

No. 877,271.

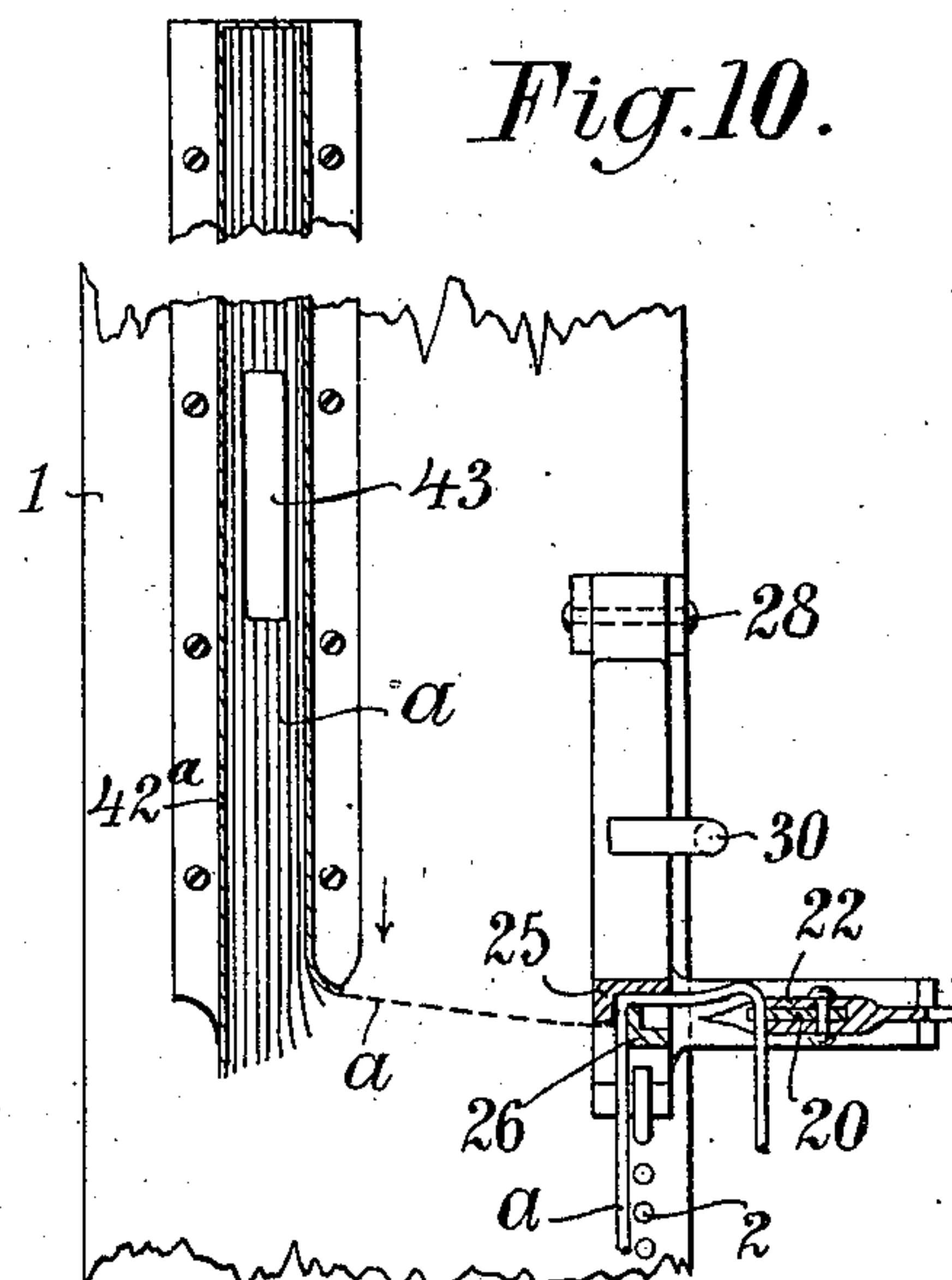
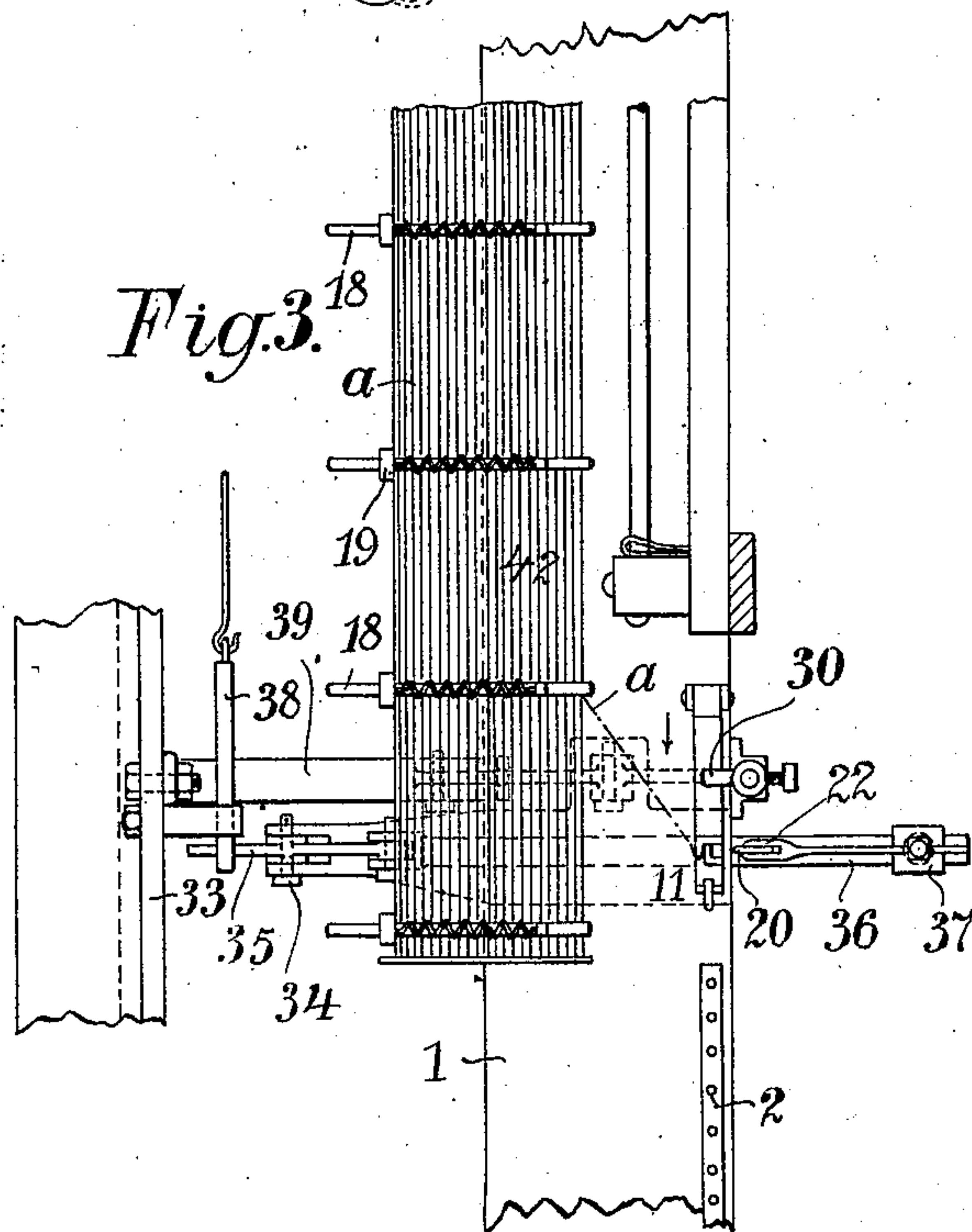
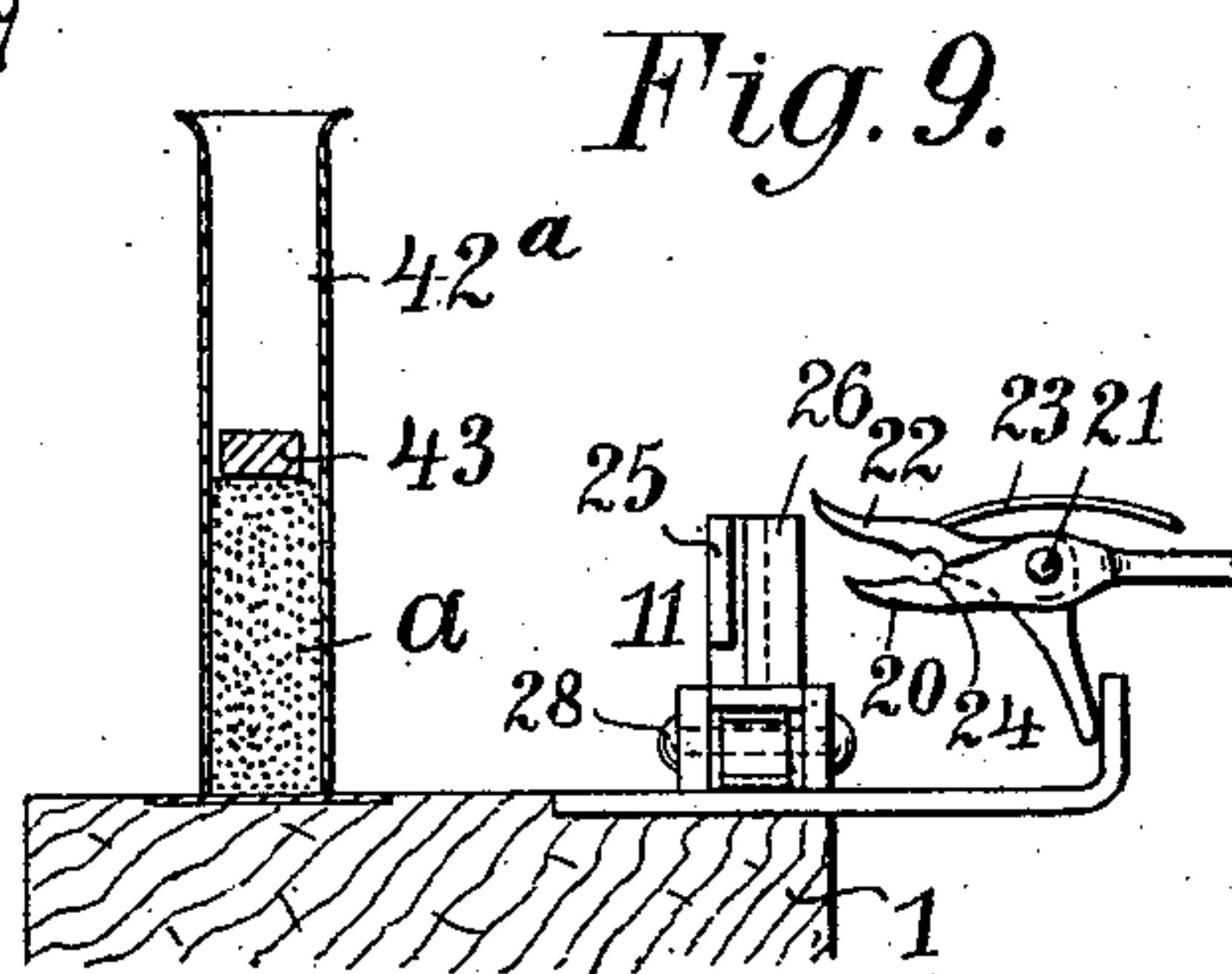
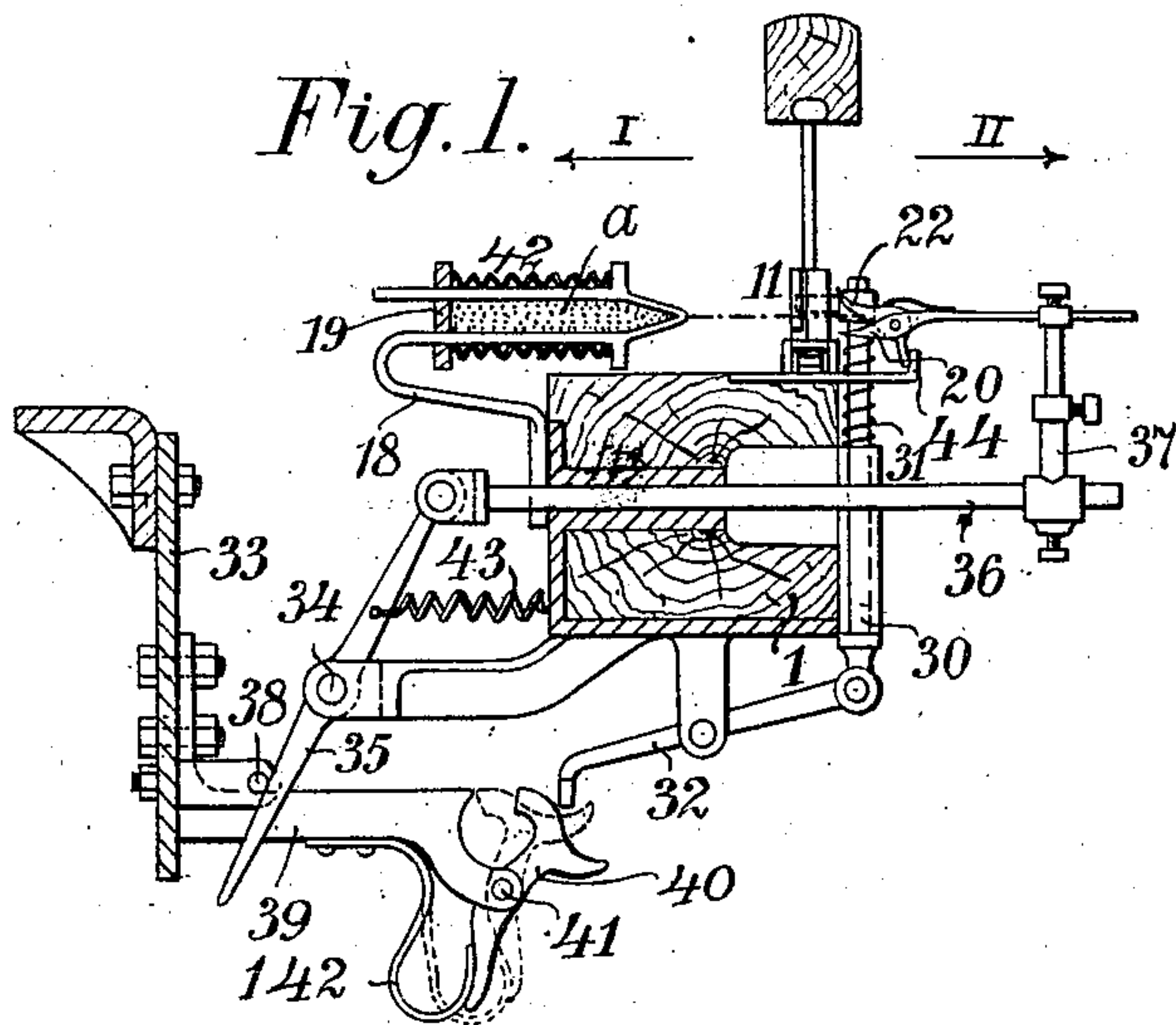
PATENTED JAN. 21, 1908.

O. WAHLE.

MECHANISM FOR INSERTING SEPARATE WEFT THREADS, SUCH AS HORSE-HAIR AND THE LIKE, IN THE SHED.

APPLICATION FILED MAY 15, 1907.

4 SHEETS—SHEET 1.



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Fig. 2.

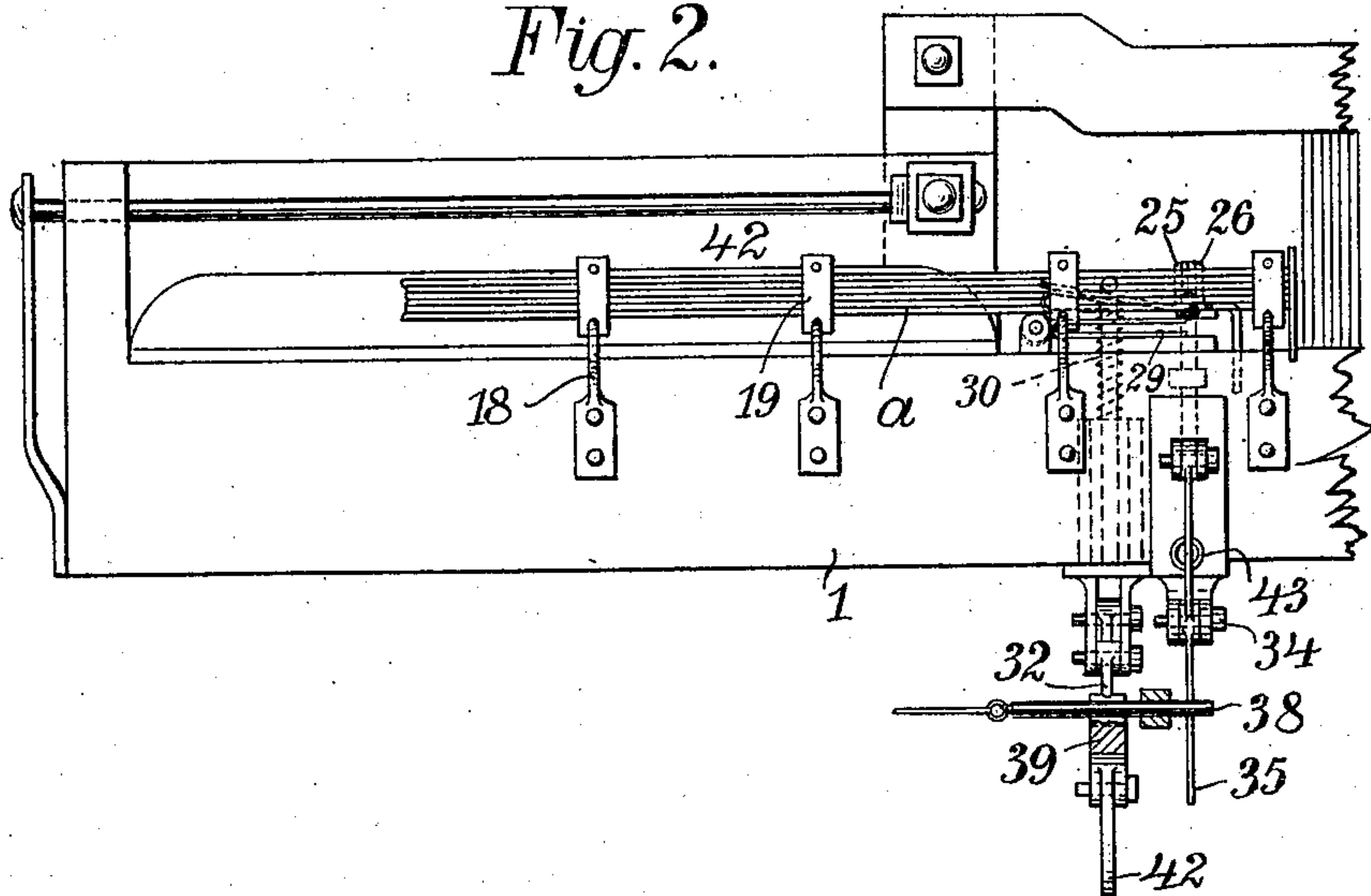


Fig. 4.

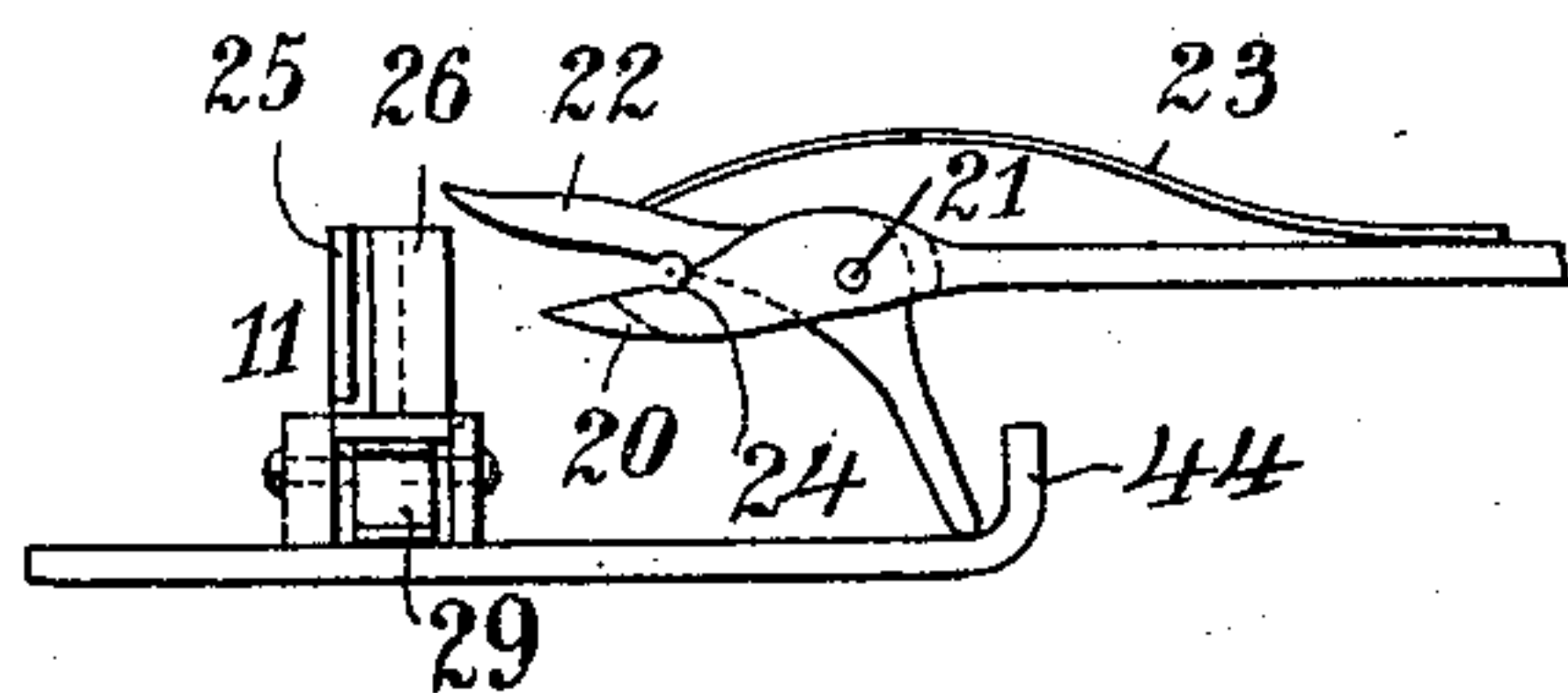


Fig. 7.

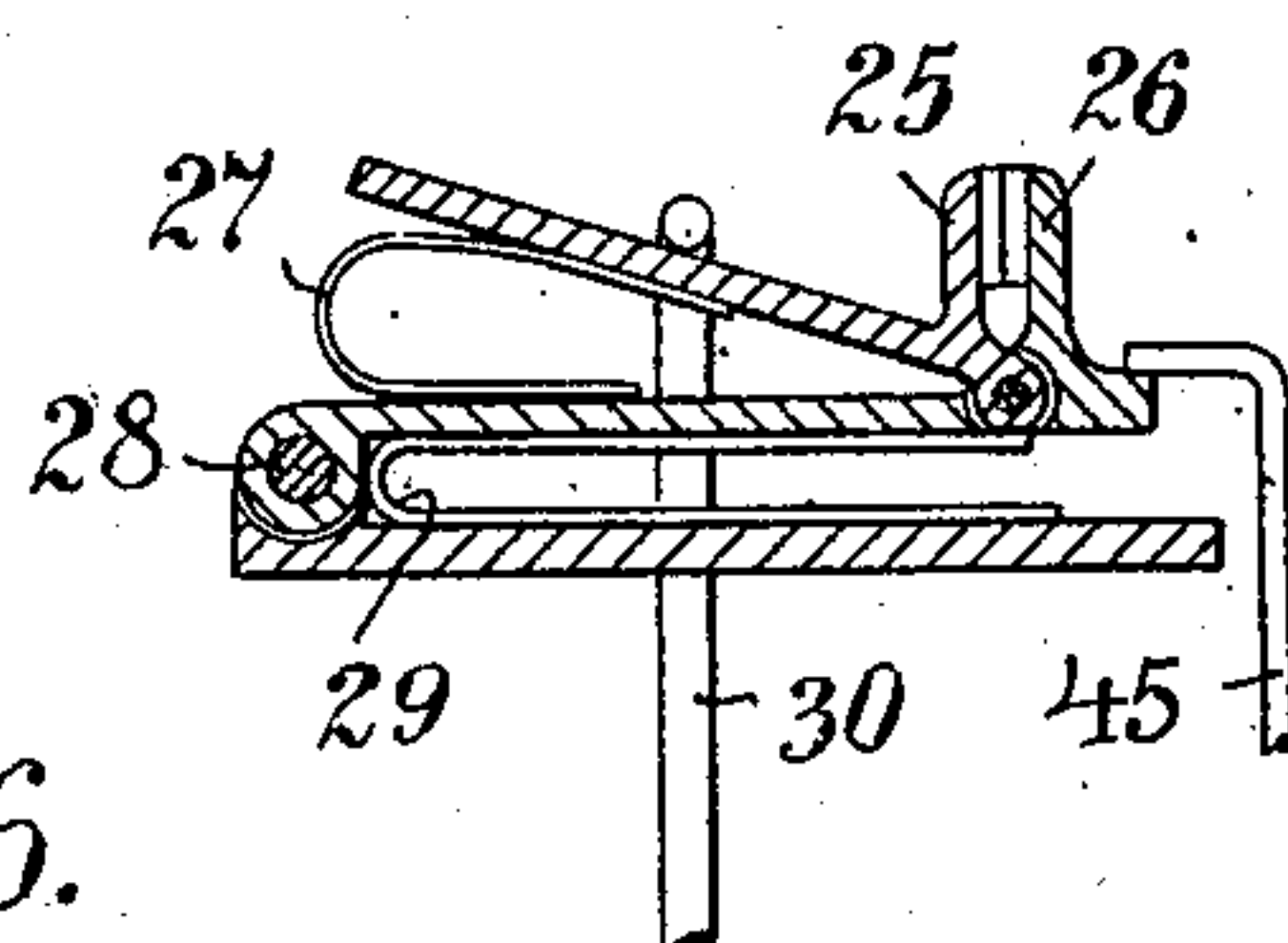


Fig. 5.

Fig. 6.

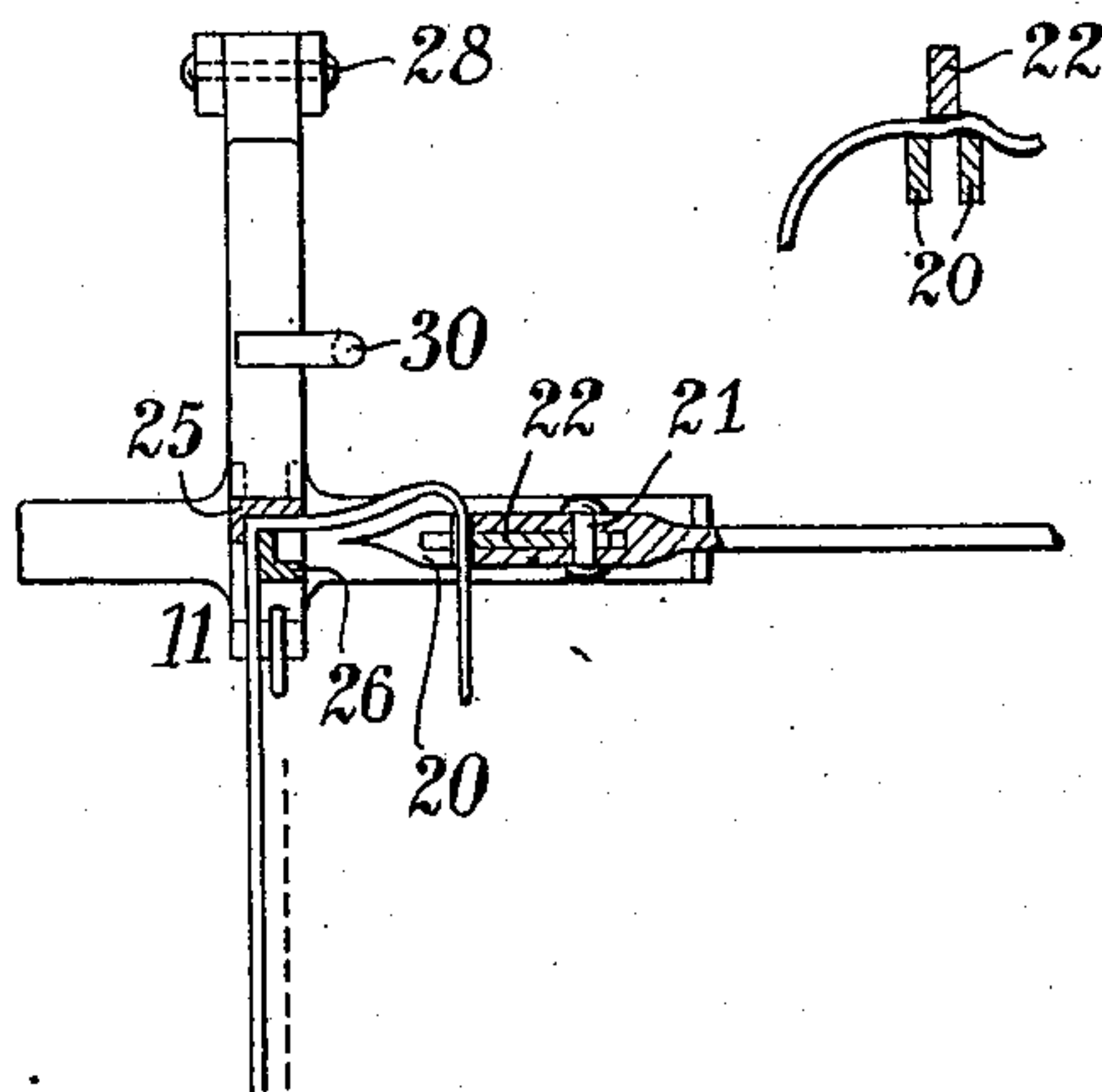
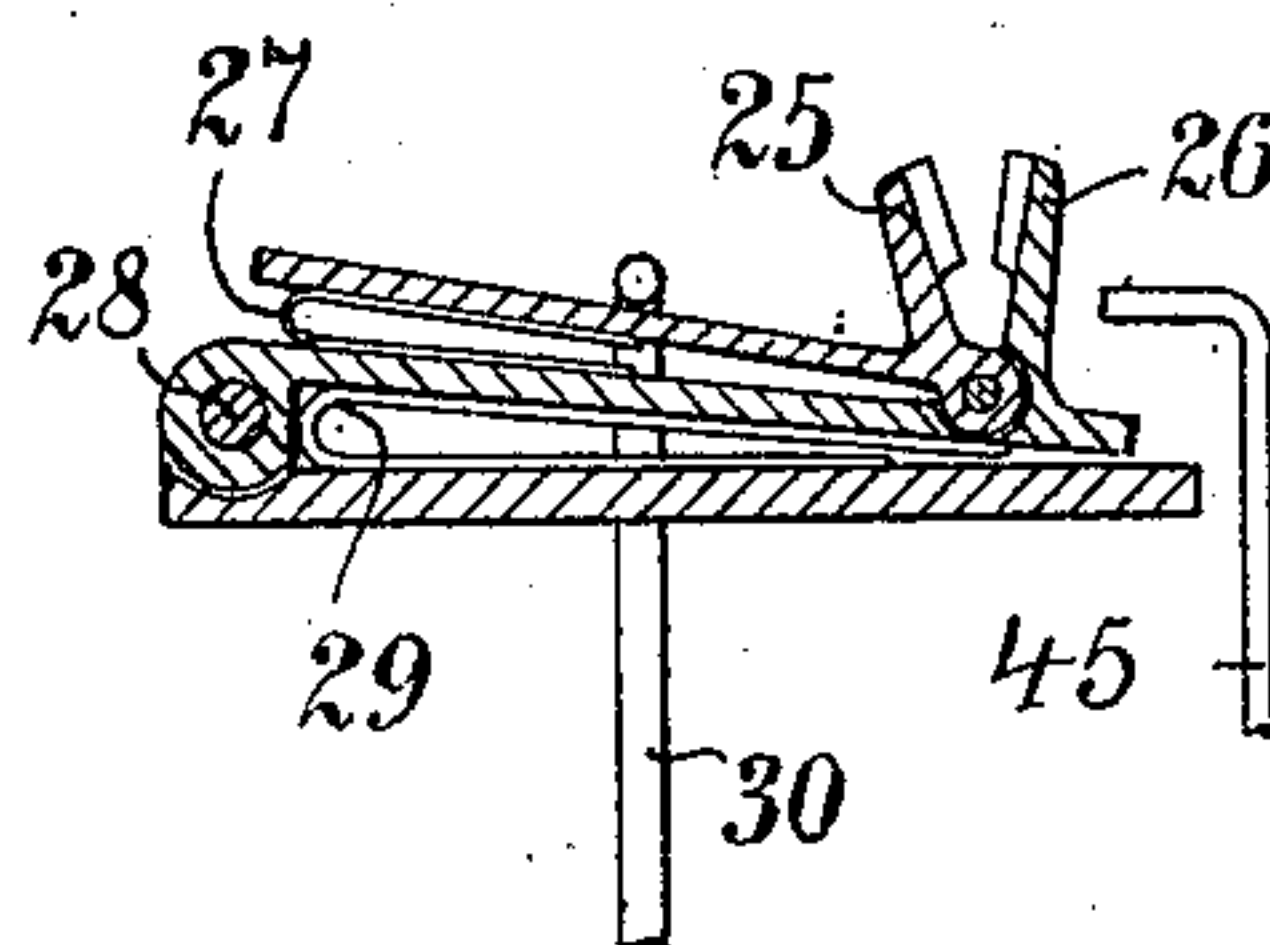


Fig. 8.



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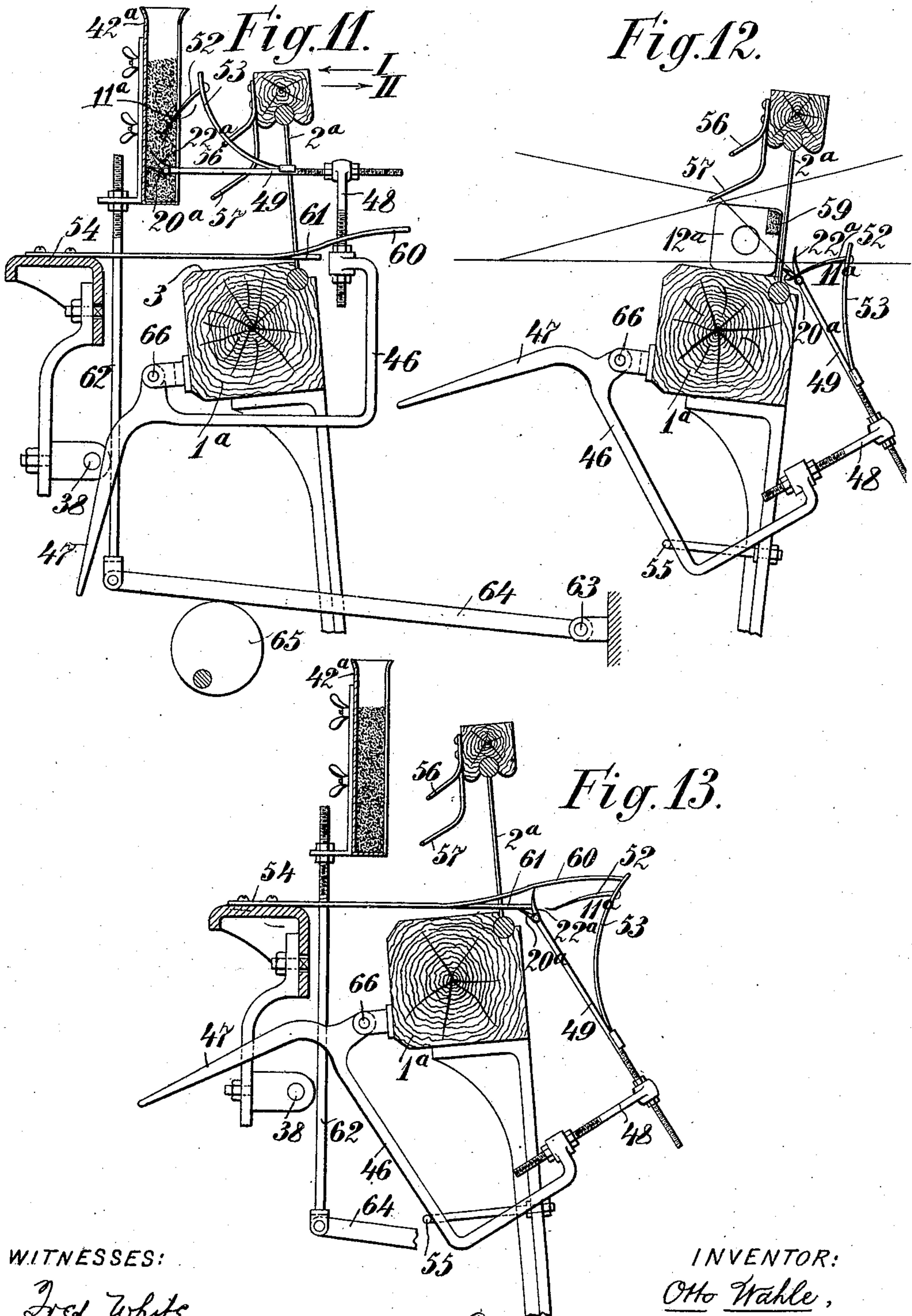
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4 SHEETS—SHEET 3.



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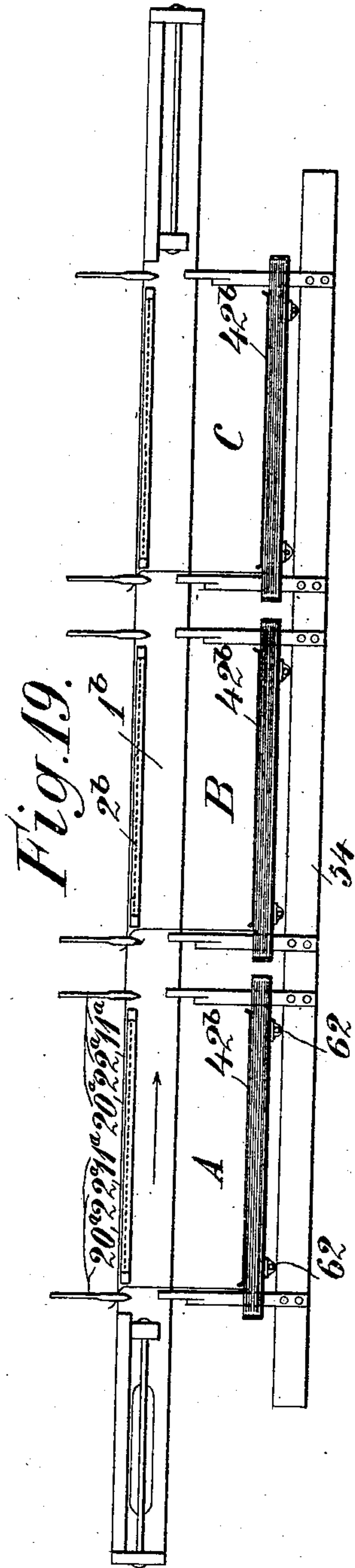
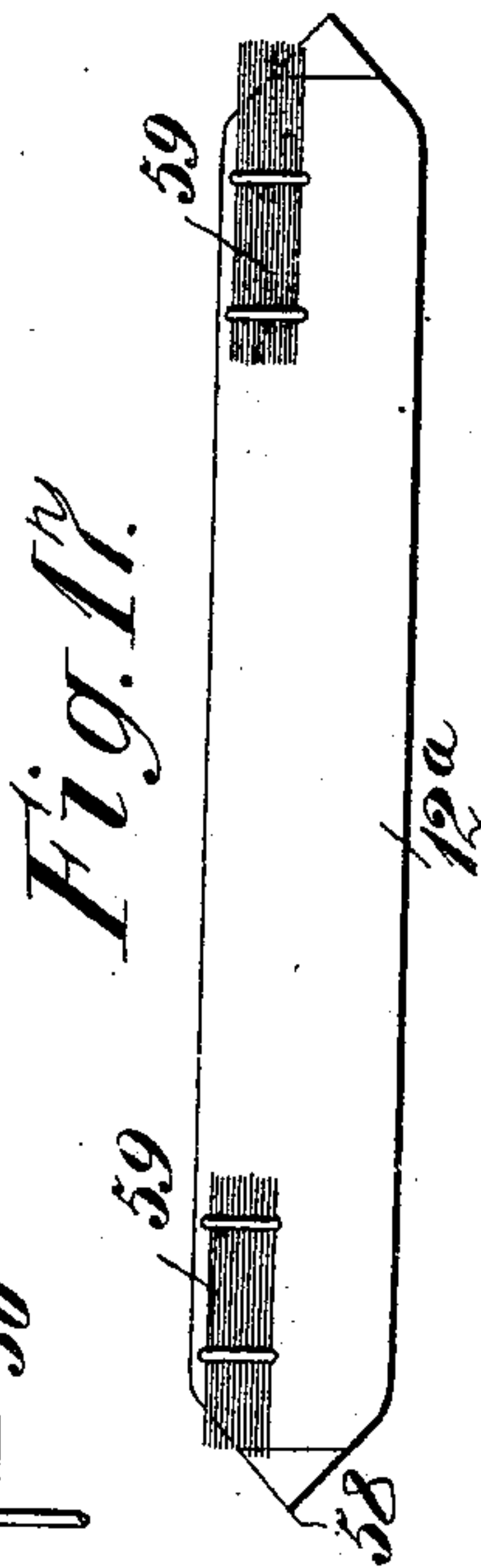
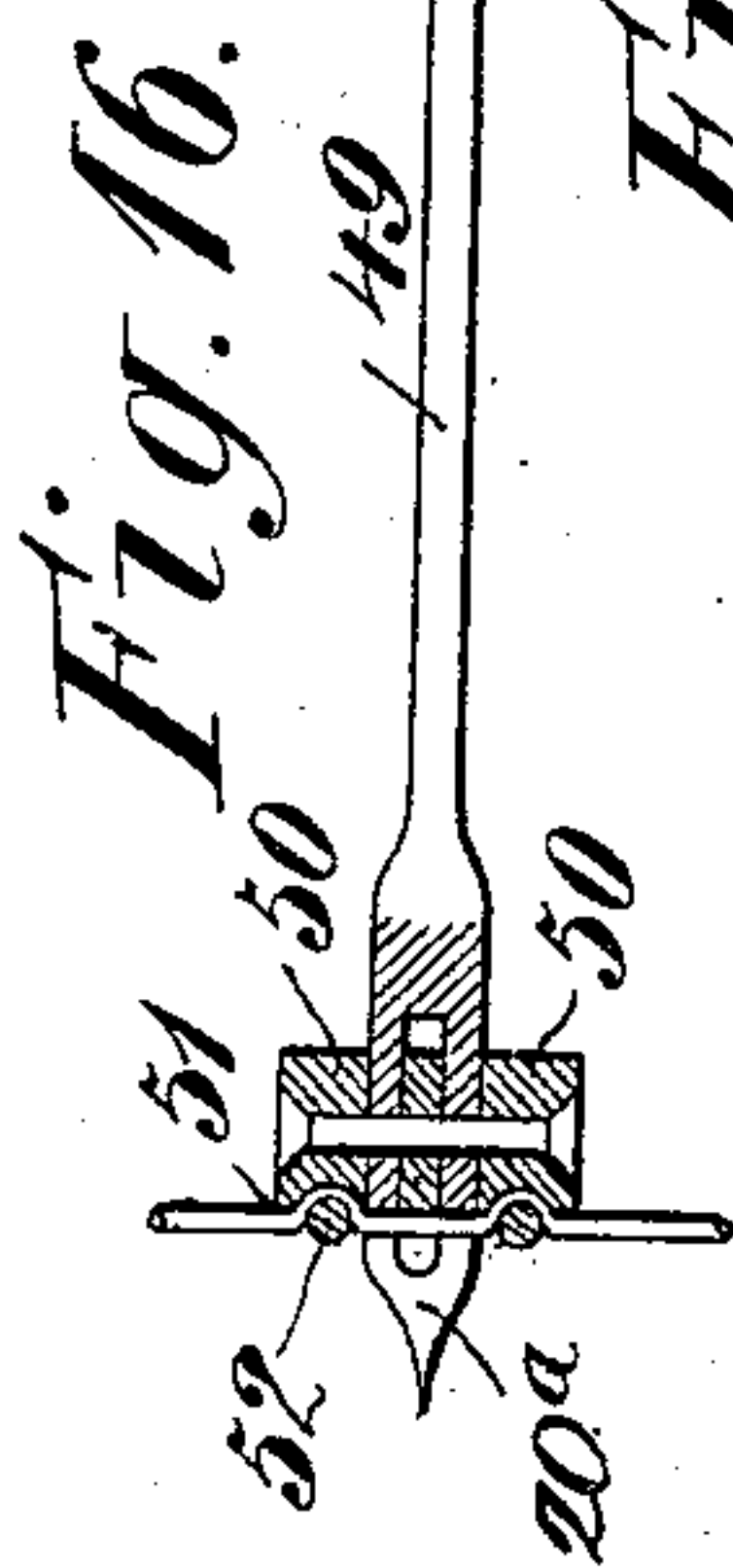
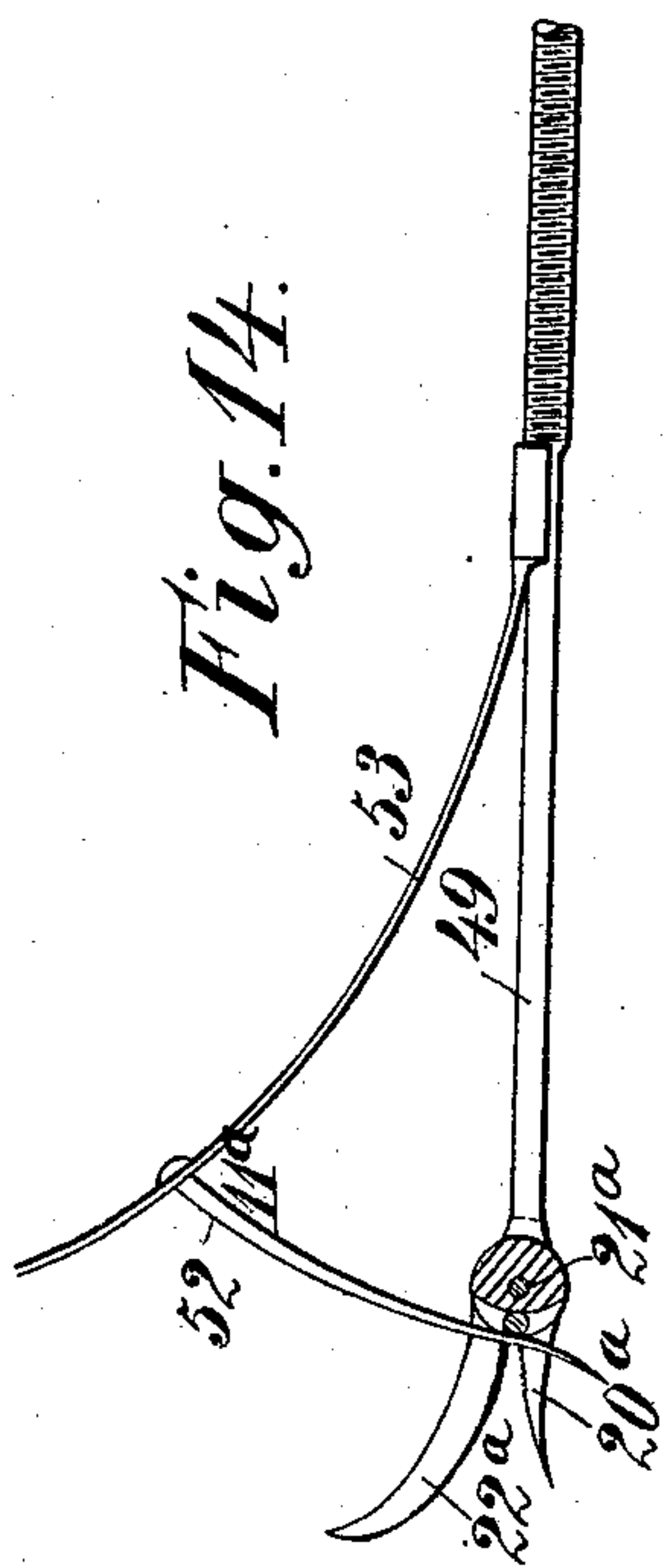
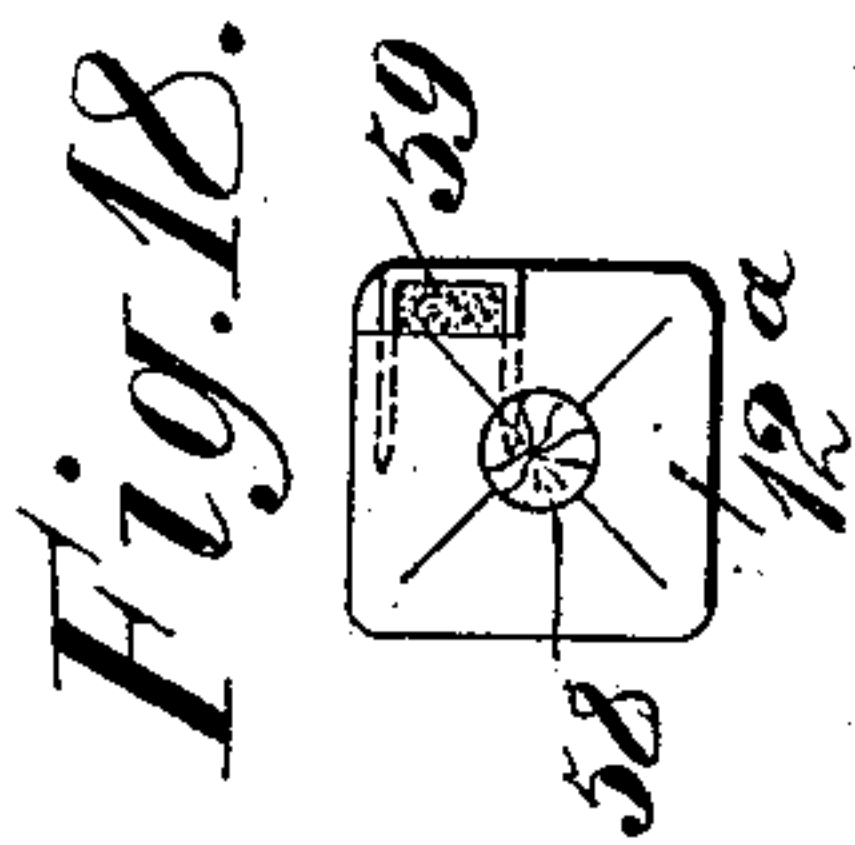
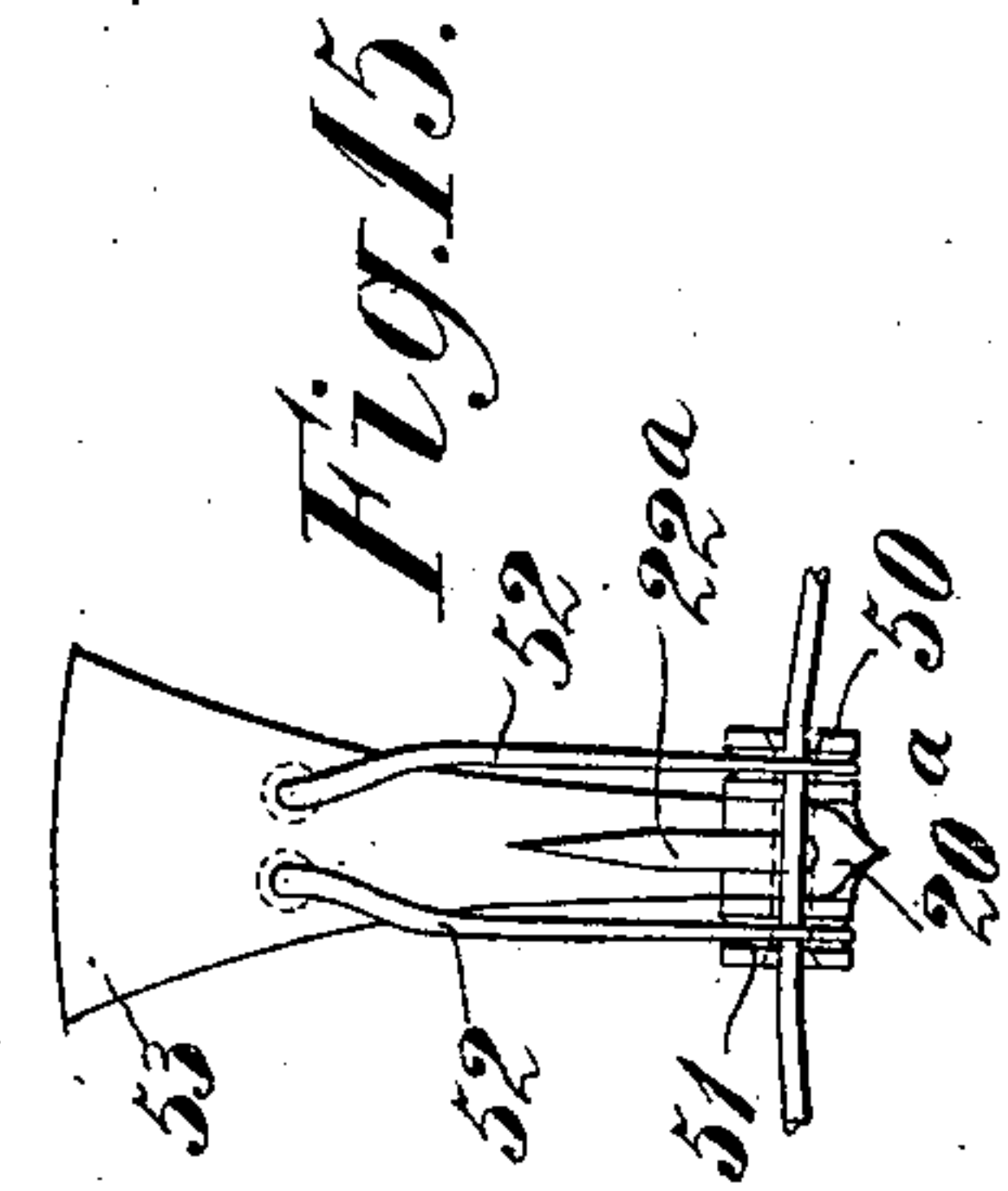
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PATENTED JAN. 21, 1908.

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APPLICATION FILED MAY 15, 1907.

4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

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OF VIENNA, AUSTRIA-HUNGARY.

MECHANISM FOR INSERTING SEPARATE WEFT-THREADS, SUCH AS HORSEHAIR AND
THE LIKE, IN THE SHED.

No. 877,271.

Specification of Letters Patent.

Patented Jan. 21, 1908.

Application filed May 15, 1907. Serial No. 373,814.

To all whom it may concern:

Be it known that I, OTTO WAHLE, round-house superintendent of the Austrian North-Western Railway, a subject of the Emperor of Austria-Hungary, and a resident of Deutsch-Brod, Bohemia, in the Empire of Austria-Hungary, have invented Improvements in Mechanism for Inserting Separate Weft-Threads, such as Horsehair and the Like, in the Shed; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

In accordance with the invention separate weft threads, of horsehair for example, of the same length or approximately the same length as the width of the goods, are inserted in the shed in such a way that the single hair or the like supplied by a device or taken from a bundle, is arranged with its end from any side, preferably from the front of the loom, transversely of the path of the shuttle within reach of the movement of the shuttle and held on the other side of the same in this position by means of a clamping device, while the shuttle in its pick through the shed seizes the hair at its free end with its seizing notch and drives this hair in front of it, loop-fashion into the shed, whereupon the hair properly arranged in the shed is finally released. For this purpose a mechanism is required which presents the separate weft threads or releases them from a bundle and arranges them with their end transversely of the path of the shuttle. *Per se* this mechanism may be of any suitable construction. The mechanism for holding the thread arranged transversely of the path of the shuttle is broadly a clamping device which is regularly opened and closed by any moving part of the loom. The withdrawing device and the clamping device are arranged on the same side of the shuttle race opposite the supply reservoir or magazine and either form two separate parts or a unitarily displaced member with separate automatic operations. For the purpose of looping-in the thread presented a seizing device is provided on the end of the shuttle.

Figures 1-3 of the accompanying drawing illustrate in cross section, front elevation,

and plan respectively a part of a loom slay with the mechanism mounted thereon. Fig. 4 is an enlarged side elevation of the withdrawing and clamping devices. Fig. 5 is a section plan of Fig. 4. Fig. 6 is a detailed cross-section of the jaws of the withdrawing device. Fig. 7 is a longitudinal vertical section of the clamping device in closed position. Fig. 8 is a similar view showing the parts open. Fig. 9 is a view similar to Fig. 4, including the hair magazine. Fig. 10 is a sectional plan of the parts shown in Fig. 9. Figs. 11-13 illustrate a second constructional form in cross section through the slay in three different positions of the same together with the combined withdrawing clamping device. Figs. 14-16 show the combined withdrawing clamping device in side elevation (partly in section), front elevation and plan (partly in section) respectively on a larger scale. Figs. 17 and 18 show a form of seizing device on the shuttle in side and end elevation respectively and Fig. 19 shows a loom slay with a number of supply reservoirs in plan.

In the constructional form of the mechanism illustrated in Figs. 1 to 3 the hair magazine 42 is arranged on the slay 1 opposite the reed 2; the hairs or the like *a* are drawn through a number of U-shaped hooks 18 arranged side by side on the slay and in which they are pressed against the point by spring plates 19. In the constructional form of the mechanism illustrated in Figs. 9 and 10 a small chamber 42^a of wood, sheet metal or the like is arranged on the slay and in this chamber the hairs are arranged loosely from above and merely loaded with one or more weights 43 for the purpose of preventing them from becoming scattered and facilitating the feed. Opposite the hair magazine, on the reed side of the slay, with the shuttle race between them, the device for taking the separate hairs out of the hair magazine is arranged. I have illustrated herein a construction described and claimed in my application No. 373,813, filed May 15, 1907. This is shown in Fig. 1 and in Figs. 4-6 in elevation and in longitudinal and cross section and in the present constructional form consists of a needle 20 provided with an arm 22 pivoted at 21 and preferably projecting beyond the

point of the needle, which arm is pressed by a spring 23 against the needle in such a manner that in the normal position the two bear against each other and form a small mouth. The needle or the arm or both these parts are provided on the inside of the angle with a notch 24 corresponding to the thickness of the hair or the like, and when the needle is inserted into the hair magazine and the device has been opened by the pressure against the hairs a hair remains suspended in this notch. In Figs. 9 and 10 in which the longer arm 22 is provided the opening of the jaws takes place by the striking of this arm against the rear wall of the magazine.

The clamping device, which seizes and holds the weft thread end which is arranged by the needle transversely over the shuttle race, is arranged on the side of the withdrawing device (the needle) and in front of the same in such a manner that the needle in moving to and fro passes in front of the mouth of the open clamping device or passes through the same. The arrangement must therefore be such that the clamping device is opened before the movement of the needle begins and is again closed when the movement of the needle has been completed. In order to afford more play for the passage of the needle provision is made for the clamping jaws to be opened and also moved out of the path of the needle (lowered) so that the needle moves in front of (over) the mouth of the clamping jaws. It is only when the needle pincers moves back, when its mouth is situated behind the clamping jaws, that the clamping jaws again move back (upwards) and then close in order to seize the hair held by the needle.

As shown in Figs. 1-10 of the accompanying drawing, and particularly in Figs. 7 and 8, the clamping device consists of the two clamping jaws 25, 26 of which one jaw 25 forms a bent lever, upon the second arm of which a relatively weak spring 27 acts in such a manner that the clamp normally remains closed. The clamping part 26 is formed as a lever arm rotatable around 28, upon which arm a spring 29 acts; this spring is stronger than the spring 27 and tends to turn the lever upwards on to a stop 45. The object of this is that the clamping jaws may only rise after the return of the needle and then close and only open when the pin passes by and then descend.

The actuation of the clamp, that is to say its opening and descent and its rising and closing, is produced by a rod 30 the end of which is bent at an angle (Fig. 1) and which is always drawn upwards by the action of a spring 31; at its lower end it is connected with a lever 32 the end of which is displaced by a device arranged on the breast beam or on a stationary part 33 of the loom. If the

slay moves in the direction indicated by the arrow I, the needle 20 is moved towards the hair magazine, because a lever 35 pivoted at 34 displaces the arm 37 carrying the needle-pincers, by means of a rod 36, when it strikes against a stop 38. In this movement the clamping device is opened and lowered by the following means. A guide 39 is provided on the frame of the loom, and on its rear end a lever 40 is rotatable around 41, this lever being formed in such a manner that it is able to constitute an inclined striking face for the end of the lever 32. A spring 142 connected with the guide 39 and lever 40 holds the lever away from the guide. When the slay moves towards the left hand the end of the lever 32 strikes against the lever 40 and rotates it into the position indicated in broken lines, in overcoming the spring 142, and in this position it forms merely an inclined bearing surface for the guide 39. During the further movement the end of the lever 32 travels up the guide 39, the clamp passing from the position shown in Fig. 7 to that represented in Fig. 8. In the first place, however, the clamp is opened in overcoming the weaker spring 27 and then depressed after the stronger spring 29 has been overcome.

In the return movement of the slay in the direction indicated by the arrow II, in the first place the needle 20, which has seized a hair, is moved back through the opened clamp 25, 26, owing to the fact that a spring 43 returns the lever 35 and the parts 36, 37 into their original position. During this time the end of the lever 32 slides on the guide 39 and, as in the meantime the lever 40 has been returned into the position shown in firm lines by the action of the spring 142, falls suddenly from the guide 39 between the latter and the lever 40 whereby the following effects are obtained; a speedy ascent of the rod 30 owing to the influence of the spring 31 and then a sudden ascent of the clamp 25-26 and immediately thereafter a sudden closing of the clamp by the action of the spring 27. The result of this is that the end of the weft thread arranged transversely over the shuttle race is securely gripped by the clamp which is preferably shaped angularly, while the withdrawing needle releases the weft thread because the prolongation of the arm 22 strikes on a stop 44 (Figs. 1 and 4) and by opening the arm 22 opens the pincers. The weft thread is now ready for insertion in the shed, accordingly the shuttle driven through the shed by the picker seizes in its notch the part of the weft thread lying transversely over the shuttle race and inserts it in the shed in that direction in which it lies in the hair magazine without bending it (Figs. 3 and 5—direction indicated by the arrow). The angular cross section of the parts of the clamp 25-26 serves to cause the clamped hair, after being shot in, to be bent short along

the reed, as shown in Fig. 5. If this formation were not adopted, owing to its elasticity the hair would assume a curved form from the needle and the projecting end of hair would be considerably longer and cause waste of hair. This method of inserting the weft threads presents the advantage that the withdrawing device, which to a certain extent itself constitutes a clamp, is relieved by a more powerful clamping device, and that the weft thread is drawn from the hair magazine without bending, and therefore without damaging it, and without additional friction, and inserted in the shed. During the further displacement of the slay in the direction indicated by the arrow II (Fig. 1) the end of the lever 32 slides over the lever 40 which is returned into its initial position by the spring 142.

The stop 38 is displaceable horizontally and is operative only at every second pick as it is thrown in and out of gear by an appropriate part.

In the constructional form illustrated in Figs. 11-18 the withdrawing device 20^a, 22^a and the clamping device 11^a are combined into one part; the combined device is arranged on the loom slay and may be actuated by a tappet on the frame of the loom. A bent lever 46 is pivoted on a stud 66 on the loom slay (Figs. 11-13); on one side this lever forms a striking arm 47 and on the other side carries the combined withdrawing and clamping device. On the angle arm 46 an arm 48 is adjustably fixed by means of screws and on it a needle bar 49 is arranged so as to be adjustable in the direction of its length, likewise by means of screws. This needle bar (Figs. 14-16) carries at its end the withdrawing device which consists of the needle 20^a already referred to and an arm 22^a pivoted on it at 21^a and extending beyond the arm 20^a the two forming a tongue in the mouth of which the hairs are held by the weight of the arm 22^a or by a spring acting upon the same; if desired, this action may be assisted by notches. The clamping device mounted on the needle bar 49 consists of a member 50 arranged laterally of the arm 20^a and provided on its front side with a cavity or notch 51, and of a fork 52 which is mounted on a spring 53 fixed on the needle bar and owing to the influence of this spring tends to come in front of the cavity 51. The striking arm 47 coöperates with an adjustable stud on the breast beam 54 of the loom.

The operation of the mechanism is as follows: If the slay 1^a moves from the position shown in Fig. 12 into that represented in Fig. 11 (direction shown by the arrow I) forwards towards the breast beam 54, the arm 47 strikes against the stop 38 whereby the bent arm 46 and the withdrawing-clamping device is rotated upwards from the position shown in Fig. 12 (in which position is is nor-

mally held by an appropriately arranged stop 55,) into the position shown in Fig. 11. During this time the spring 53 has slid along a stop 56 in its path, whereby the fork 52 is brought out of reach of the pincers 20^a, 22^a which enters one end of the magazine 42^a in Fig. 11 (or 42^b in Fig. 19). A number of hairs are thus caused to enter the mouth of the pincers, particularly at the moment at which it is turned upwards owing to the arm 22^a encountering the rear wall of the magazine so that the mouth of the pincers is opened wider. Now if the slay moves back in the direction indicated by the arrow II into the position shown in Fig. 12, then, as the arm 47 gradually leaves the stop 38, the bent arm 46 rotates into the position shown in Fig. 12. During this time the hairs have left the pincers and only one hair which has remained suspended in the notches, is held and prevented from being pulled out by the fork 52, which, when the spring 53 leaves the stop, comes against the mouth of the pincers and lies with a certain wedgelike pressure in front of the notch 51. The hair is thus withdrawn from the magazine with certainty and carried over a hook or eye guide 57 so that finally it assumes a position athwart the shuttle race in which the shuttle 12^a when driven through the shed is able to drive the thread in front of it. To this end the shuttle (Figs. 17, 18 and 12) is provided with a seizing device, which consists of a projection 59 on one edge above the point 58, and preferably on the edge directed towards the reed 2^a, this projection advantageously consisting of a bundle of horse-hair and in conjunction with the point 58 of the shuttle forming a notch. Owing to this arrangement of the bundle of hair the point of the shuttle is kept free for the attack of the picker and loose warp threads are prevented from adhering to it. During the pick of the shuttle the hair enters this notch and is removed from the magazine smoothly and readily and without any considerable friction and forced loop-fashion into the shed. As the pincers needle 20^a, 22^a is quite close to the shuttle race, the loss of hair, that is to say the length of the end of hair which is not woven in, is reduced to the minimum, notwithstanding the fact that the pincers needle enters the magazine at a proper height above the fabric. The release of the horsehair inserted in the shed from the withdrawing and clamping device takes place during the second forward stroke, that is to say during the beating up of the weft. This position is represented in Fig. 13. The bent lever 46 retains the position represented in Fig. 12, because the arm 47 does not strike against the stop 38; the stop 38 has been rendered inoperative by the driving gear of the loom (in the drawing displaced at right angles to the plane of the paper). Immediately before the movement of the slay begins the spring 53 and the arm 130

22^a strike against the stops 60, 61 provided on the breast beam 54 whereby they remain behind the needle bar 49. This results in the opening of the clamping and withdrawing device and consequently the release of the horsehair. During this movement of the slay, hair is taken from the same magazine (Fig. 19, division A) on the other side of the loom, as shown in Fig. 11. The withdrawal and insertion of the horsehair therefore takes place on both sides alternately in correspondence with the movement of the shuttle.

In order to prevent the withdrawing device 20^a, 22^a from entering the magazine at the same place always, in which case even if a number of hairs were withdrawn the operation would not take place under favorable conditions, a slow upward and downward movement is given to the magazine, whereby the pincers 20^a, 22^a is obliged to enter the bundle of hair at a different place every time. In the construction illustrated in Fig. 11 the magazine 42^a is adjustably mounted on rods 62 (one shown) appropriately guided on the frame and moved by means of levers 64 rotatable around 63, a cam plate or the like 65 slowly rotated by the loom gear raising and lowering these rods.

Fig. 19 shows that it is possible on a loom of normal construction to manufacture a number of horsehair fabrics of a width equal to the length of the hairs, side by side and simultaneously. For this purpose a number of magazines 42^b, preferably connected one with the other, are arranged above and transversely of the goods, these magazines being open at both ends so that at each end a withdrawing-clamping device 20^a, 22^a, 11^a is able to act alternately in the manner described. Accordingly, before the shuttle is driven from left to right all the left hand withdrawing-clamping devices of the compartments A, B, C are operative and before it is driven from right to left all the right hand side devices are operative, so that all three hairs are inserted during the same flight of the shuttle one after the other in the corresponding sheds.

What I claim as my invention and desire to secure by Letters Patent is:

1. A means for inserting separate weft threads into a shed, including in combination a magazine, and means for withdrawing threads therefrom, said magazine and withdrawing means being arranged with the shuttle race between them, and said withdrawing means being adapted to draw the thread from front to back across the shuttle race.

2. A means for inserting into a shed separate weft threads of hair, including in combination a hair magazine, a slay, means for withdrawing the end of a hair from said magazine, the normal positions of said withdrawing means and magazine being one at the

front and the other at the rear of said slay, so that when the end of a hair is withdrawn it lies transversely over the slay from front to back.

3. A means for inserting into a shed separate weft threads of hair, including in combination a slay 1^a, a magazine 42^a forward of the slay, and a device for withdrawing the end of a thread from said magazine having its normal position at the rear of the slay, and means actuated on the forward movement of the slay for introducing said withdrawing device into the magazine to take hold of the end of a hair and for returning said withdrawing device to the rear of the slay upon its rearward movement, so as to draw the thread over the slay from front to back, so that its intermediate part lies across the shuttle race.

4. In a mechanism for inserting weft threads into a shed, a picking device adapted to pick a thread and withdraw it from a bundle, additional clamping means moving with said picking device and adapted to clamp and hold said thread, and means independent of the picking device for actuating said clamping means.

5. In a mechanism for inserting weft threads into a shed, a withdrawing device including pincers-like arms 20^a and 22^a, a member 50 provided with a notch 51 on its front side, a spring 53, a fork 52 carried by said spring, means for moving the aforesaid parts forward, and a stop 56 adapted to engage said spring 53 on said forward movement and to lift said spring and said fork.

6. In a mechanism for inserting into a shed separate threads of hair, including in combination, a magazine, a withdrawing device, a loom slay on which said device is carried, and means for moving the withdrawing device to cause its mouth to pass back and forth over the slay and to enter the magazine at a point above the fabric.

7. A means for inserting into a shed separate threads of hair, including in combination a magazine for hairs, a withdrawing device, a loom slay, a support 46 for said withdrawing device pivoted on said slay so as to swing transversely thereof and at a point 66 to cause the mouth of the withdrawing means to pass across the line of the shuttle race and to enter the magazine at a point above the fabric, and a stop 55 to determine the normal position of said withdrawing means close to the shuttle race, and means for swinging said support about said pivot.

8. In a mechanism for inserting weft threads into a shed, a shuttle having a fixed tapering end, and a projection extending longitudinally beyond the base of said tapering end and adapted in conjunction with the tapered face of said end to form a thread-seizing notch.

9. In a mechanism for inserting weft
threads into a shed, a shuttle having an end
point and a longitudinally arranged projec-
tion adapted in conjunction with said point
5 to form a seizing notch, said projection com-
prising a bundle of hairs.

In testimony whereof I have signed my

name to this specification in the presence of
two subscribing witnesses.

OTTO WAHLE.

Witnesses:

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ARTHUR SCHWERZ.