

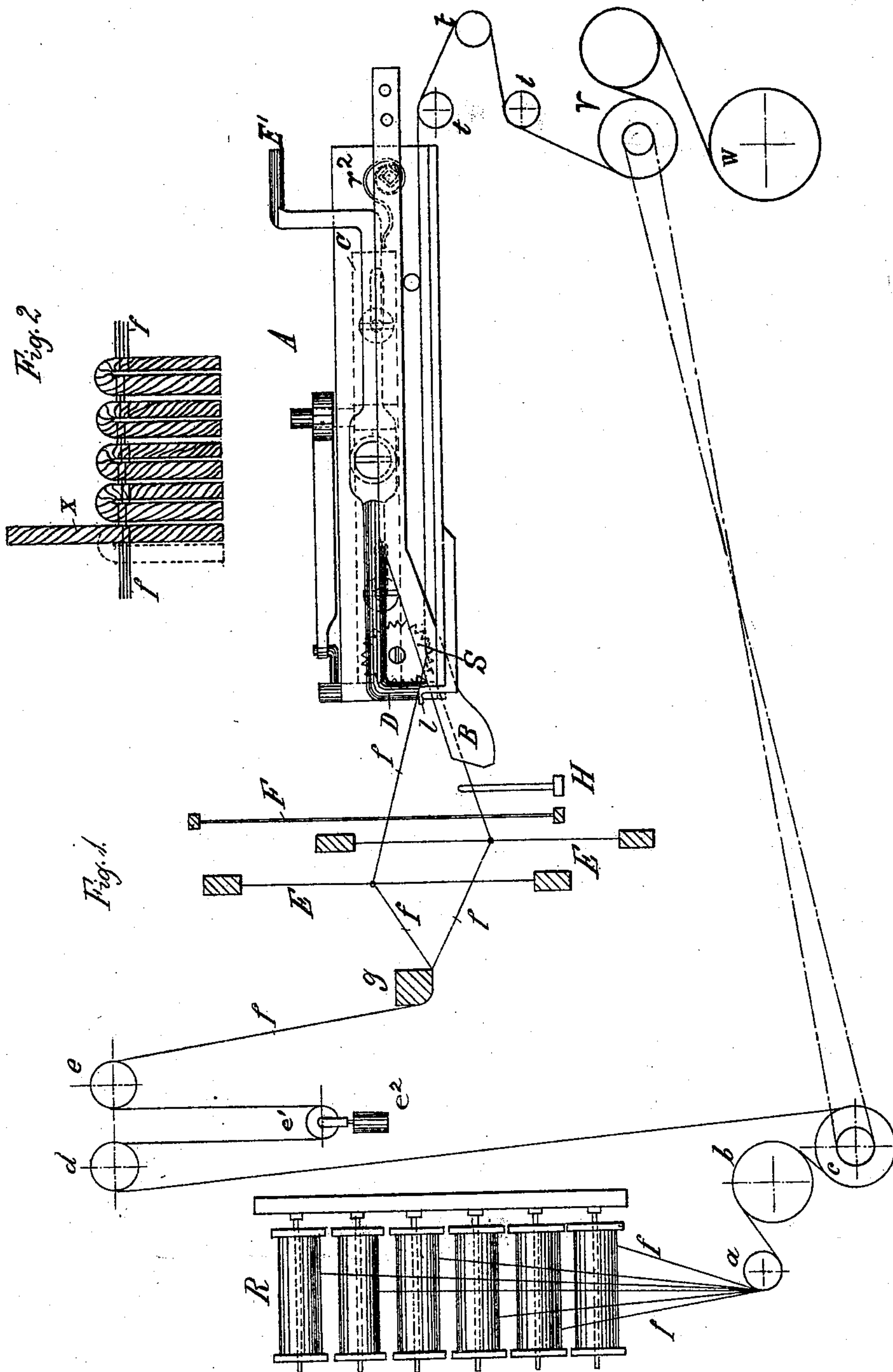
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12 Sheets—Sheet 1.

F. WATZLAWIK.
LOOM FOR WEAVING CHENILLE STRIPS.

No. 502,920.

Patented Aug. 8, 1893.



Witnesses
William Miller
Attest du Façon

Inventor
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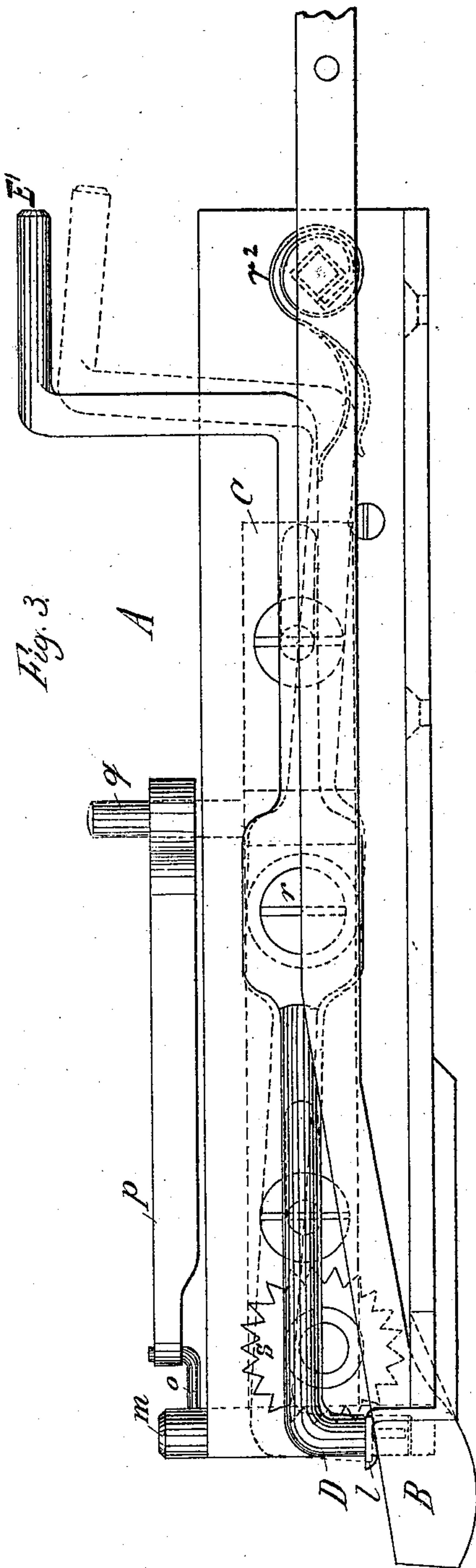


Fig. 3.

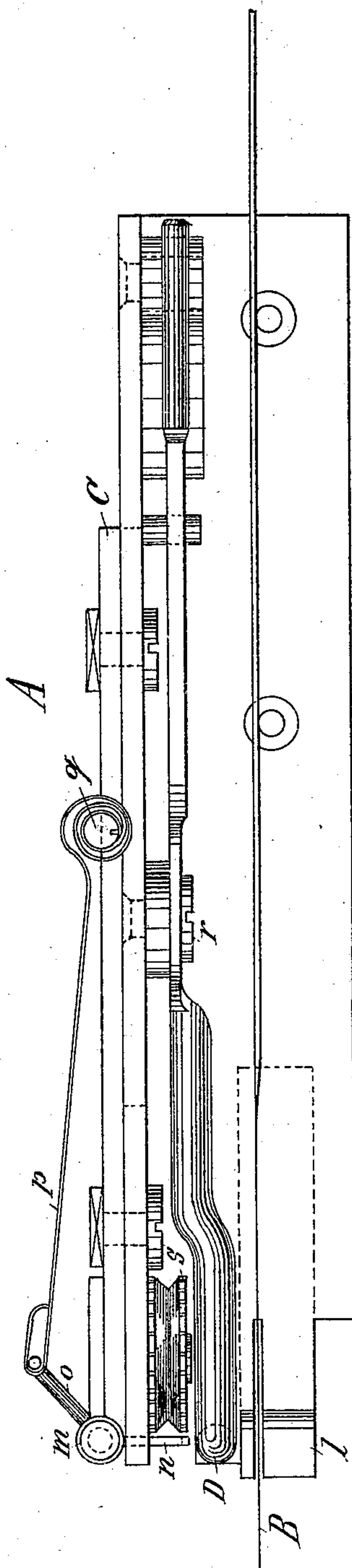


Fig. 4.

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Fig. 6.

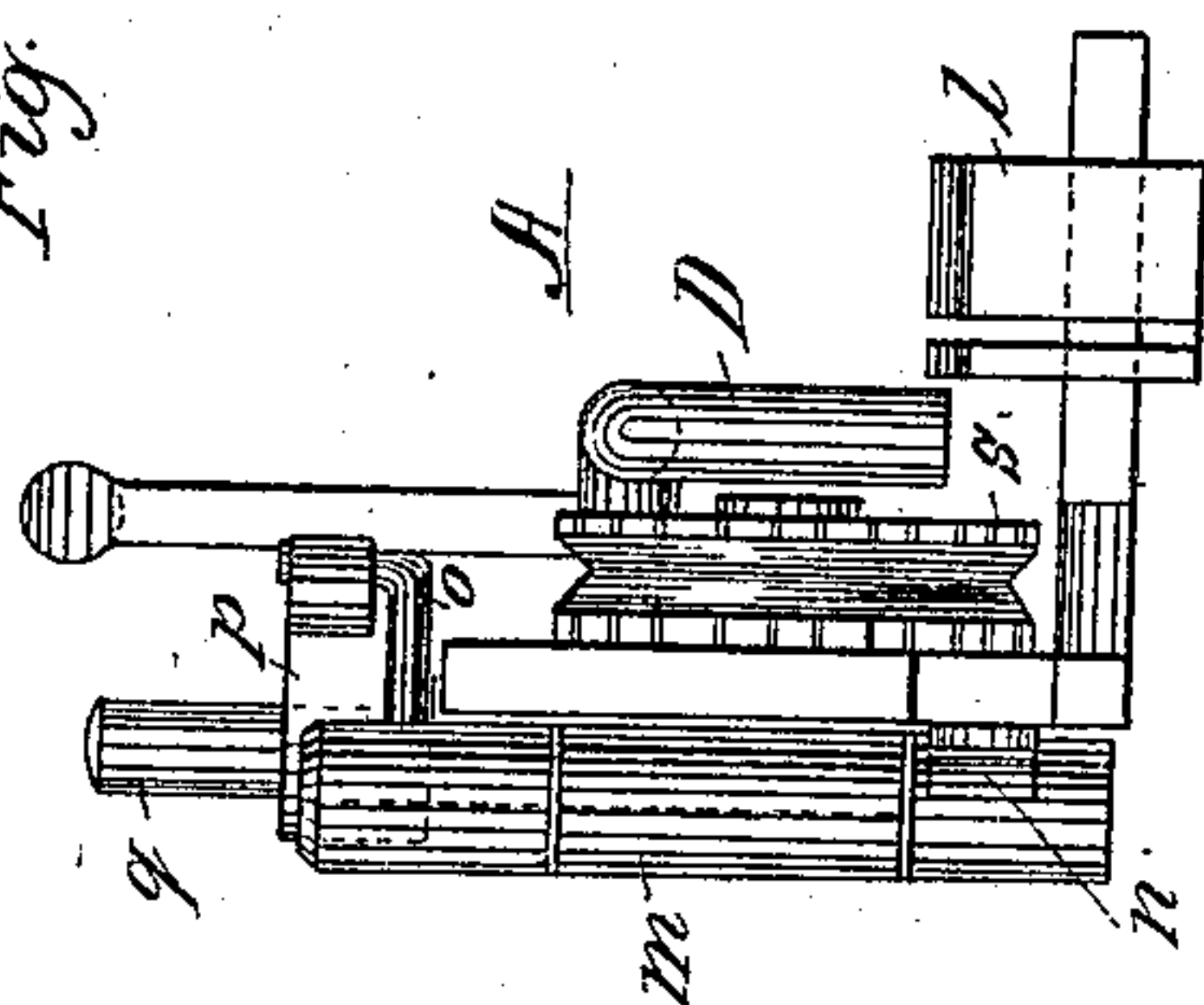


Fig. 5.

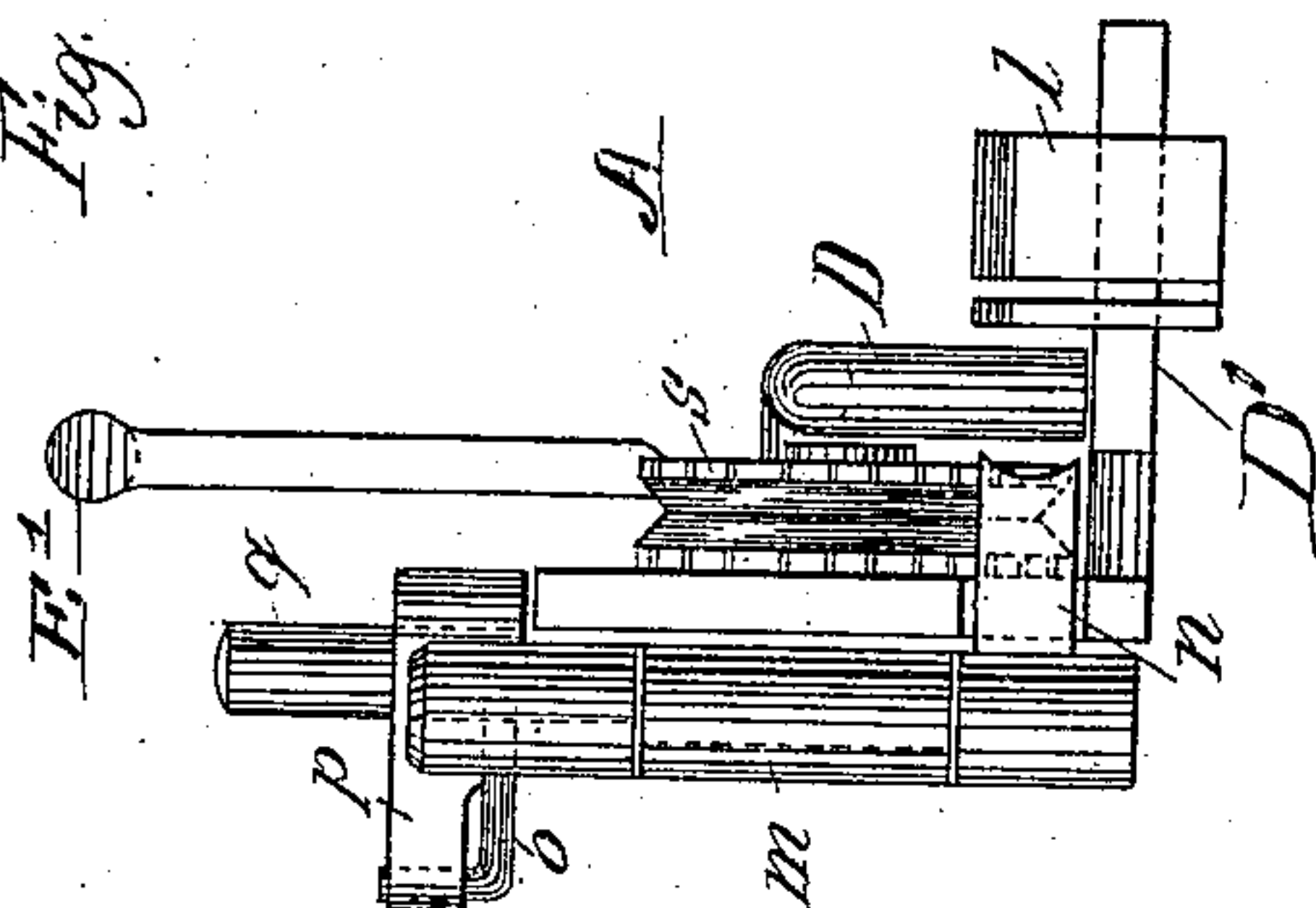
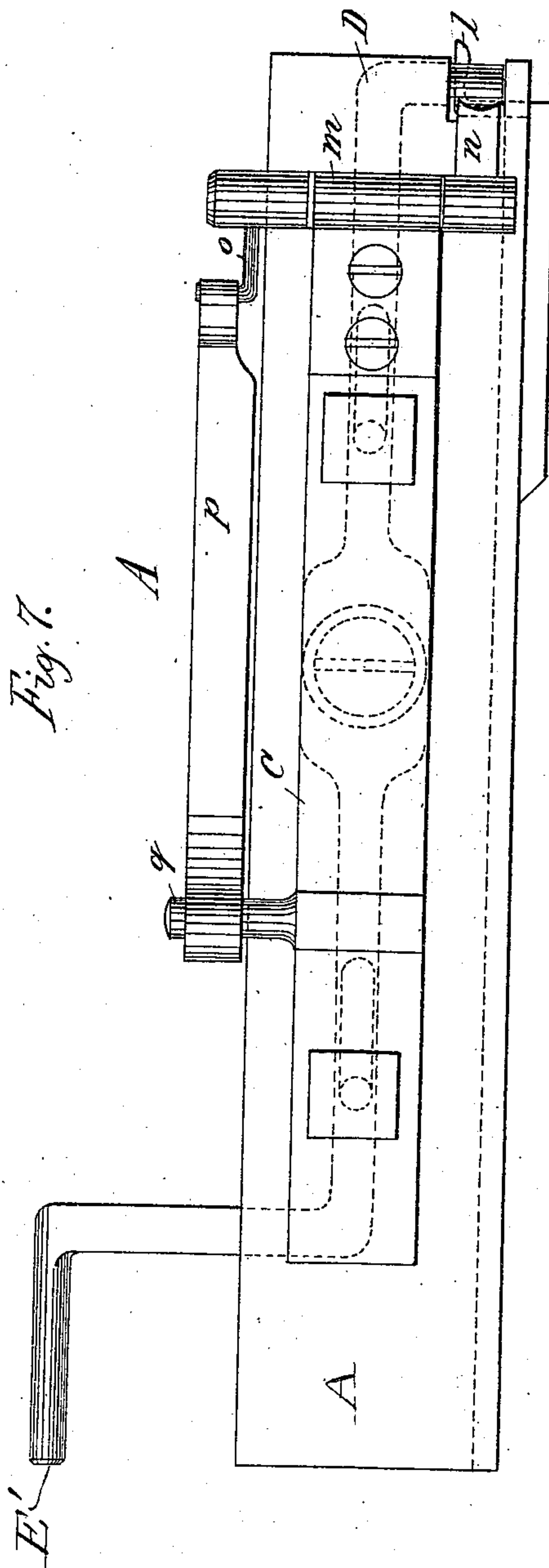


Fig. 7.



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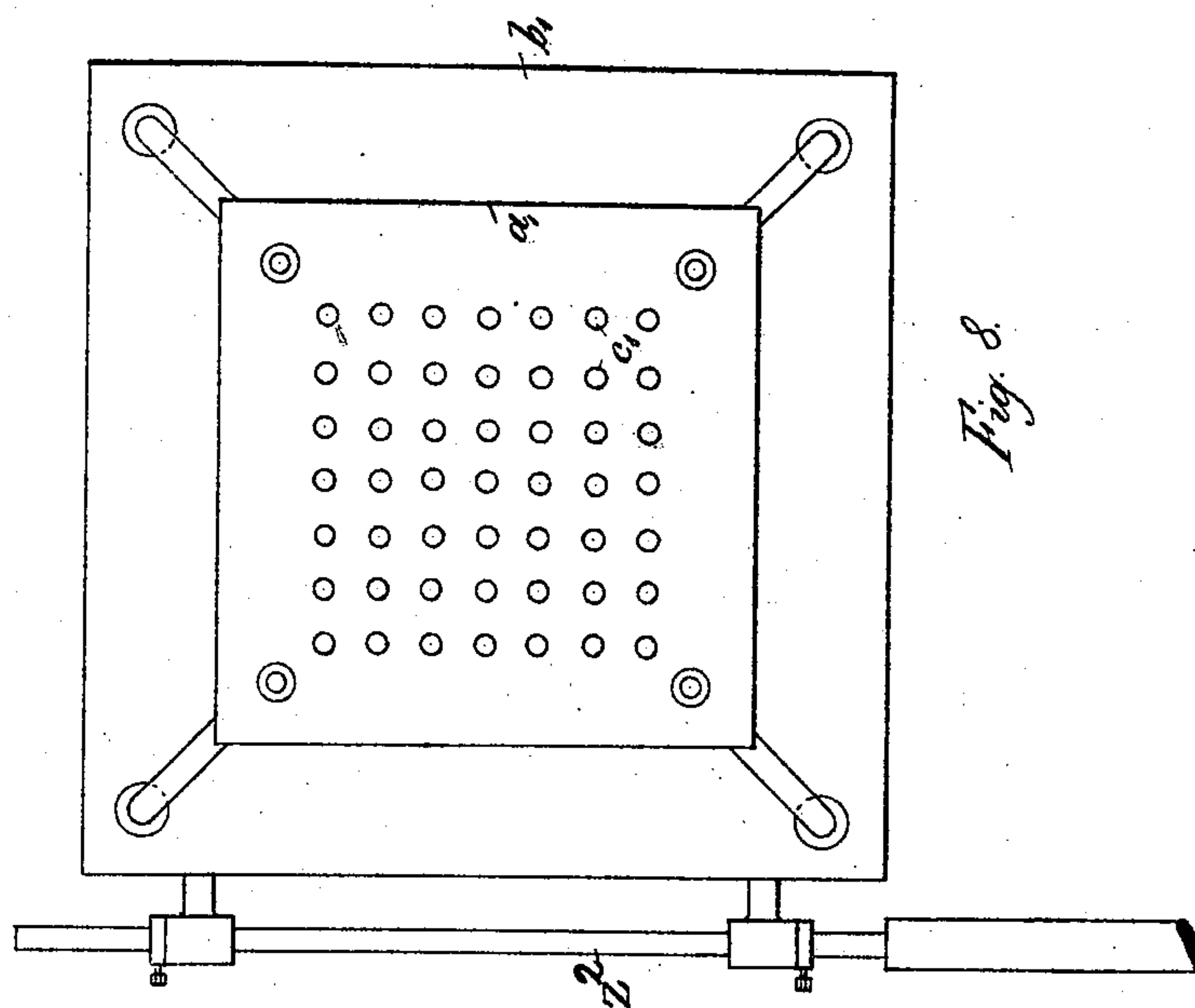
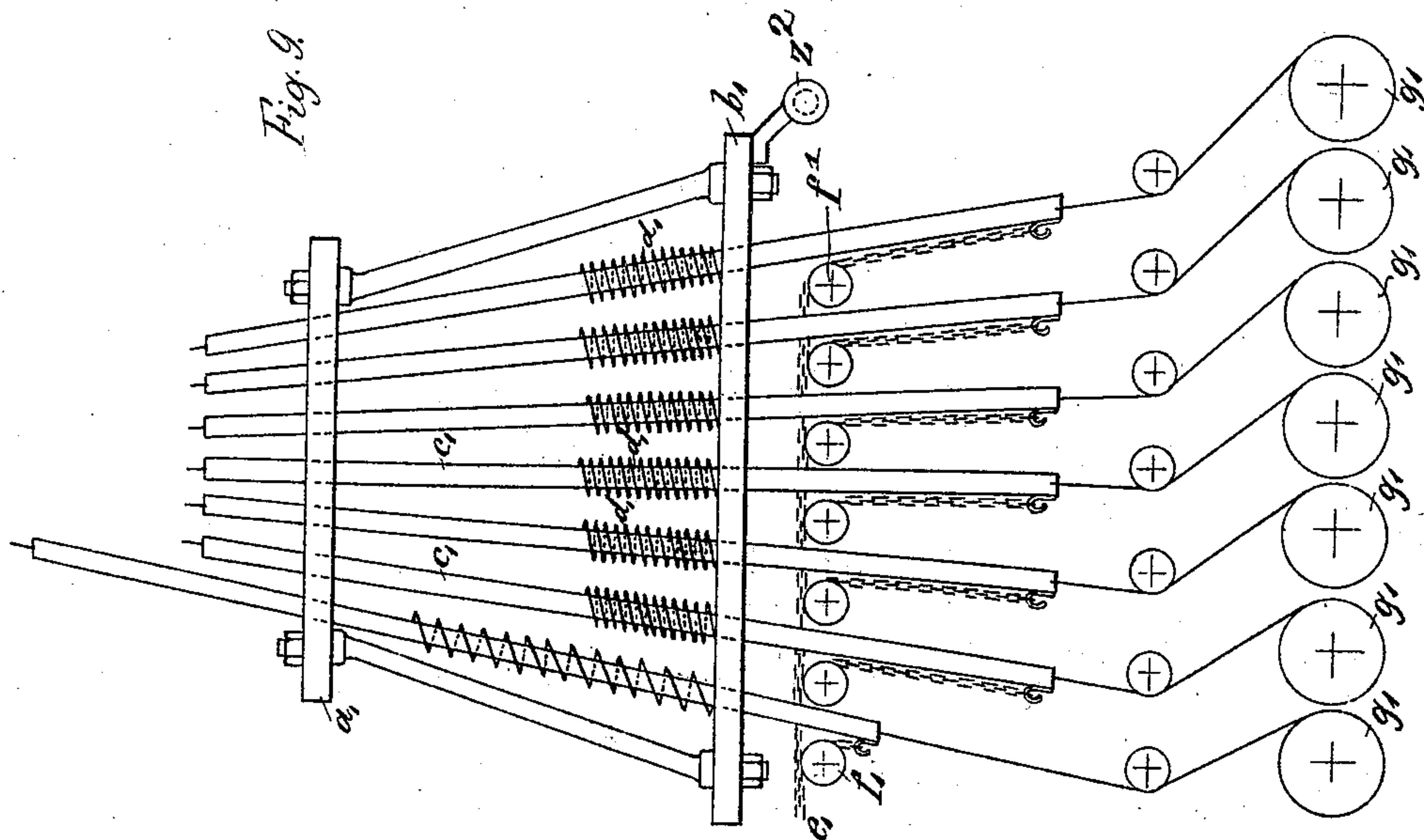
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Fig. 11.

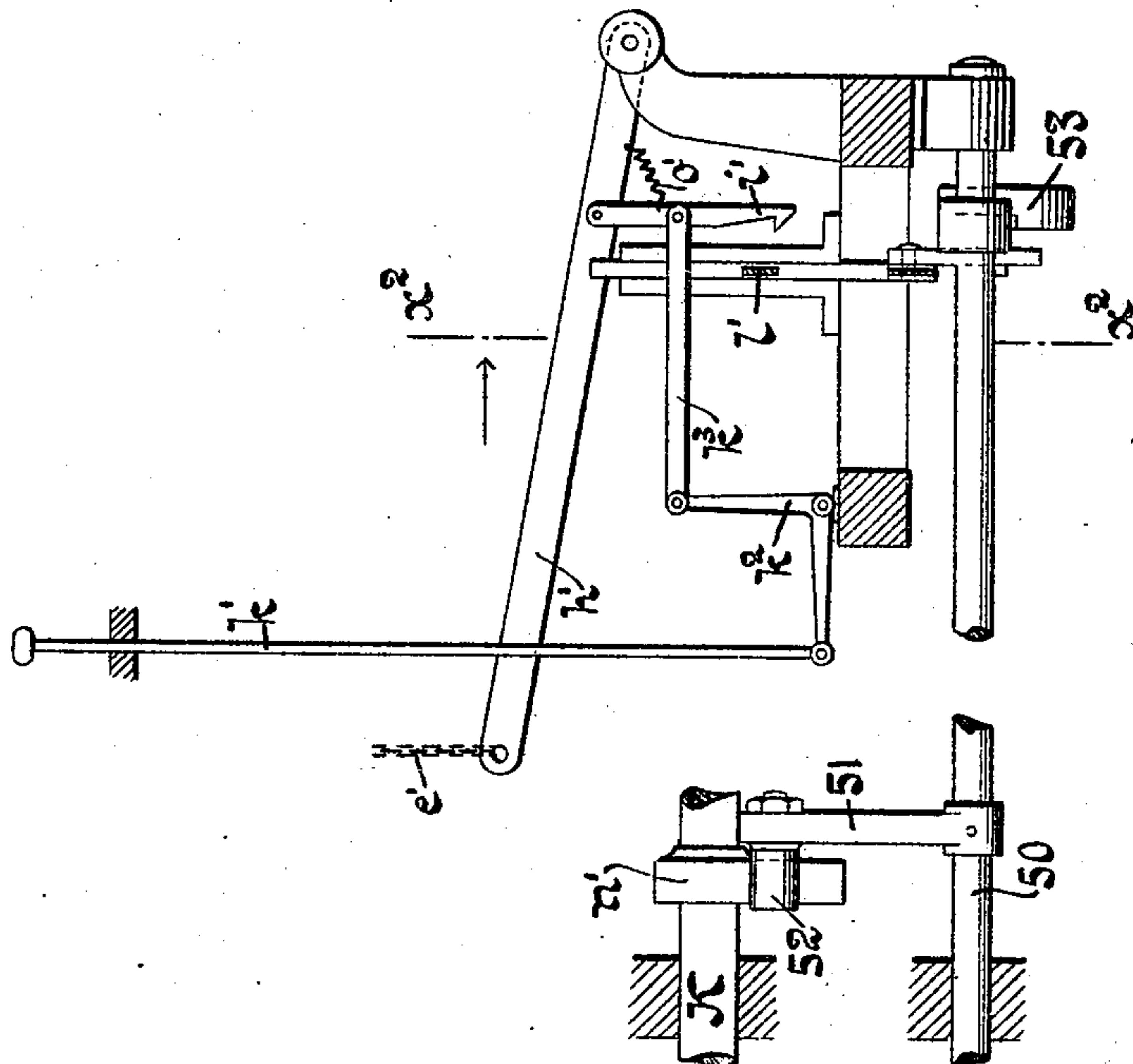
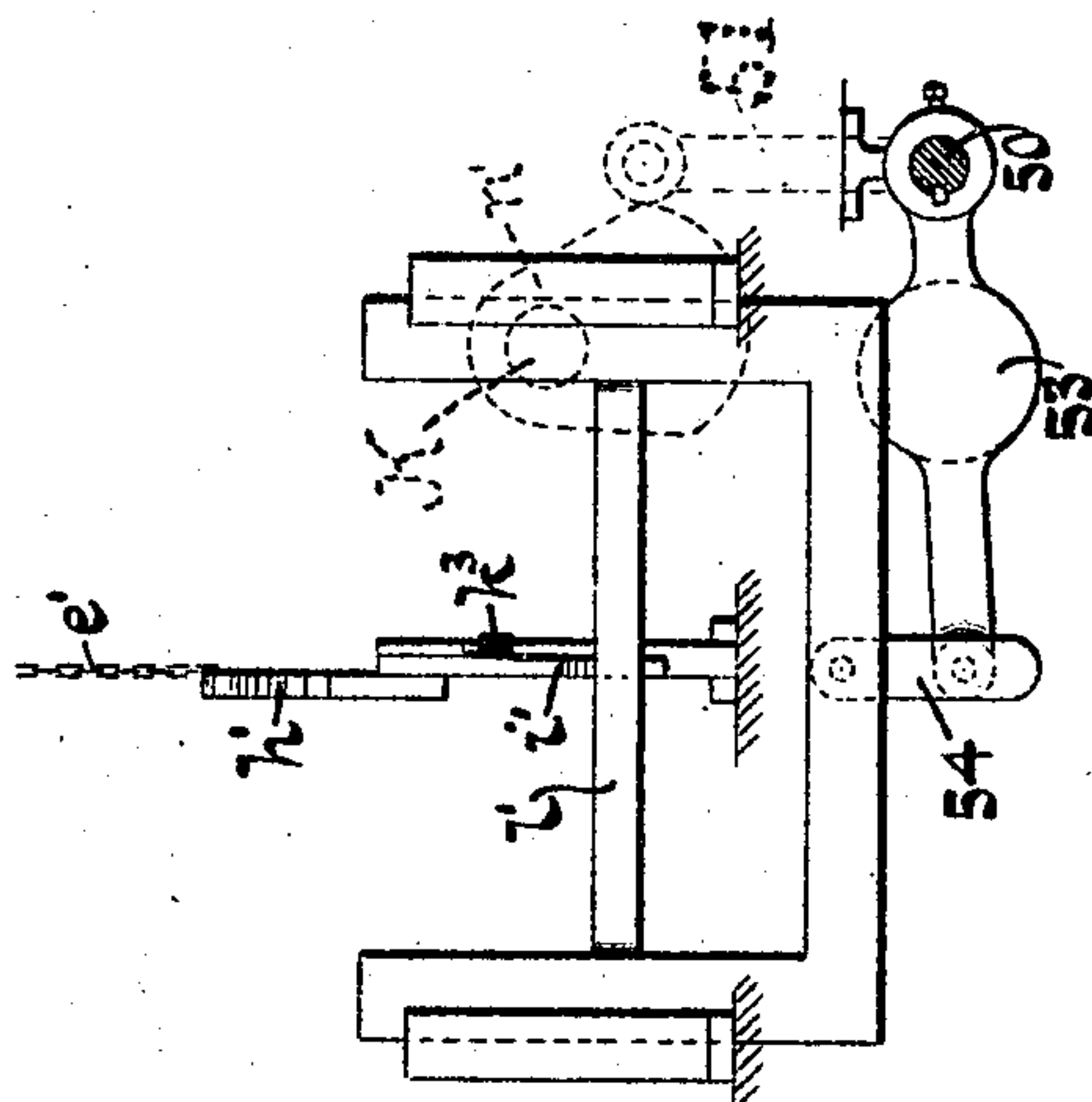


Fig. 10.



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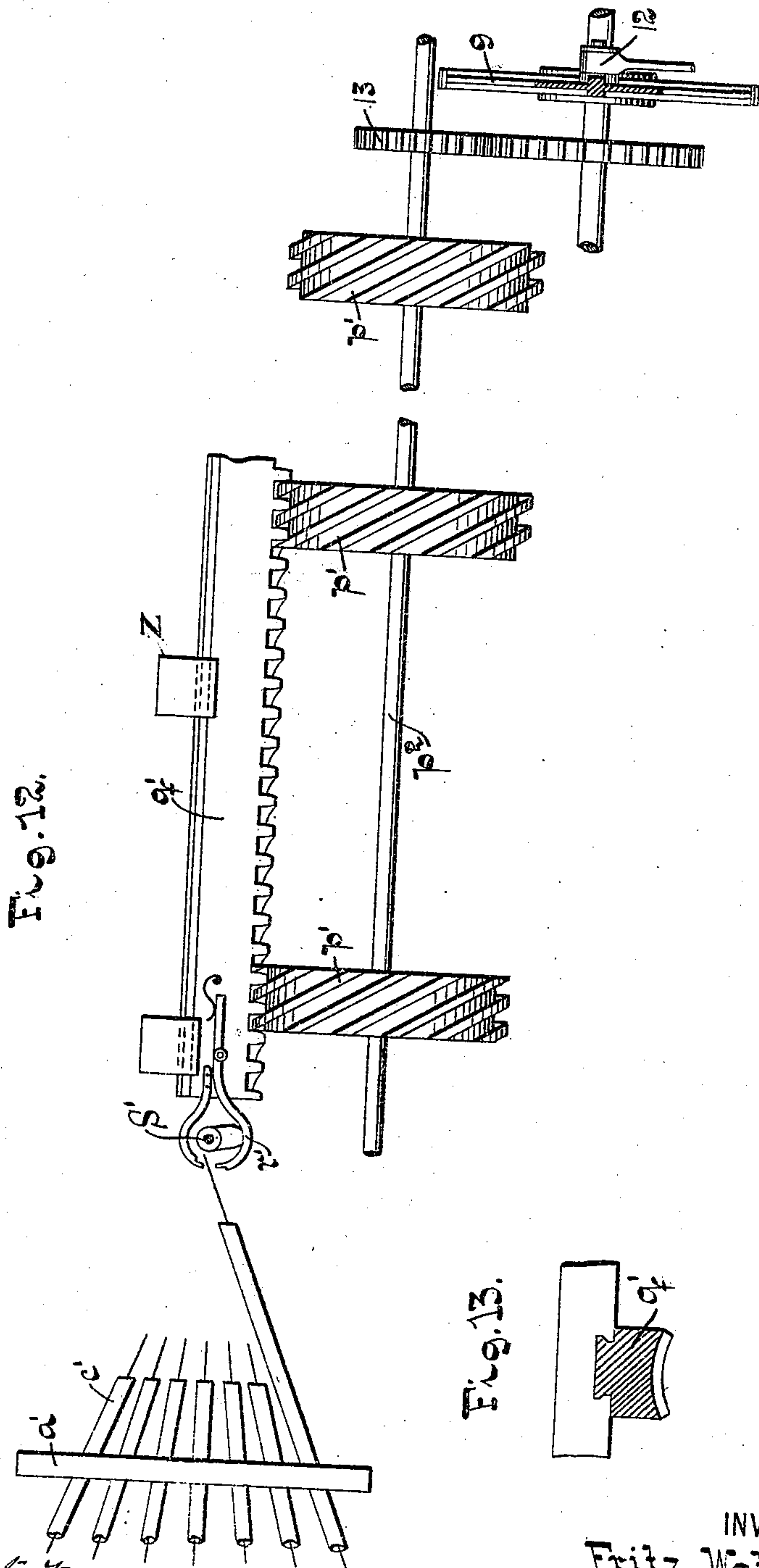
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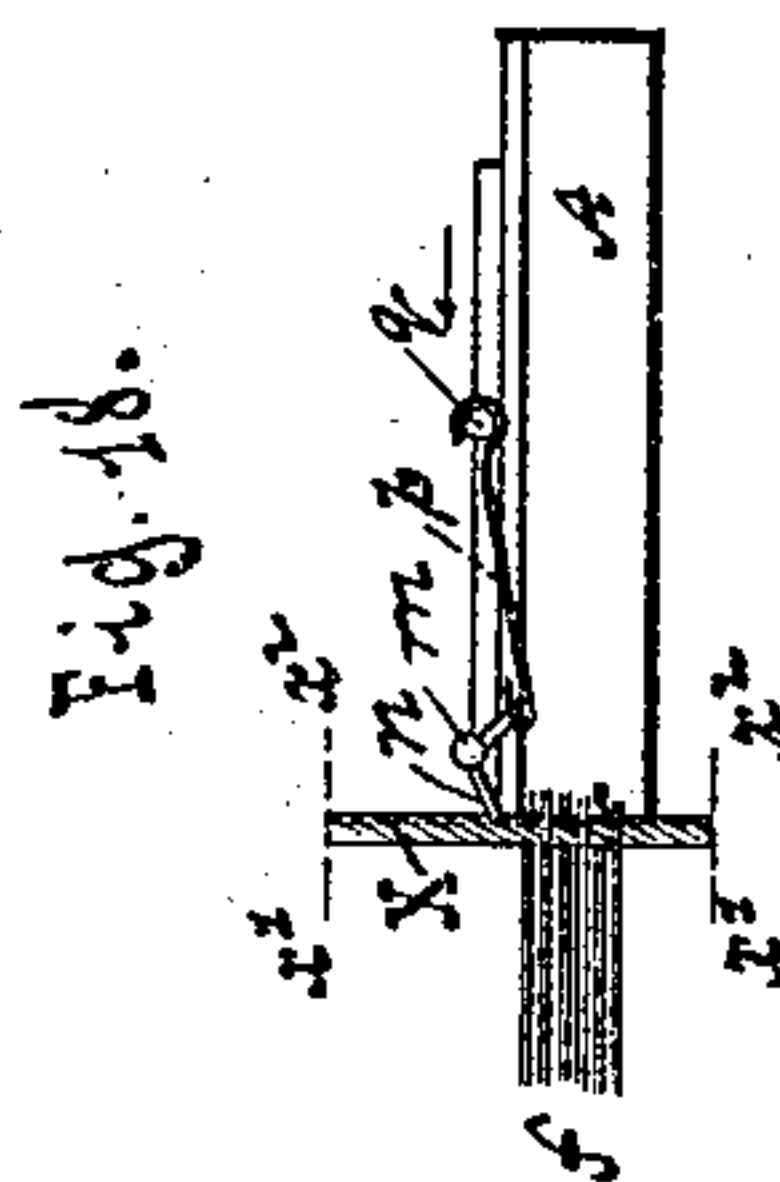
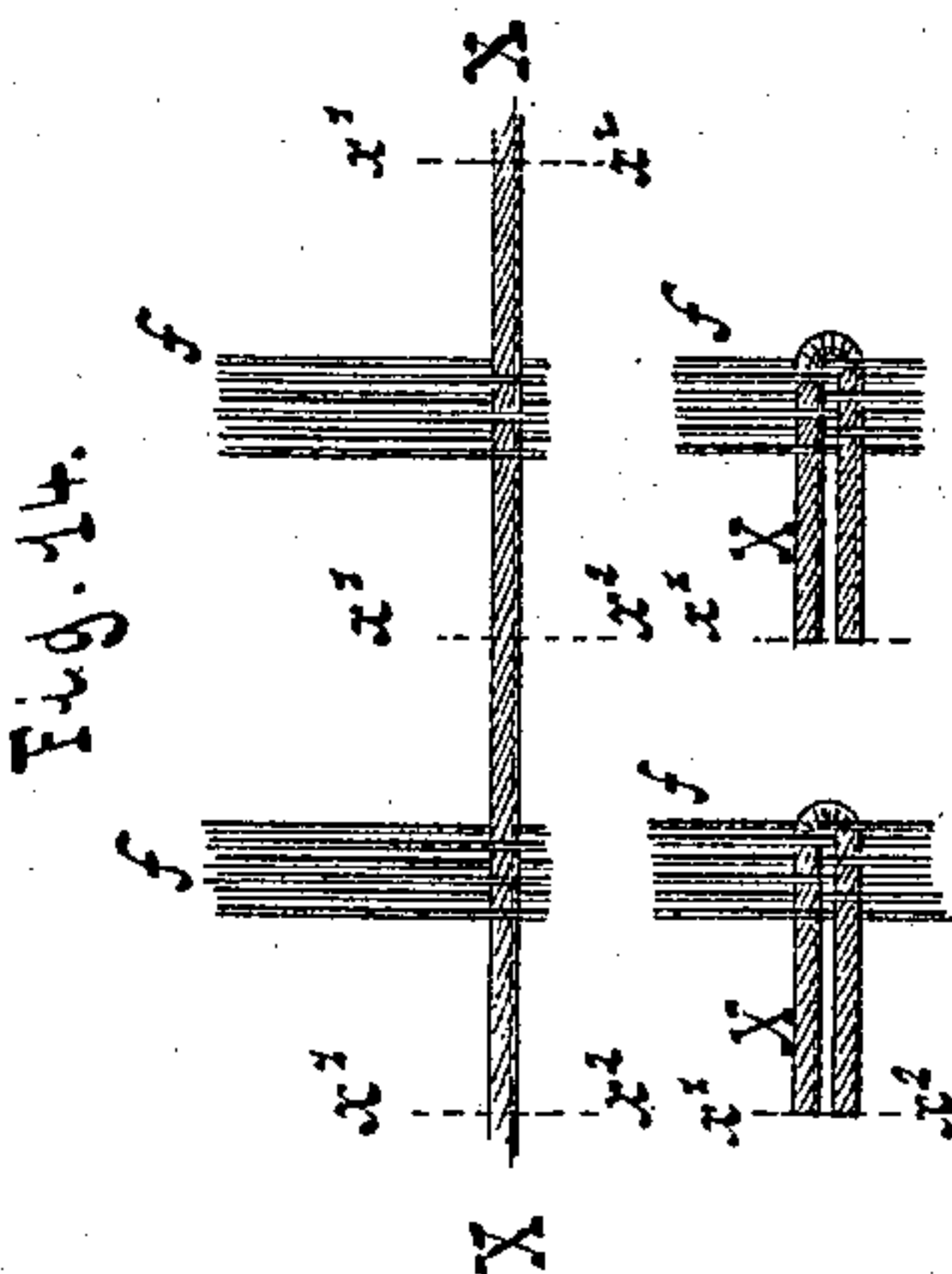
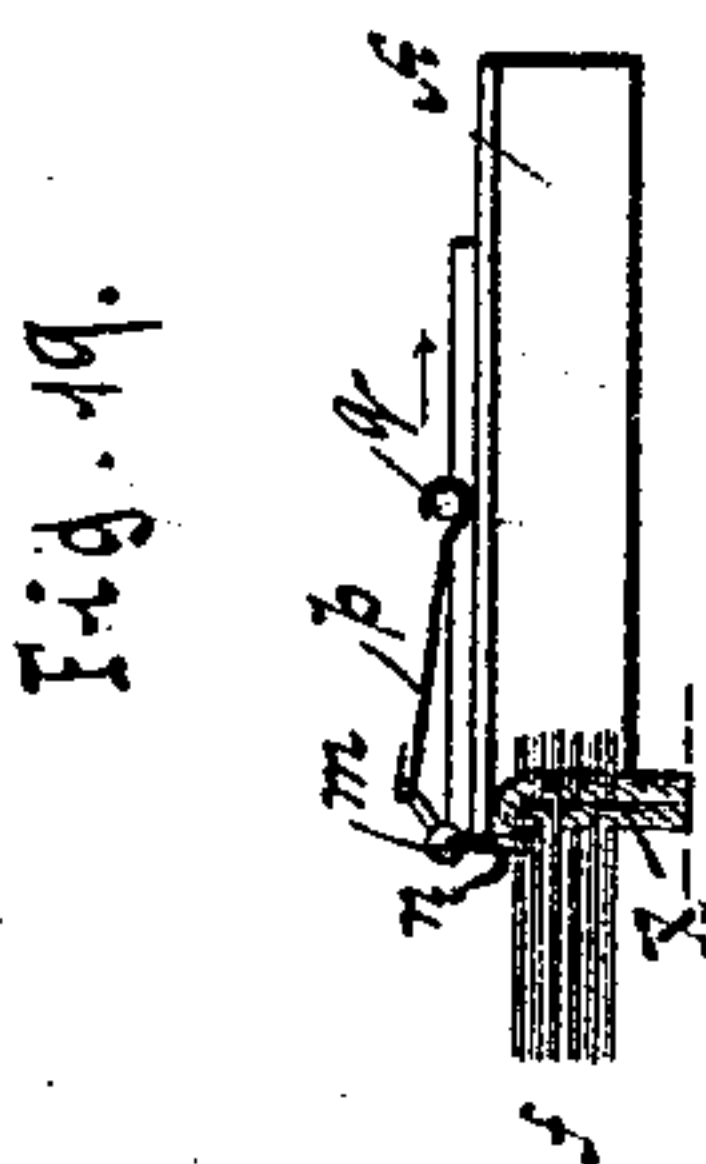
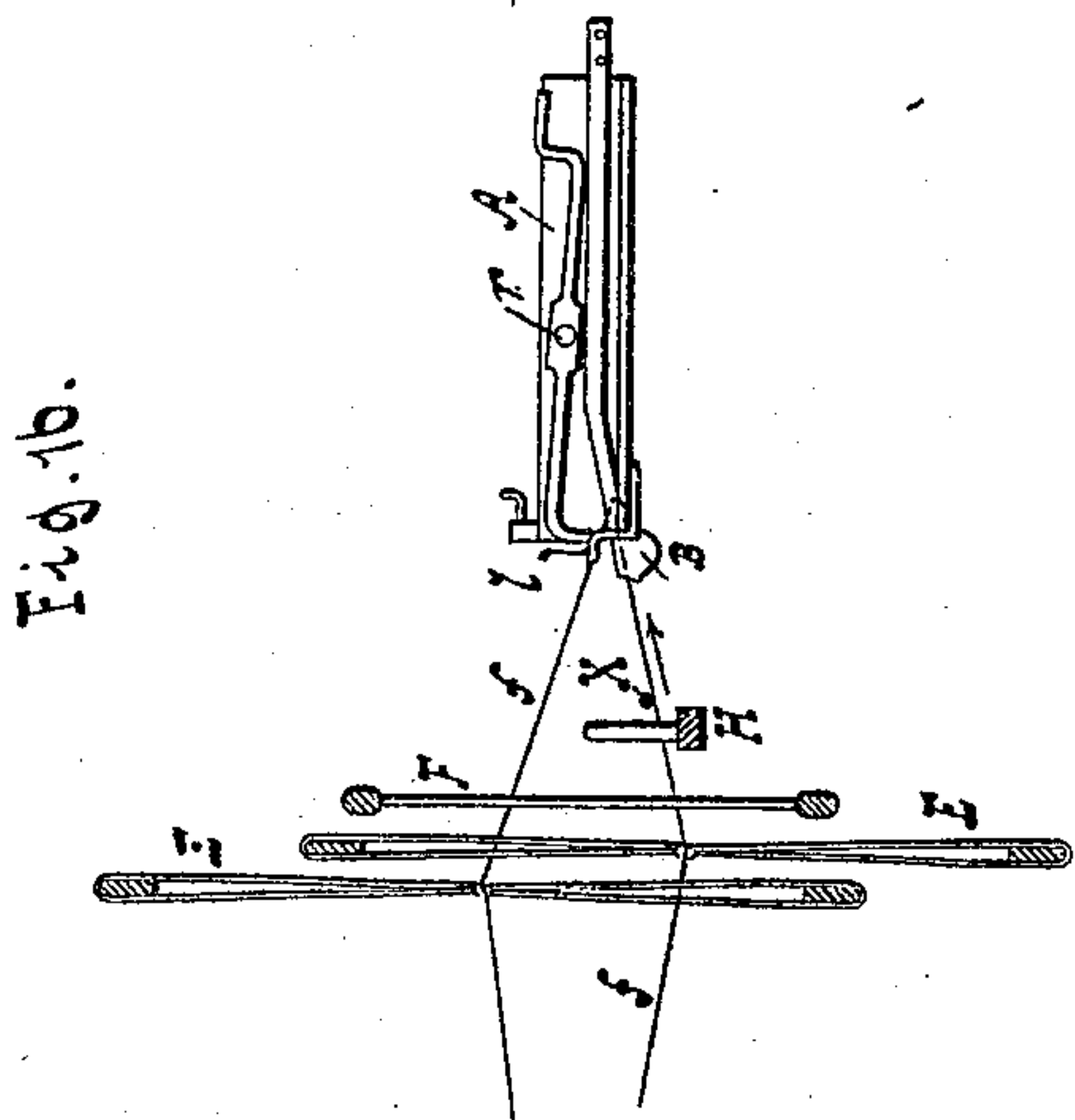
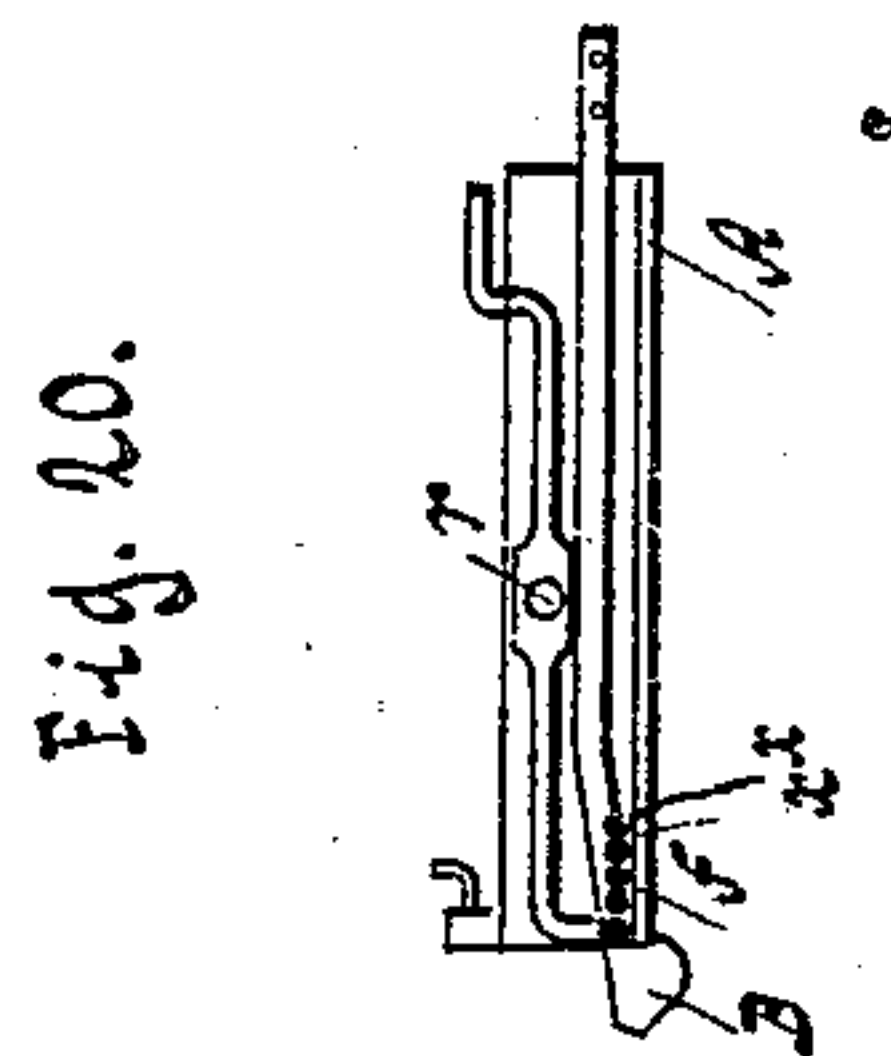
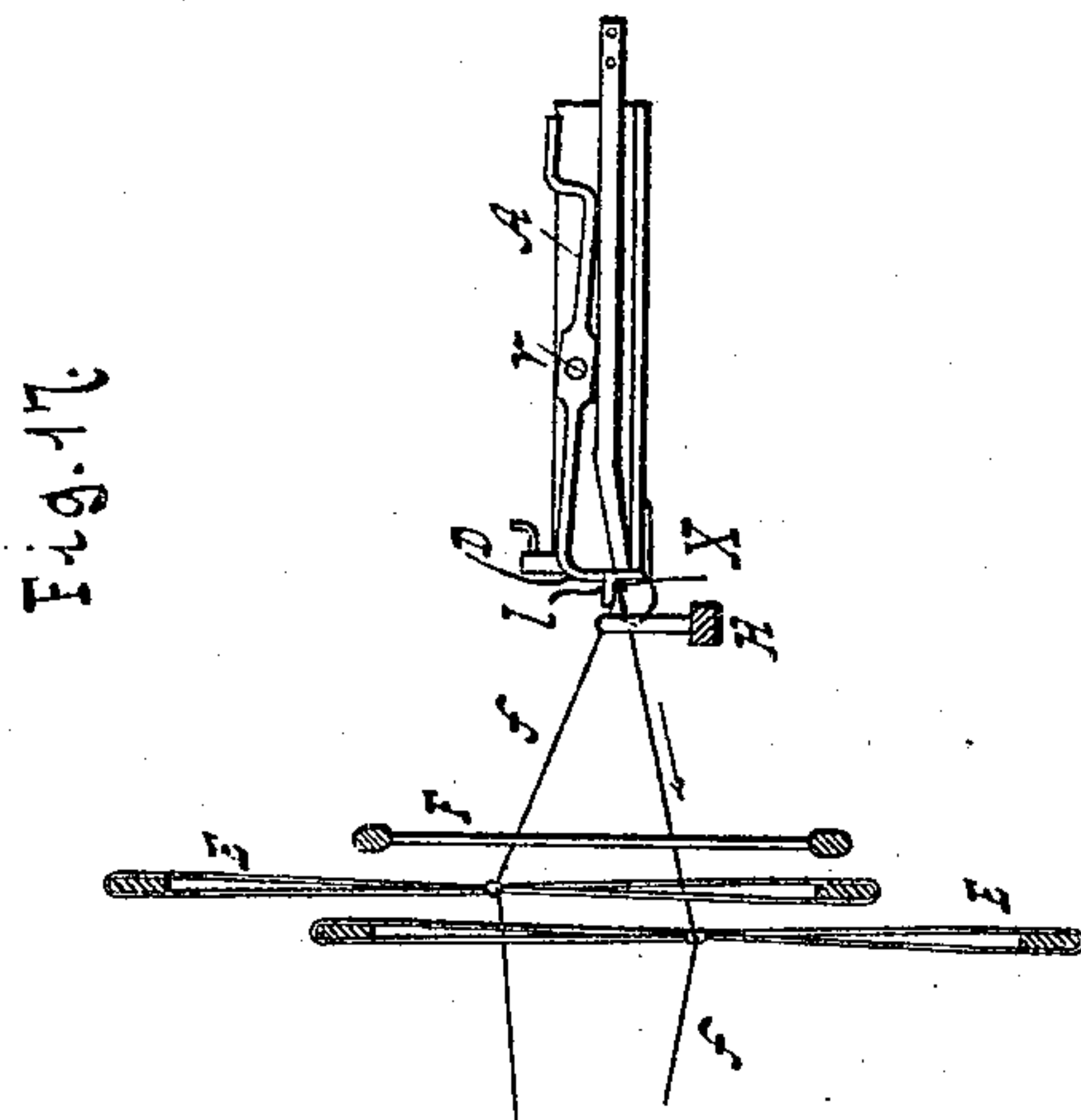
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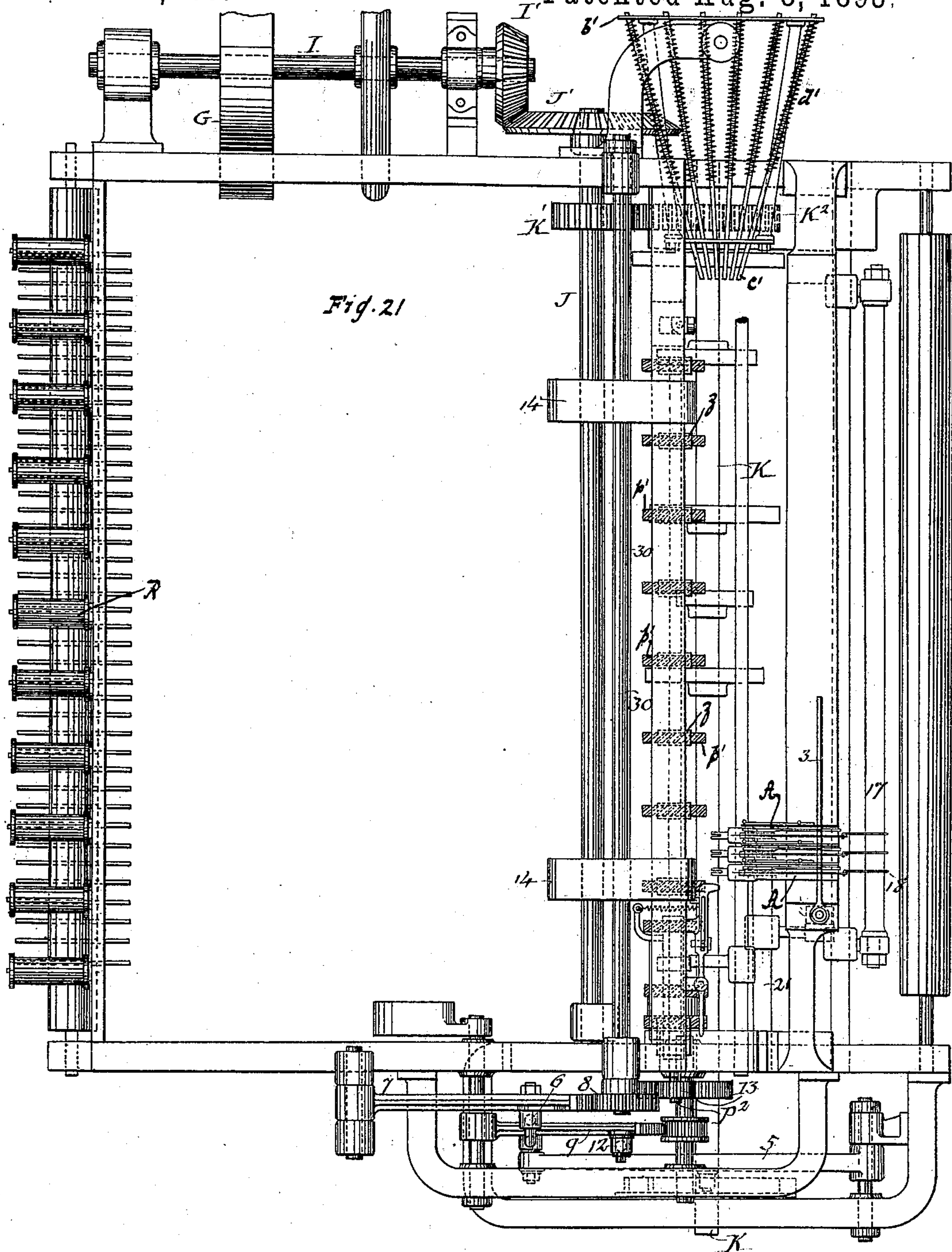
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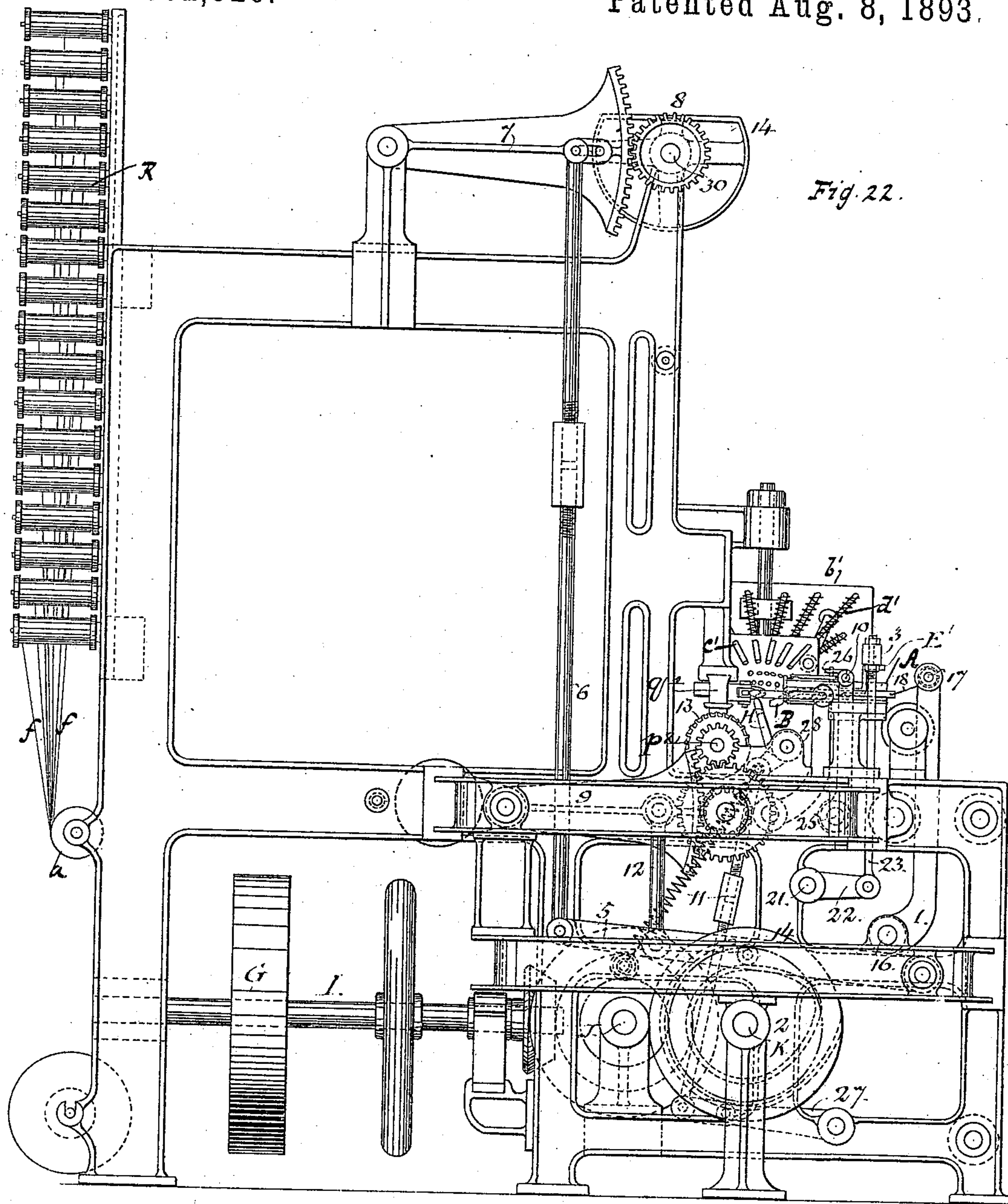
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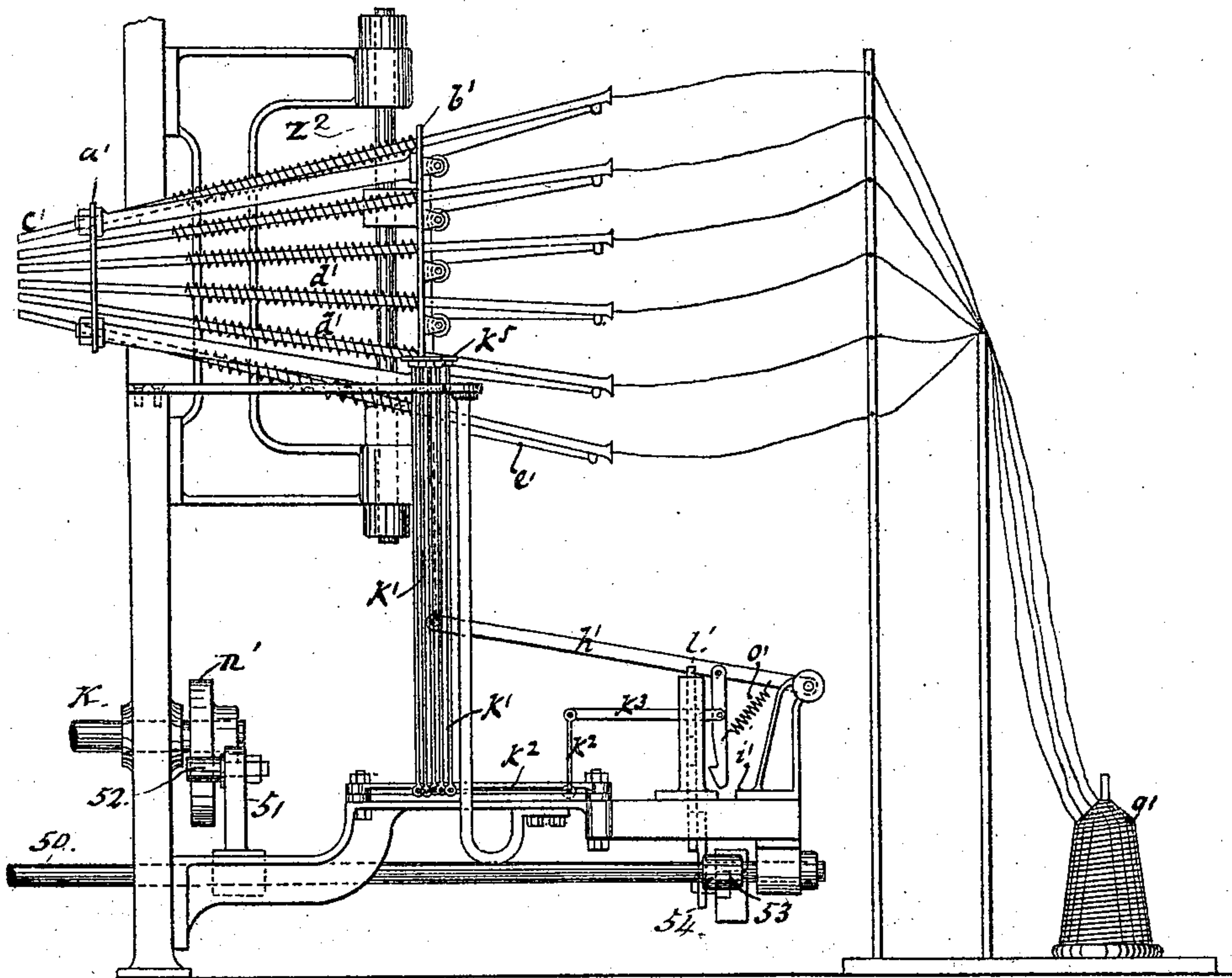
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F. WATZLAWIK.
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Fig. 23.



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Fig. 24.

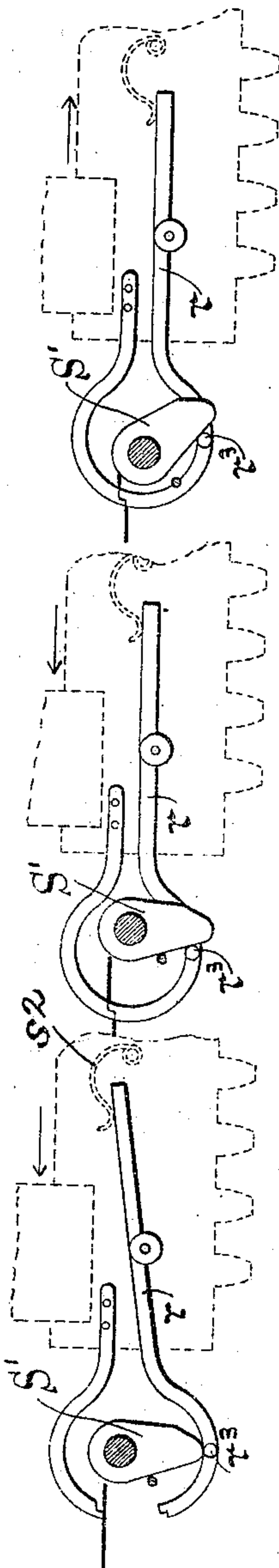


Fig. 25.

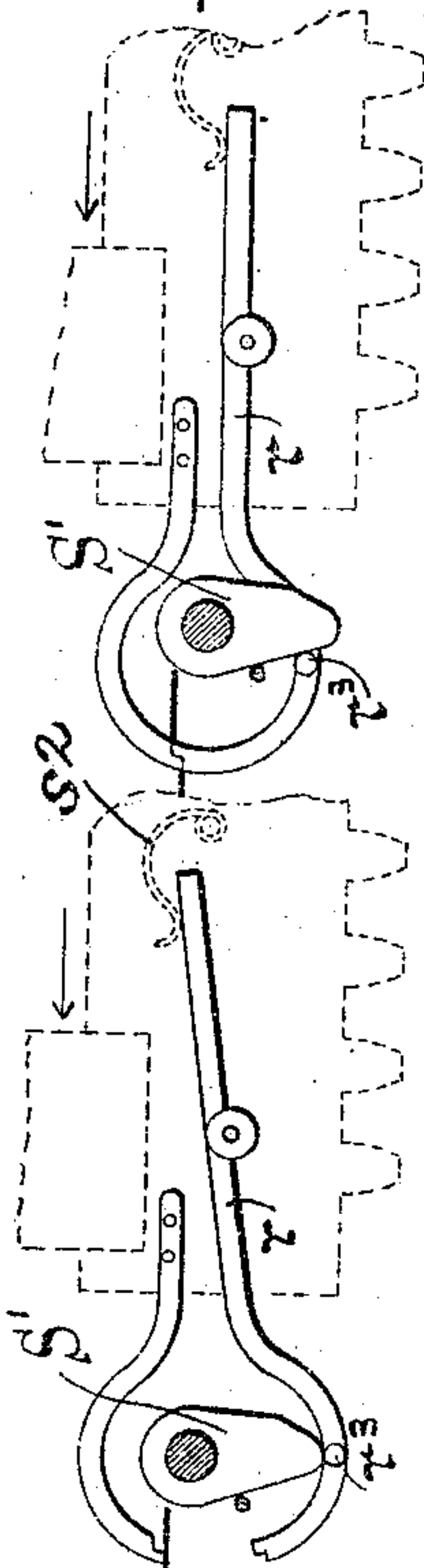


Fig. 26.

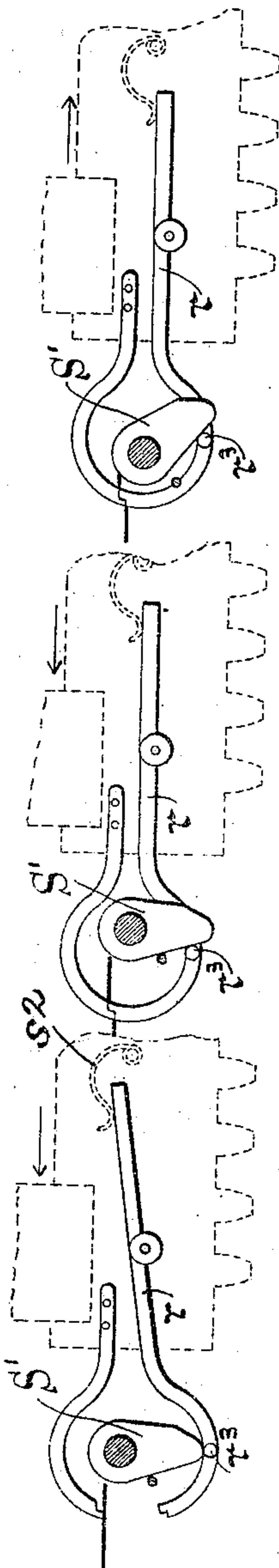


Fig. 27.

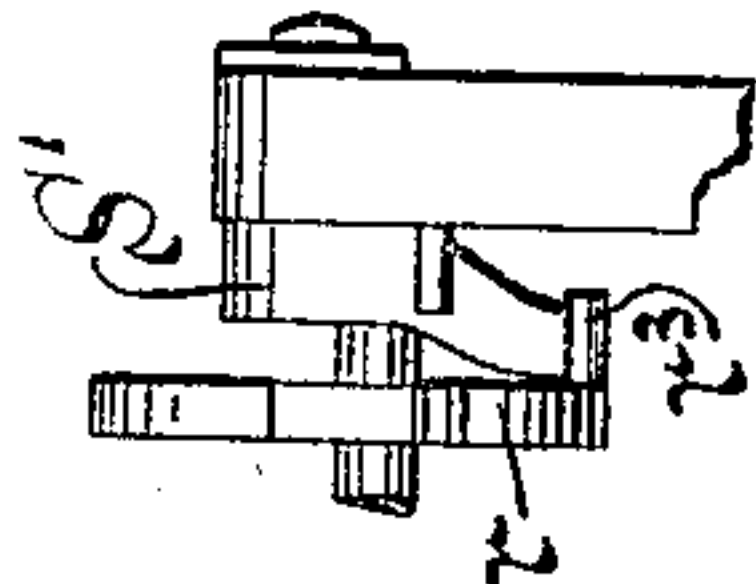
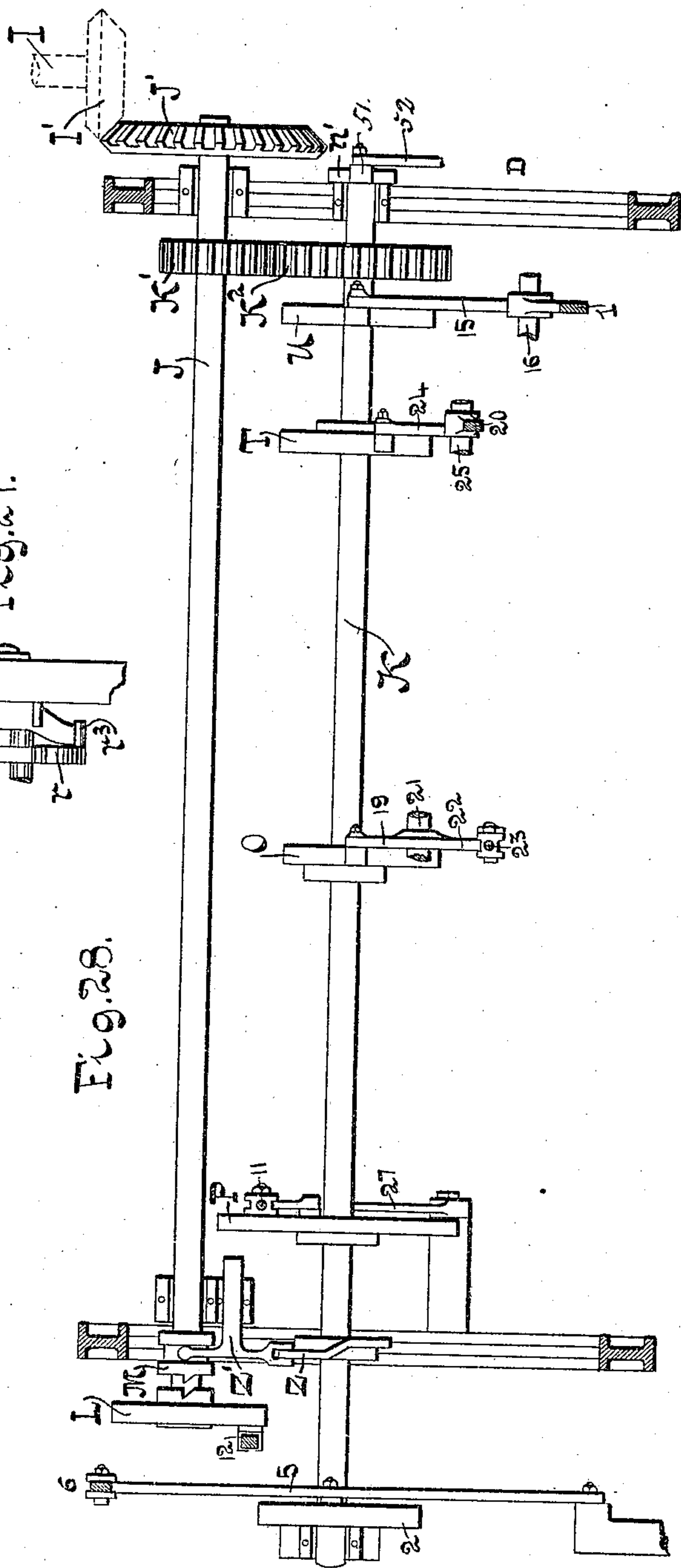


Fig. 28.



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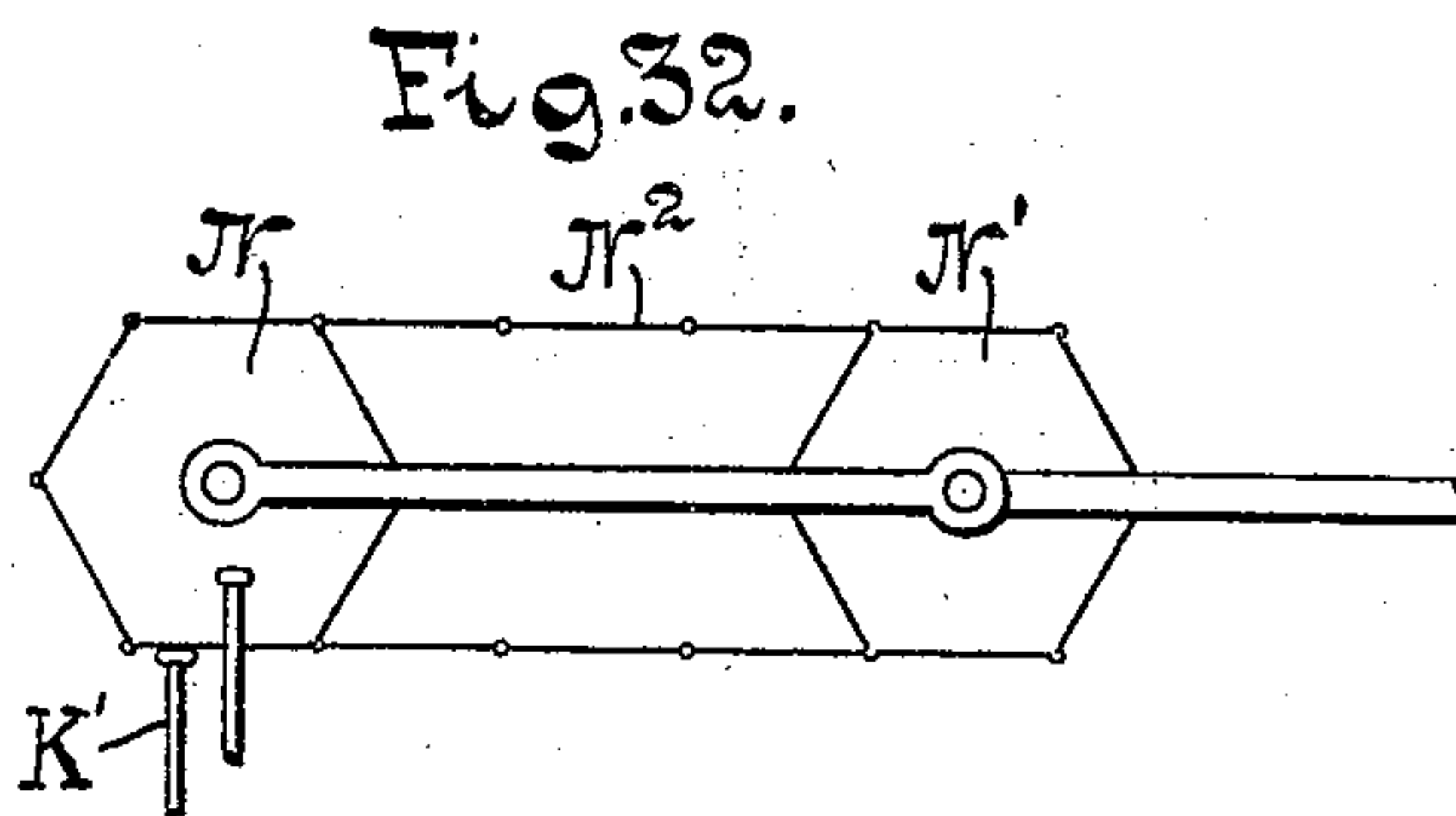
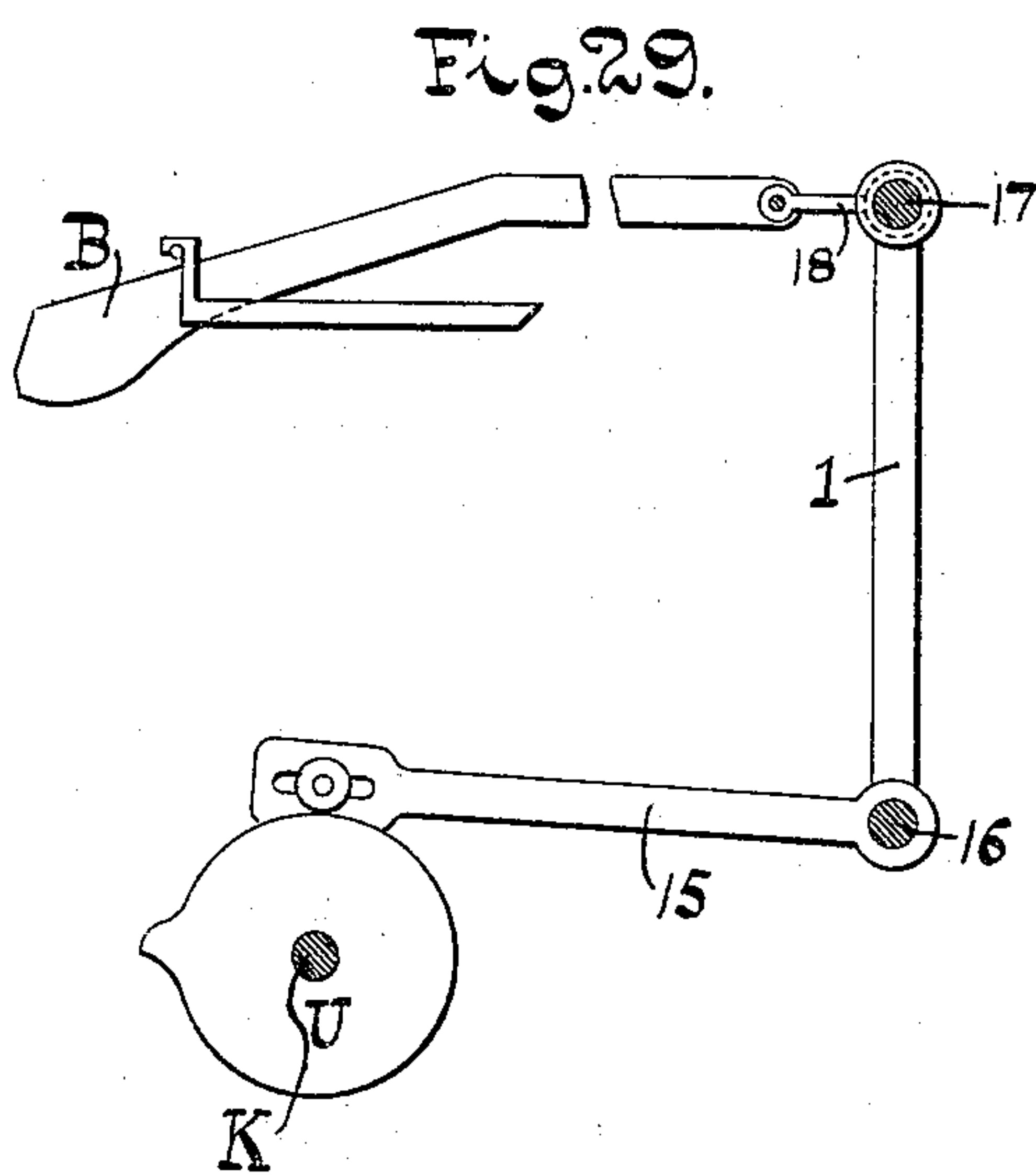
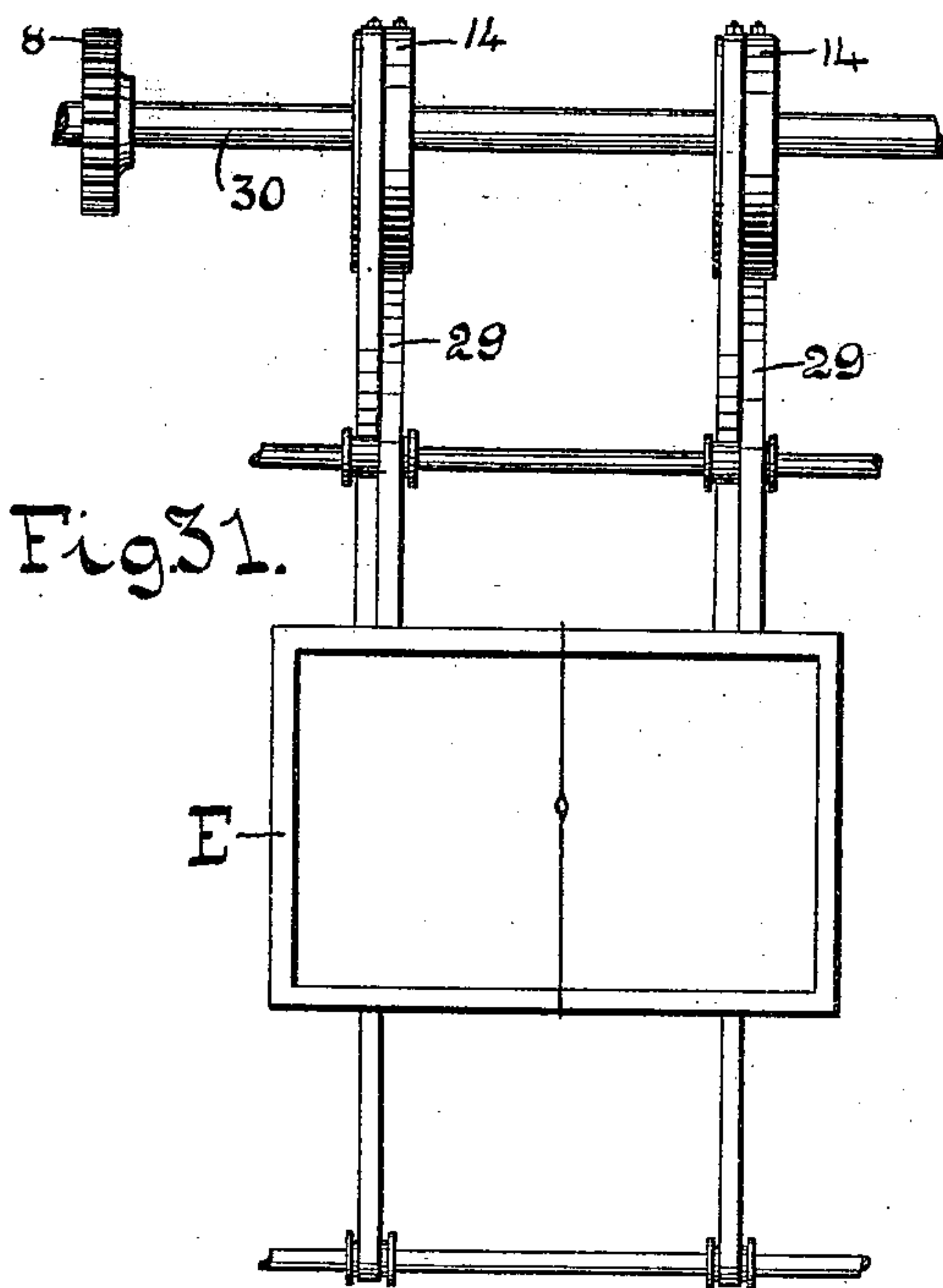
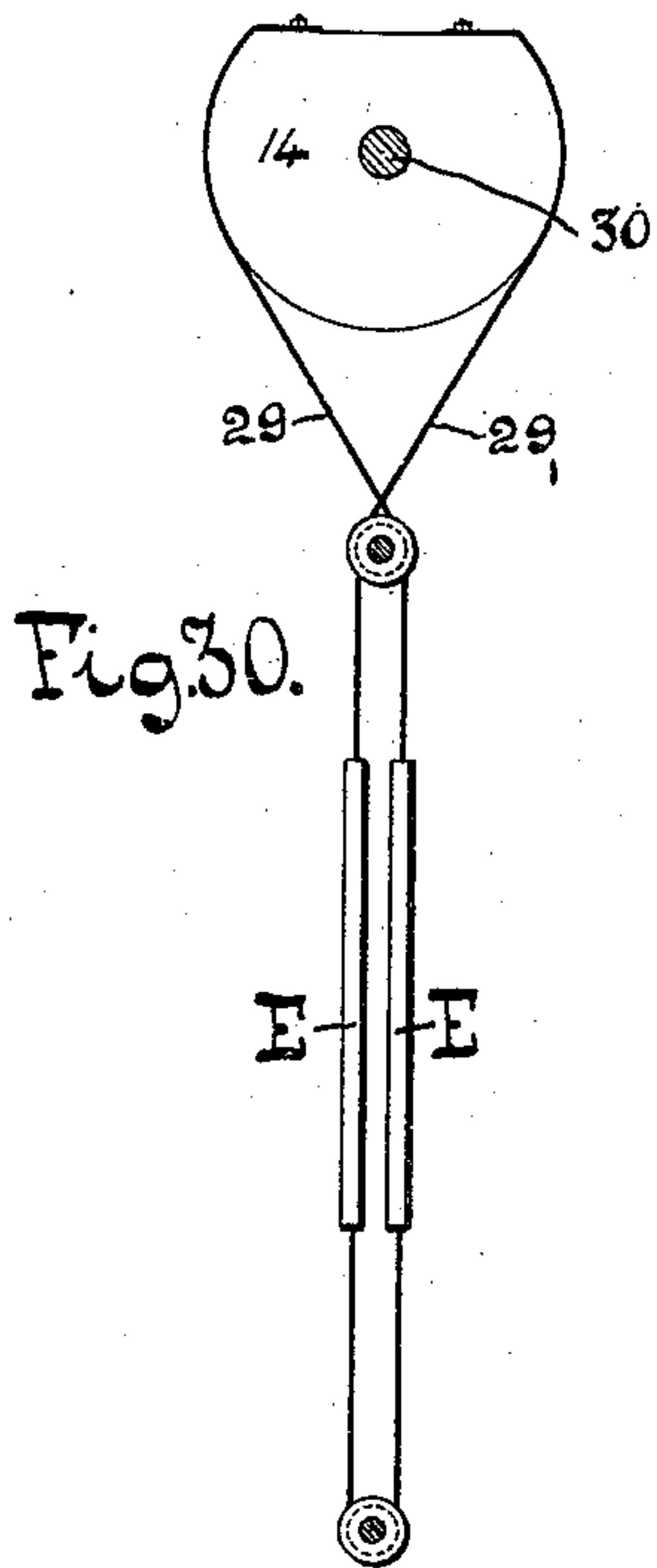
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FRITZ WATZLAWIK, OF REICHENBERG, AUSTRIA-HUNGARY.

LOOM FOR WEAVING CHENILLE STRIPS.

SPECIFICATION forming part of Letters Patent No. 502,920, dated August 8, 1893.

Application filed November 27, 1885. Serial No. 184,081. (No model.) Patented in Germany September 27, 1885, No. 37,251, and in England October 24, 1885, No. 12,779.

To all whom it may concern:

Be it known that I, FRITZ WATZLAWIK, a subject of the Emperor of Austria-Hungary, residing at Reichenberg, in the Empire of Austria-Hungary, have invented new and useful Improvements in Looms for Weaving Chenille Strips, (patented in Germany September 27, 1885, No. 37,251, and in Great Britain October 24 1885, No. 12,779,) of which the following is a specification.

This invention relates to a loom for the manufacture of fringed ribbons or chenille strips, to be used as weft for forming the nap of piled fabrics, as set forth in the following specification and claims and illustrated in the accompanying drawings in which—

Figure 1 shows diagrammatically in side elevation, partly in section, the principal parts of a loom containing my improvements. Fig. 2 shows the method of forming the fringed ribbons. Fig. 3 is a side elevation on a larger scale of the apparatus marked A in Fig. 1. Fig. 4 is a plan view of the parts shown in Fig. 3. Fig. 5 is a front view of the parts shown in Figs. 3 and 4; Fig. 6, a similar view to Fig. 5 showing the parts in different relative positions. Fig. 7 is a view similar to Fig. 3 taken from the opposite side. Fig. 8 is an end view of the guide frame for the weft tubes. Fig. 9 is a plan view of the part shown in Fig. 8 and of the weft tubes and connecting parts. Fig. 10 is a section on an enlarged scale in the plane x^2-x^2 , Fig. 11 of the mechanism for actuating the weft tubes. Fig. 11 is a sectional side elevation of the parts shown in Fig. 10. Fig. 12 shows the weft tubes and the gripper for seizing the weft threads and drawing them through the shed. Fig. 13 is a sectional view of the gripper bar. Fig. 14 shows the manner of inserting the weft into the warp threads, prior to the cutting of the weft. Fig. 15 is a similar view to Fig. 14, the nap or weft having been cut and the projecting ends bent and inserted between the warp threads. Fig. 16 is a detail view of the heddles, reed, and the retaining, severing, and inserting devices. Fig. 17 is a similar view to Fig. 16, the parts being in different relative positions. Figs. 18 and 19 are detail views illustrating different positions of the device for inserting the projecting ends of the weft

into the succeeding openings of the shed. Fig. 20 is a detail view showing a number of wefts or naps inserted in a fabric. Fig. 21 is a plan view showing the general arrangement of the warp spools, gripper, weft tubes, cutting and inserting apparatus, &c. Fig. 22 is a side elevation of the machine shown in Fig. 21. Fig. 23 is a detail view of the weft tubes and apparatus for operating the same. Figs. 24 to 27 inclusive are detail views illustrating the operation of the gripper. Fig. 28 is a sectional plan view illustrating the devices for operating the several parts of the apparatus for cutting, bending and inserting the weft or pile. Fig. 29 is a sectional elevation of the mechanism for actuating the knives. Fig. 30 is an end elevation of the mechanism for actuating the heddle frames. Fig. 31 is a face view of the same. Fig. 32 is an end elevation of a Jacquard mechanism for operating the tube pushers.

Similar letters and figures indicate corresponding parts.

In the manufacture of ribbons or chenille strips, U-shaped loops of weft threads are inserted between warp threads, Fig. 2, mounted on an ordinary loom; the weft threads are first passed through the shed of the warp threads and after closing the shed are then cut to the proper lengths, as represented by X in Fig. 2;—one of the projecting ends of the piece X is then bent into U-shape and turned into the next succeeding opening of the shed as indicated by dotted lines in Fig. 2.

Fig. 2 shows but one strip with four warp threads f ; in practice however I form on a loom a series of such strips by mounting on the loom a series of sets of warp threads at proper distances apart, passing a weft thread through all of them, cutting the same at the proper points and then turning one of the projecting ends of each piece into the open shed of the corresponding set of warp threads, as indicated in Figs. 14 and 15.

Fig. 14 shows two sets of six warp threads each, between which a weft thread is passed and secured, the dotted lines at right angles to the weft indicating the lines on which it is to be cut.

Fig. 15 shows the weft thread cut and turned into the next succeeding opening of the shed.

By successively inserting weft threads of different colors the desired patterns are produced.

In Fig. 1 the letter R designates a series of spools or bobbins from which the warp threads $f f$ pass. These warp threads pass over suitable rollers a, b, c, d, e , and e' the latter carrying a weight e^2 and beneath a beam g to the heddles E E mounted in suitable frames in the usual manner. From the heddles the warp threads pass through a fixed reed F into the apparatus marked A, of which a series is used, corresponding to the number of ribbons to be made, and to the series of sets of warp threads, which are placed at distances apart corresponding to the height of the pile or to the width of the strip.

The apparatus A, which will hereinafter be more fully described, serves the purpose of cutting the weft into proper lengths, bending the projecting ends around so as to form the lengths into U shape and inserting the ends into the next succeeding openings of the warp threads. A gripper shown in Figs. 12, 21, 22, 24, 25, 26, and 27 grips the ends of the weft threads and carries them through the shed, when they are beaten up by a reed H, Figs. 1, 16 and 17. When different colors of weft threads or pile threads are to be inserted successively, the apparatus shown in Figs. 8, 9, 10, 11, 12, 21, 22, 23 is used, which is so arranged that by depressing one of a series of knobs, or a lever, the gripper will seize the weft thread presented to it by the apparatus and pass it through the shed. From the apparatus A the finished strips pass over the guide rollers t, t, t and the regulator V to the take up W, all constructed in the usual well known manner.

The gripper for seizing and passing the weft threads through the shed in the example shown in Figs. 12, 13, 21 and 22 consists of a rack bar q' to which motion is imparted by a series of worm wheels p' mounted upon a shaft p^2 placed beneath the shed and turned alternately in opposite directions as hereinafter described. The rack bar is guided in a series of ways or guide grooves in parts z of the frame.

To the side of the gripper bar facing the apparatus A is secured the gripper jaw, the upper part of which is rigidly attached to the bar, while the lower part r' is pivoted to the bar and provided at its inner end with a spring s^2 which has a tendency to close the jaw. S' is a cam pivoted to a fixed part of the frame in such a manner, that it cannot turn toward the weft thread frame beyond the position shown in Fig. 12, but is free to move in the opposite direction. The lower jaw r' has a cam shaped projection r^3 which is acted upon by the cam S' . When the gripper moves toward the weft frame, (Figs. 24 and 28) the cam S' acts upon the projection on the jaw r' , opening the jaw so that it may pass over the end of one of the weft threads, when the jaw is closed by the projection on the lower jaw

passing the cam S' Fig. 25. During the return motion of the gripper the cam S' being free to move in the direction of this movement does not open the jaw again and the thread is pulled through the shed, Fig. 26.

The apparatus marked A in Fig. 1 and shown on a larger scale in Figs. 3, 4, 5, 6 and 7 consists of a frame containing devices for cutting the thread, for bending it into U-shape and inserting the free end into the next succeeding opening of the shed, and for holding it.

l is an L-shaped projection on the frame, against which projection the weft thread is moved by the reed H from the position shown in Fig. 16 to the position shown in Fig. 17, whereupon by the change of the heddles it is secured between the warp threads. A knife B, having its cutting edge on the top, and the lower part of its end facing the heddles cam shaped, when moved toward the heddles allows the weft to pass, and when moved in the opposite direction is moved upward in a slit of the L-shaped projection l by the cam shaped lower face striking a fixed part of the frame, and by this upward movement combined with the horizontal drawing motion cuts the thread. The knife may be moved by hand or by mechanical means.

C is a slide free to be moved toward and from the shed by hand or by a connecting rod attached to the pin q as hereinafter described. At its left end (Figs. 3 and 4) this slide C carries a vertical shaft m which at its lower end has a projecting finger n and at its upper end an arm o engaged by a spring p which has a tendency to turn the finger n into the position shown in Figs. 4 and 5. The finger n passes through a recess in the frame in such a manner, that when the slide recedes from this position the finger n is by contact with the frame turned into the position shown in Figs. 6 and 7. After the weft has been cut by the knife B, the free end not already held by the warp is turned into the next succeeding opening of the shed by the finger n taking the position shown in Figs. 4 and 5 as hereinafter described. The turned in end of the weft thread is held fast by the thread holder D which consists of a swinging arm secured to the frame by a pivot r , and bent downward at its end over the thread. After the end of the thread has been turned into the shed the lever D is brought into the position shown in Figs. 3 and 5, as hereinafter described, so as to hold this end down against the bed plate D' , whereupon the shed is changed and the thread end secured between the warp threads. S is a toothed wheel pivoted to the frame, for holding the fabric down.

The apparatus for presenting the weft threads to the gripper is shown in Figs. 8 to 12, also Figs. 21, 22, 23 and 24. It consists essentially of a series of guide tubes c' through which the weft threads are passed from spools g', g' (Figs. 9 and 23) which tubes are so placed into a frame that they may be moved in a

longitudinal direction, and that they all converge toward one point which is reached by the gripper jaw, and by means of springs or weights they are normally held at a short distance from the converging point, and that any one of them may, by hand or by machinery, be moved to near the converging point, so as to bring the projecting end of the thread carried by it within reach of the gripper jaw.

In Figs. 8 and 9, a' , b' , are perforated plates properly connected and supported on guide rod Z^2 . Tubes c' c' c' pass through the holes of the plates a' b' , which are so arranged, that the axial lines of all of the tubes converge to one point, which is so situated that the end of a thread there presented is in the proper position for the gripper. Springs d' , d' , d' normally hold the tubes at a distance from the converging point, as shown in Figs. 9 and 12, where all but one of the gripper tubes are in the normal position, the said single tube being pushed toward the converging point so as to present the projecting end of the thread to the gripper. The tubes are moved toward the converging point by suitable mechanism, for example, such as shown in Figs. 9, 10 and 11. By means of chains or strings e' attached to the outer ends of the tubes and passing over proper guide rollers f' each tube is connected to a separate lever h' , Figs. 10 and 11. To this lever h' is pivoted a lever i' which as shown in Fig. 11 is hook-shaped at its lower end and is normally held in the position shown, by a spring o' . k' is a vertical rod, properly guided and pivoted to one arm of a bell crank lever k^2 , k^2 while the other arm of the bell crank lever is connected to the arm i' by a link i^2 , the whole system being normally held in the position shown in Fig. 11, but by pressing the rod k' down, the hooked part of the lever i' , engages a frame l' to which a vertically reciprocating motion is imparted by means of a cam n' . The said cam n' is mounted on the shaft K and imparts a rocking motion to a shaft 50 through the arm 51 carrying a roller stud 52. From the shaft 50 projects a weighted arm 53 connected by a link 54 with the frame l' . The weighted arm holds the roller stud at all times in contact with the periphery of the cam n' , whereby the proper reciprocating motion is imparted to the frame. Such a system of chains e' , levers h' , i' , k^2 , and rods k' is provided for each of the tubes c' c' , and by pressing down any one of the rods k' the hook of the corresponding lever i' engages the reciprocating bar l' which at the proper time depresses the levers i' and h' , thereby moving the corresponding thread tube toward the converging point and presenting the end of the thread passing through it to the action of the gripper.

The arrangement of the levers, &c., above described may be modified in various ways; the rods k' are operated by hand, but they may be operated by machinery such for example, as Jacquard cards which allow but one of the rods k' to descend at a time, or

which may be moved toward the upper ends of the rods k' , all but one of which pass into corresponding holes of the card, while the remaining one is pressed down. Such a mechanism I have illustrated in Fig. 32, in which the letters N N' designate the two card cylinders and N^2 the several perforated cards passing over said cylinders, all as usual.

I will now proceed to describe the mechanism for imparting motion to the several devices of apparatus A, as well as the mechanism for operating the heddles, reed H and weft gripper.

Referring at present to Figs. 21, 22 and 28, the letter G designates the driving pulley mounted on a shaft I, from which latter motion is transmitted by bevel gears I' J' to a shaft J. A cam shaft K extending parallel to shaft J is connected by gears K' K² with said shaft; said gears being so proportioned that shaft K makes one revolution for every two of shaft J. Upon the shaft K are mounted the several cams which are placed in operative connection with the above named devices.

Mechanism for actuating the knives B.—This mechanism consists of a cam U, (Figs. 22, 28 and 29 especially) mounted upon shaft K with which the roller stud of an arm 15 mounted on a rock shaft 16 is in contact. Arms 1 at opposite ends of the rock shaft 16, carry a bar 17, which is connected by a series of links 18 with the knives B. It is evident that as the rock shaft 16 is vibrated the bar 17 through its link connections with the knives draws the same in and out.

Mechanism for operating the thread-holders D, (Figs. 21, 22, and 28).—This consists of a cam O mounted on shaft K upon which cam bears the roller stud of an arm 19 projecting from a rock shaft 21, which latter is provided with a set of arms 22 connected by links 23, with a cross piece 3. The cross piece is located directly above the handles E' of the holders and consequently when caused to descend by its actuating mechanism depresses the handles and lifts the holders. On the upward motion of the cross-piece the holders are depressed by their springs r^2 (Fig. 3).

Mechanism for operating the slides C.—This mechanism consists of a cam T mounted on shaft K and engaging an arm 24 projecting from shaft 25, which latter has arms 20 connected with a bar 10, from which links 26 extend to the pins q of the slides C.

Mechanism for actuating reed H for holding the bent-over ends of the weft until the shed has changed.—This mechanism consists of cam P engaging the roller stud on a lever 27 connected by an adjustable rod 11, with an arm on shaft 28, from which project the reeds or forks H.

Mechanism for operating the heddle-frames E E, (Figs. 22, 30 and 31).—This mechanism consists of a closed cam 2, acting on a roll or lever 5, which is connected by rod 6, with toothed segment 7. This segment engages a

pinion 8 upon the shaft 30. On the shaft 30 are mounted cams 14 which are connected by straps 29 (Figs. 30 and 31) to the heddle frames and alternately raise and lower the latter.

Mechanism for reciprocating the gripper toward and from the weft-frame.—Upon the shaft J (Fig. 28) is loosely mounted a crank disk L adapted to be engaged by a clutch sleeve M moved toward and from the same by a slide Z' and cam Z mounted on shaft K. The crank disk L is connected by rod 12 to a segment 9 (Figs. 21 and 22) which engages a train of gears meshing into gear 13 on shaft p^2 . During one half of the revolution of shaft J the shaft p^2 is thus caused to make a number of revolutions in one direction, and on the other half the same number of revolutions in the opposite direction,—thereby first advancing the gripper in virtue of gears p' and rack q' (Fig. 12), toward the weft thread presented to it, and then returning the gripper and drawing the weft thread through the shed. The function of the clutch M is to throw the shaft J out of action to permit the gripper to remain at rest in its normal position (Fig. 21) after drawing the thread through the shed, while the shaft K continues to rotate and the other operative parts perform their functions.

What I claim as my invention is—

1. In an apparatus of the character specified, the combination with the shed forming mechanism and with the reed for beating up the weft, of a gripper for seizing the weft thread and drawing it through the open shed, a fixed support for the weft-thread, a movable knife for cutting the weft-thread into

suitable lengths, a thread holder, and a slide provided with a pivoted spring-operated finger for turning the projecting end of the thread into the next succeeding opening of the shed, substantially as and for the purpose specified.

2. In an apparatus of the character specified the combination with the shed forming mechanism, and the reed for beating up the weft, of the gripper for seizing the weft thread and drawing it through the open shed, a series of guide tubes $c' c'$ for the weft threads, all movably secured in a frame and converging to one point, and means substantially as described for holding the tubes at a proper distance from the converging point and moving any one of them to the gripper, substantially as and for the purpose specified.

3. In an apparatus of the character specified the combination with the shed forming mechanism and the reed for beating up the weft, of a gripper for seizing the weft and drawing it through the shed, a series of guide tubes $c' c'$, for the weft threads mounted in a frame so as to converge toward one point, springs d' which normally hold the guide tubes away from the converging point, chain e , levers h' and i' , springs o' , reciprocating bar l' , and means substantially as described for engaging any one of the levers i' with the reciprocating bar, substantially as described.

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

FRITZ WATZLAWIK.

Witnesses:

P. WICHMANN,
B. ROJ.