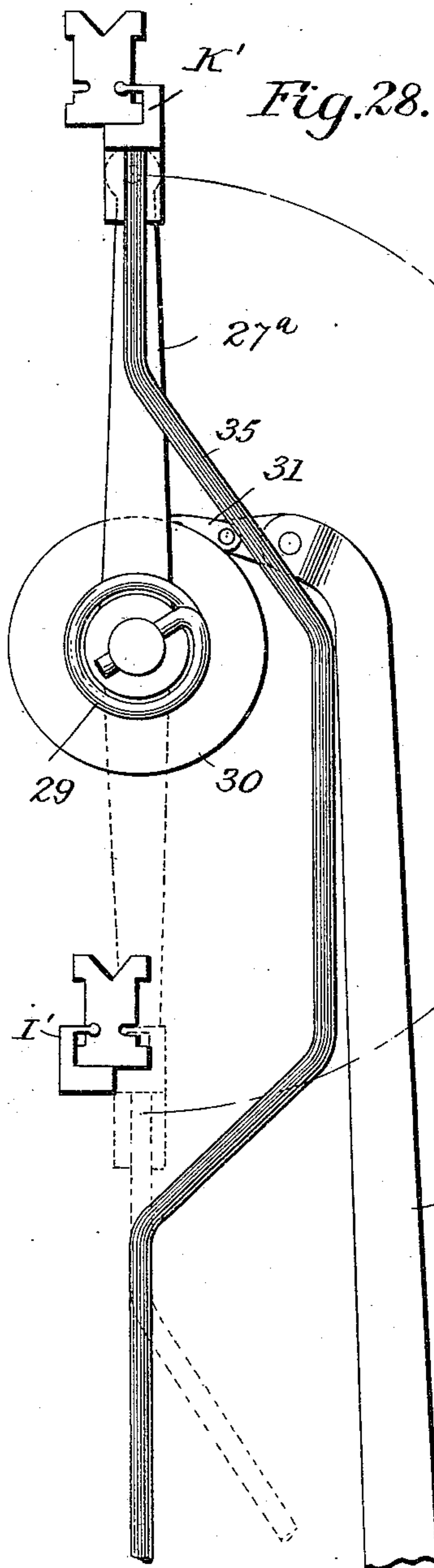
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(Application filed Sept. 22, 1897.)

(No Model.)

9 Sheets—Sheet 9.



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UNITED STATES PATENT OFFICE.

CARL MUEHLEISEN, OF BALTIMORE, MARYLAND, ASSIGNOR TO THE
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LINOTYPE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 610,454, dated September 6, 1898.

Application filed September 22, 1897. Serial No. 652,585. (No model.)

To all whom it may concern:

Be it known that I, CARL MUEHLEISEN, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Multiple-Magazine Linotype-Machines, of which the following is a specification.

The linotype-machines now in common use are provided with magazines in which there are tubes or channels for a set of matrices representing about ninety characters. In these machines it is often desirable, especially for bookwork, to have conveniently at hand a considerable number of matrices representing a number of additional characters; and it is the object of the present invention to provide machines of this class, such as those shown in United States Letters Patent Nos. 436,532 and 557,000, with any desired number of characters in addition to those carried by the usual magazine and to provide means for automatically assembling and automatically distributing the additional characters.

In carrying out the invention I provide the machine with a plurality of independent magazines and a corresponding plurality of series of matrices. The selected matrices from all of the magazines are assembled into lines at a common point by a suitable assembling mechanism. After an impression is taken from an assembled line the matrices are first separated into series corresponding to the respective magazines and then the matrices in each series are distributed to their proper magazine-tubes. For this purpose I provide means for automatically separating an assembled line of matrices into groups corresponding to the magazines from which they were drawn and mechanism for delivering the matrices of each group to the distributing mechanism of its respective magazine.

The invention further consists in various details of construction, which will be hereinafter described.

In the accompanying drawings a machine is shown having two magazines, this number being deemed sufficient for the purpose of illustrating the invention; but it will be understood that it is within the scope and purpose of the invention to increase the number of magazines and the number of series of mat-

trices, as will more fully appear from the following specification.

In the drawings, Figure 1 is a front elevation of a machine embodying the invention, the lower part being omitted. Fig. 2 is a left end elevation of the same. Fig. 3 is a portion of Fig. 1 enlarged. Fig. 4 is an end elevation of the parts shown in Fig. 3. Figs. 5 and 6 are details of the main elevator. Figs. 7 and 8 are details of the devices for separating the second series of matrices from the first. Figs. 9, 9^a, and 10 are details of the devices for shifting the matrices from the elevators to the distributing mechanism. Figs. 11 and 12 are side and end views of a line of matrices in position to be separated. Figs. 13 and 14 are corresponding views of the line of matrices separated into groups. Figs. 15 to 18, inclusive, illustrate a modified form of the devices for separating the matrices into groups. Fig. 19 shows a matrix of the ordinary form. Figs. 20 and 21 show the same matrices as adapted to be separated into two groups by an endwise movement. Figs. 22 and 23 show matrices adapted to be separated by a sidewise movement. Figs. 24 to 27, inclusive, illustrate matrices adapted to be separated automatically into four groups; and Figs. 28 and 29 are views corresponding to Figs. 7 and 8, illustrating a modified device for separating the matrices shown in Fig. 15.

It will be necessary to describe in detail only those parts of the machine embodying the present improvements. For complete descriptions of the remaining parts of the machine reference may be had to the patents above specified.

Referring to the drawings, A indicates the main frame. B B' indicate two magazines; C C', keyboards for said magazines, respectively; D D', distributing mechanisms, and E an assembling-block into which the matrices from both magazines are carried by an endless belt F.

The magazines B B' may be of any suitable construction, those shown being magazines of the standard linotype-machines illustrated in the above-mentioned patents. The magazine B is in the usual position, and the magazine B' is superposed thereon, being arranged at a somewhat less angle to the vertical and

having its lower end just above the lower end of the magazine B. The matrices of the magazine B are released by escapements G, of well-known construction, which are operated by connections from the keyboard C, and they drop between guides 1 to the belt F. The matrices of the magazine B' are released by similar escapements G' and conducted to the guides 1 by upper guides 2. As shown, the escapements G' are held normally in one position by a series of springs 3, and they are operated to release the matrices by key-levers 4 of the upper keyboard C'. The rear ends of these key-levers are normally depressed by a series of springs 5. The key-levers are fulcrumed on a bar 6, which is mounted in a frame 7, which frame is connected by hinges 8, so that it may be raised, as shown in dotted lines in Fig. 4, to permit of access to the matrix guides and escapements. Connected with the frame 7 is the plate 9, which forms the front or cover of the guides 1 and 2. It will be seen that the matrices selected from the upper magazine B' will reach the assembling-belt about as quickly as those selected from the magazine B. Two or more additional magazines might be added and arranged in tandem with the magazines B B', as illustrated in my pending application, Serial No. 649,053.

Before describing the distributing mechanism it will be convenient to allude to the matrices which I use with the present machine. Fig. 20 illustrates a matrix *b* of the series adapted for magazine B, and Fig. 21 one of the matrices *b'* of the series for magazine B'. In the upper ears of the matrix *b* are upwardly-inclined notches 10, forming undercut shoulders 11, which hang on ribs 12 of a rail I, Figs. 12, 14, and 20. The matrices *b'* have their upper ears cut away, as at 13, so that they cannot be sustained by the ribs 12. In the lower end of the matrix *b'* is an undercut notch 14, which is adapted to interlock with a rib 15 of corresponding cross-section upon a rail K, while in the lower end of matrix *b* is an open notch 16, which will not interlock with the rib 15. The sustaining-shoulders 11 are undercut to prevent the matrices from turning accidentally and dropping from the ribs 12. The assembled matrices are transferred to a casting mechanism and justified, and after a cast or impression is taken they are transferred to an elevator, which lifts them to the distributing mechanism. The devices for performing these operations are fully described in United States Patent No. 436,532 and need not be referred to in detail herein, with the exception of the elevator, which I have modified in adapting the present invention to standard machines. The elevator-rail H in the standard machine is usually carried in a vertical plane by the elevator-arm H'; but to adapt the present improvements to the standard machine I have provided the elevator-arm with a laterally-movable rail which is adapted to move to the

left as the arm rises for the purpose of providing space between the elevator-rail and the distributor-rails in which to locate the devices for separating the matrices into groups for the different magazines.

The elevator-arm H' is operated by a cam on the shaft 17 in the usual manner. On the outer end of the elevator-arm, Figs. 1, 2, 5, and 6, are guides 18, in which works a slide 19. The slide is normally drawn to the right by a coiled spring 20, one end of which is connected with the slide and the other end with the arm. A friction-wheel 21 on the right end of the slide engages a cam-rail 22 and causes the slide to travel to the left as the elevator-arm rises. Upon the slide 19 is an arm 23, which carries a lever 24, from the forward end of which the elevator-rail H is hung. The rear end of this lever is normally drawn down by a spring 25 against a stop 26.

When a line of matrices is ready for distribution, it is received on the elevator-rail H in the usual manner. The elevator is then raised to the position shown in Figs. 1, 2, and 6, being carried to the left by the cam 22. To the right of the elevator-rail when in its upper position are the devices for separating the matrices into groups corresponding with the several magazines. These devices include the pair of rails I K. The rail I, Figs. 12 and 14, is stationary and provided with the upwardly-inclined ribs 12, which engage the shoulders 11 of the matrices *b*, while the rail K carries the rib 15, which engages the undercut notches 14 of the matrices *b'*. The rail K is pivotally supported on a rocking arm 27, carried by a sleeve 28. The arm tends to move in one direction under the influence of a coiled spring 29 and is rotated in the opposite direction periodically by devices consisting of a drum 30, a flexible chain or rope 31, cam-lever 32, and cam 33 on an intermittently-running sleeve 34. The rail K is maintained at all times with the rib 15 on top and substantially perpendicular by means of a depending rod 35, the upper end of which is attached to the rail, while the lower end slides in an opening in a fixed arm 36. In its upper position the rail K sustains its matrices in line with the upper distributing-rail. After a line of matrices is pushed onto the rails I K the first movement of the rail K draws the matrices apart, and the further movement of rail K carries all of the matrices *b'* up to the distributor of the upper magazine, while the matrices *b* remain opposite the distributor of the lower magazine. The matrices are shifted from the rail H to the rails I K, and afterward from the rails I K to the individual distributors D D', by means of slides M N, which carry matrix-engaging fingers 37. The slides are connected by links, respectively, with arms *m n*, which rock on a shaft 38. The slides are normally drawn to the right by springs 39, which are connected to lateral projections 40 on the hubs of the arms *m n*, Figs. 1, 9, and 10. To operate the arms *m n* in the opposite direc-

tion, they are provided with projection, 41, which are engaged by arms 42 upon shaft 38. This shaft is rocked to throw the slides to the left by a lever 43 and cam 44 on shaft 17, and the return movement of the slides is regulated by an arm 45, link 46, cam-lever 47, and face-cam 48 upon the intermittent sleeve 34. The slides M N move to the right independently under the influence of independent springs. This is essential, for the reason that the line of matrices is usually unequally divided, which results in one of the slides having a greater quantity of matrices to feed to its distributor than the other.

The intermittent cam-shaft 17, which operates the elevator-arm H', stops shortly after the elevator reaches its upper position, and it is necessary that the devices for separating the series of matrices should operate after the cam-shaft has come to rest. These devices, as above stated, are driven by cams mounted on the sleeve 34, which is loose on a shaft 49. This shaft is constantly rotated by means of a pulley 50 and belt 51. Upon the shaft 49 is a wheel or disk 52, having a series of pins 53, and upon the sleeve 34 is an arm 54, carrying a spring-pressed pawl 55, which constantly tends to engage with the pins 53. The pawl is thrown out of engagement with the pins by an inclined surface 56 on the end of a lever 57, which lever also carries a stop-pin 58. The lever is drawn normally into position to engage the pawl 55 by a spring 59, and the cams 33 and 48 are therefore normally at rest. Upon the rear end of the lever 57 is a roller which is engaged and raised by a short lever 60 on the arm H' as said arm rises, thus releasing the pawl 55 and causing the cams 33 and 48 to make a revolution. The lever 60 is held against a stop 61 by a spring 62, the tension of the spring being such that the lever 60 will yield as the arm H' descends and not operate the clutch-lever 57. As the arm H' rises the slides M N are thrown to the left. After the arm comes to rest the slide N moves to the right, carrying the line of matrices from the elevator-rail H to the rails I K. The slides M N are then held from further movement to the right by the cam 48 until the rail K carries its matrices to the upper distributor. The further revolution of the cam 48 then permits the slides M N to move to the right, carrying the two groups of matrices over to their respective distributors, from which point they are carried by the distributors to their respective magazine-channels. The distributors, as illustrated, are of the standard form shown in the patents above cited and need not be described in detail.

In Figs. 15 to 18, inclusive, and 21 and 22, I have illustrated matrices adapted to be separated into two series by rails I' K'. The matrices of one series have undercut notches on the left side and open notches on the right, while the matrices of the other series have undercut notches on the right and open

notches on the left. It will be evident that the matrices of the two series may be separated by sliding the line onto rails, as shown in Figs. 15 and 16, and then separating the rails, as shown in Figs. 17 and 18. The rails I' K' can be separated by the devices shown in Figs. 1, 7, and 8 simply by shifting the sleeve 28 into the vertical line between the rails I K, Fig. 7. Thus, as shown in Fig. 28, the arm 27^a, which is carried on the sleeve 28, is substantially vertical in its upper and lower positions. This arm carries the rail K', and as it starts to move from its lower position the initial movement of the rail K' is horizontal and the matrices are separated, as shown in Fig. 17, after which the rail K' is carried to the upper position, as shown in full lines, Fig. 28.

The above manner of separating matrices belonging to different series may be carried out to any extent. Thus in Figs. 24 to 27, inclusive, are shown matrices which may be separated into two groups by a vertical movement, such as that described in the foregoing specification, and each of these two groups may again be separated by laterally-moving rails, such as those shown in Figs. 15 to 18, inclusive. In this manner a composed line of matrices may be separated into four groups and then delivered to four magazines.

The operation of the invention will be obvious from the foregoing description and need only be briefly recapitulated. The matrices fall from the magazines in response to the operation of the keys, being released one at a time by the escapements. As the magazines have their discharge ends close together, the matrices from the upper magazine arrive at the point of assemblage as quickly as those from the lower magazine, thus preventing transposition. After the line has been justified and a cast taken the line of matrices is transferred to the elevator-bar H and raised into position opposite the distributor of the lower magazine, as shown in Fig. 2. As the line rises the slide N is drawn back and the clutch of shaft 49 is released, thus starting the cam 48. After the line reaches its upper position slide N moves forward sufficiently to carry the matrices onto the rails I K. A flat portion of the cam 48 prevents the slides M N from moving farther until the cam 33 has rocked the arm 27 and carried the matrices upon bar K into alinement with the distributor of the upper magazine, the other matrices remaining in line with the distributor of the lower magazine. The slides M N then move to the right and carry the matrices into the distributors. The matrices are then carried singly along the distributor-bars and dropped into the proper magazine-channels. The distributors of all the magazines operate simultaneously, and matrices may thus be distributed into several magazines as quickly as into one.

The invention as above described is applied to the standard linotype-machine at present

in use. By reorganizing the machine it will be evident that the invention may be applied in simpler form and at less expense.

The principal features of the invention consist in using a plurality of magazines and a plurality of series of matrices, one series for each magazine. The matrices for each magazine have a distinctive mark or part which coöperates with a selecting device to separate said matrices from those of other series. While I have illustrated and described but one way of separating the matrices into series, it will be evident that this may be accomplished by other mechanisms. I believe myself to be the first to use a plurality of series of matrices and means for separating mixed matrices by series. I also consider myself to be the first to use, in combination with a plurality of magazines and distributing mechanisms, means for separating mixed matrices by series and transferring the matrices of the different series to their respective magazines. Therefore I do not limit myself to the precise construction and arrangement of mechanism above described, as the same may be considerably varied within the scope of my invention.

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

1. In a linotype-machine, a plurality of matrix-magazines simultaneously operative and a distributor for each magazine, in combination with a corresponding plurality of series of matrices, and means for separating a line of matrices by series before said matrices pass to the distributors, substantially as described.

2. In a linotype-machine, a plurality of magazines, in combination with a corresponding plurality of series of matrices, means for separating a line of matrices by series before said matrices pass to the distributors, and means for distributing each series into its magazine, substantially as described.

3. In a linotype-machine, a plurality of magazines and an individual distributing mechanism for each magazine, in combination with means for separating a line of matrices by series, and means for delivering the separated matrices to the distributing mechanisms of their respective magazines, substantially as described.

4. In a linotype-machine, a plurality of magazines superposed upon one another and arranged to deliver their matrices to a common assembling-belt, and means for automatically and simultaneously distributing matrices to each of said magazines, substantially as described.

5. In a linotype-machine, a plurality of fixed magazines superposed upon one another and arranged to deliver their matrices to a common assembling-belt in combination with means for separating matrices by series, and means for simultaneously distributing the matrices to their respective magazines, substantially as described.

6. The combination with a plurality of magazines, each having a number of tubes or receptacles and a distributing mechanism, of a plurality of series of matrices, the matrices of each series having distinct interlocking portions, and means for separating lines of matrices by series before said matrices pass to the distributors, substantially as described.

7. In a linotype-machine, the combination with a plurality of magazines, each having a number of tubes or receptacles and a distributor, of a plurality of series of matrices, the matrices of each series being provided with undercut notches and the said undercut notches of the respective series being differently located, and means for separating lines of matrices by series and delivering the matrices to their respective distributors, substantially as described.

8. In a linotype-machine, a plurality of series of matrices, the matrices of each series being provided with undercut or interlocking notches, and the matrices of each series being also provided with open or non-interlocking notches in line with the interlocking notches of the other series, and mechanism for engaging the interlocking notches to separate lines of matrices by series, substantially as described.

9. The combination with two series of matrices, each matrix having an interlocking and a non-interlocking notch so located that the interlocking notches of one series stand in line with the non-interlocking notches of the other series, of two rails adapted to interlock with the two series of matrices respectively, whereby when the rails are moved apart the matrices will be separated by series, substantially as described.

10. In a linotype-machine, the combination with two magazines each having a plurality of tubes or receptacles, of two series of matrices, each series having a distinctive interlocking portion, and two relatively-movable rails adapted to engage said interlocking portions respectively, and means for separating the rails to separate a line of matrices by series before distribution, substantially as described.

11. In a linotype-machine, the relatively-movable rails, I, K, provided respectively with the ribs 12 and 15, in combination with a series of matrices having shoulders 11 and a second series of matrices having undercut notches 14, substantially as described.

12. In a linotype-machine, the relatively-movable rails, I, K, provided respectively with the ribs 12 and 15, in combination with a series of matrices having shoulders 11 and open or non-interlocking notches 16, and a second series of matrices having interlocking notches 14 corresponding with the notches 16 and non-interlocking notches 13 corresponding with the shoulders 11, substantially as described.

13. In a linotype-machine, the combination

with a magazine and its keyboard, with a second magazine superposed thereon, and a movable keyboard for said second magazine, said latter keyboard being movable to permit inspection of the matrix-guides and escape-ments, substantially as described.

14. In a linotype-machine, the combination with a fixed magazine, an assembling-belt, and matrix-guides leading from the magazine to the belt, of a second fixed magazine superposed thereon, distributors in said machine for both magazines, and guides leading from the discharge-openings of the upper magazine to the matrix-guides of the lower magazine, whereby the matrices of both magazines are delivered to the assembling-belt through common guide-channels, substantially as described.

15. In a linotype-machine, an elevator constructed to carry the matrices to the distributing mechanism, in combination with an elevator-rail movable endwise thereon, substantially as described.

16. In a linotype-machine, an elevator-arm, a slide on the extremity of said arm movable laterally to the plane in which the arm travels, and an elevator-rail connected to said slide, substantially as described.

17. In a linotype-machine, the combination of an elevator-arm, the laterally-movable slide on the end of said arm, the cam for moving the slide, and the elevator-rail connected to said slide, substantially as described.

18. In a linotype-machine, the combination of the elevator-arm, the rail carried by said arm and movable laterally to the plane of movement of the arm, the spring urging said rail in one direction, and the cam arranged to move the rail in the opposite direction, substantially as described.

19. In a linotype-machine, the elevator-arm, the slide on the free end of said arm, the lever carried by said slide, and the elevator-rail carried by said lever, substantially as described.

20. In a linotype-machine, the combination with a plurality of magazines each having a number of tubes or receptacles and a like plurality of series of matrices, of means for separating lines of matrices into series consisting of two relatively-movable rails, means for interlocking the different series of matrices with their respective rails and then moving the rails apart to separate the matrices, and means to distribute the separated matrices to their respective magazines, substantially as described.

21. In a linotype-machine, a pair of fixed magazines, an elevator adapted to lift lines of matrices to one of said magazines, means for separating said matrices by series and conveying the matrices of one series to the second magazine, and automatic means for distributing matrices simultaneously to both magazines, substantially as described.

22. In a linotype-machine, the devices for separating matrices by series consisting of a

stationary rail, a movable rail, parts on said rails adapted to interlock with different series of matrices, and means for transferring the matrices from said rails to different distributing mechanism, substantially as described.

23. In a linotype-machine, the means for separating matrices by series consisting of a stationary rail and a movable rail, means for carrying the movable rail into proximity to the stationary rail, means for transferring a line of matrices to said rails, and means for separating the rails, whereby the matrices are separated by series, substantially as described.

24. In a linotype-machine, the combination of a plurality of magazines, a distributing mechanism for each magazine, means for separating matrices by series and presenting the matrices of the different series to their respective distributors, and slides adapted to transfer the matrices to the distributors, substantially as described.

25. In a linotype-machine, the combination with a plurality of magazines, each provided with a distributing mechanism, of a corresponding plurality of slides for transferring matrices to said mechanism, and means for moving said slides independently whereby the matrices are fed independently to the several distributors, substantially as described.

26. In a linotype-machine, the combination of a plurality of magazines, each provided with a distributing mechanism, with a plurality of slides for transferring matrices to said mechanism, arms adapted to move said slides, a cam for throwing the slides out, and a second cam controlling in part their inward movement, substantially as described.

27. In a linotype-machine, the combination of a plurality of magazines, each provided with a distributing mechanism, with a plurality of slides for transferring matrices to said mechanisms, arms for moving said slides, said arms being mounted independently of each other, cam mechanism for throwing said arms outward and independent springs for moving said arms inwardly, substantially as described.

28. In a linotype-machine, an elevator and driving mechanism therefor constructed to lift lines of matrices to the distributing mechanism, devices for separating said matrices by series before said matrices pass to the distributors, and independent driving mechanism for said devices arranged to operate after the elevator-driving mechanism has come to rest, substantially as described.

29. The combination with a plurality of magazines, of mechanism for simultaneously distributing matrices to said magazines, slides for transferring matrices to said distributing mechanisms, springs urging said slides and arms in one direction, and a cam arranged to control the movement of the slides in the opposite direction, substantially as described.

30. In a linotype-machine, the devices for

separating lines of matrices by series and conveying the matrices to their respective distributing mechanisms, in combination with a cam-shaft for operating said devices, a clutch
5 for said shaft, an elevator-arm, and means whereby the clutch is operated by said arm, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

CARL MUEHLEISEN.

Witnesses:

THOS. KELL BRADFORD,
SAML. D. BRADFORD.