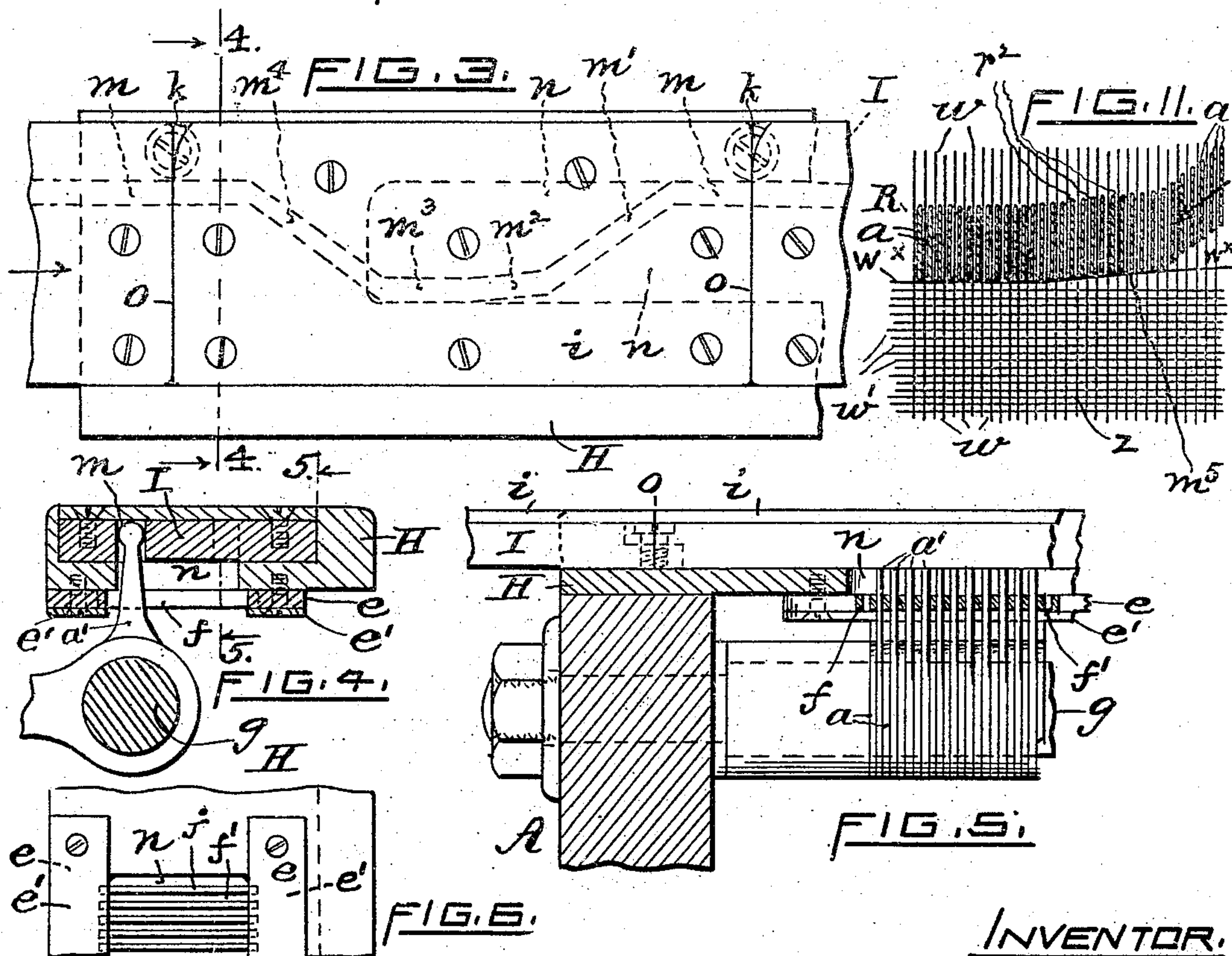
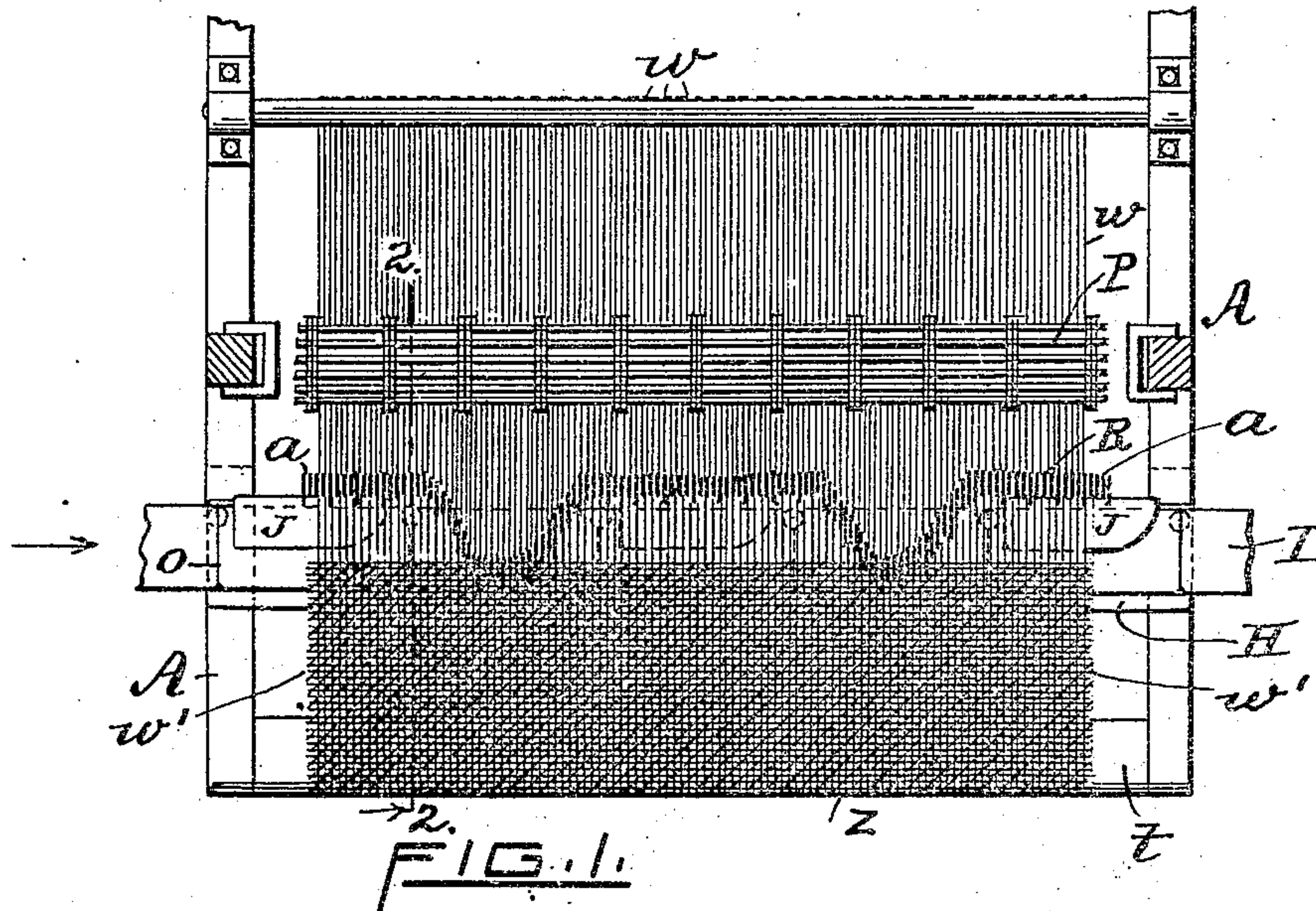


955,211.

Patented Apr. 19, 1910.

2 SHEETS—SHEET 1.



WITNESSES.

C. T. Hannigan
 Calvin H. Brown

INVENTOR.

I Levi E. Salisbury.
By Geo. A. Remington.
Atty.

L. E. SALISBURY.
POWER LOOM FOR WEAVING TEXTILE FABRICS.
APPLICATION FILED NOV. 6, 1907.

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2 SHEETS—SHEET 2.

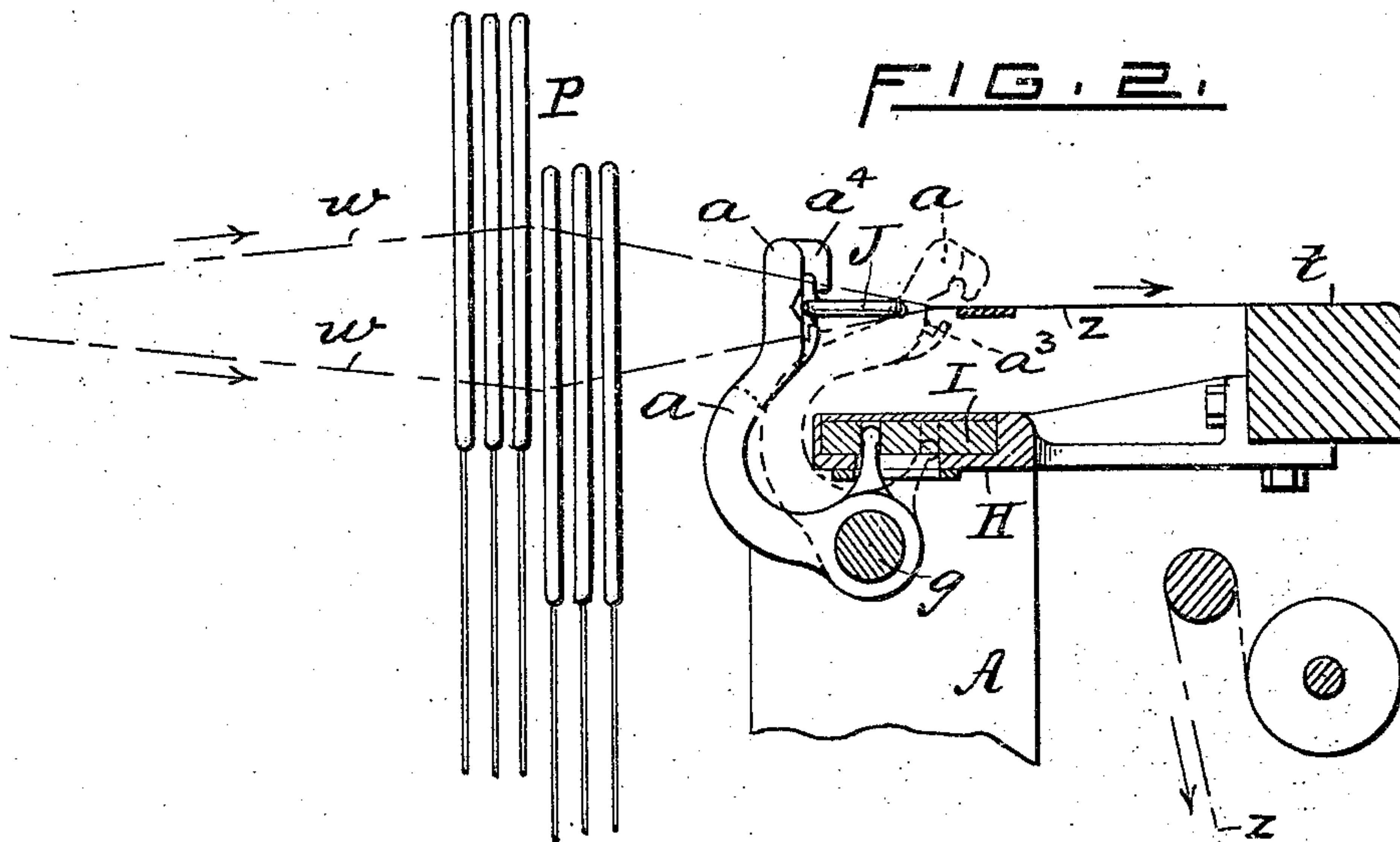
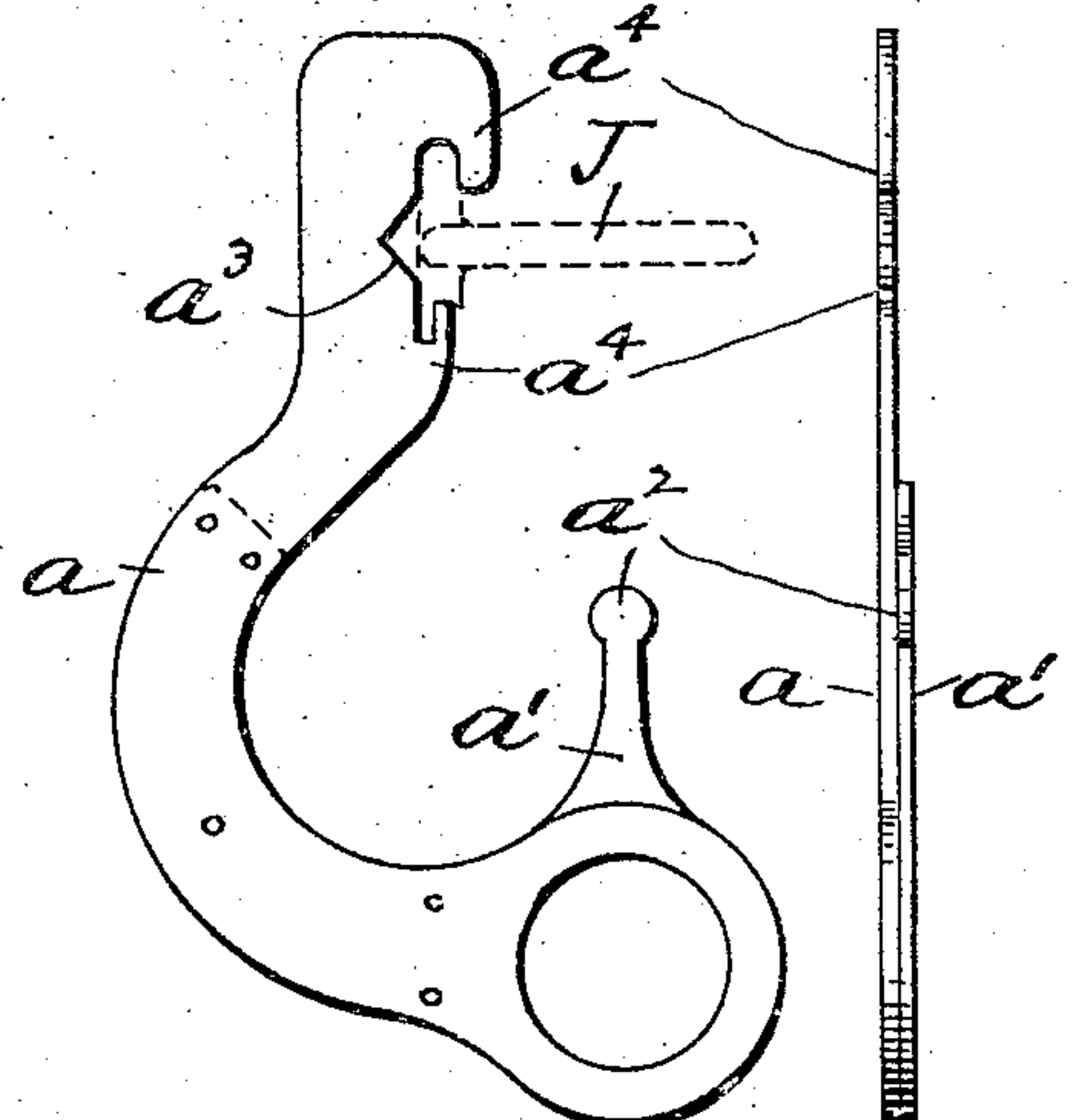
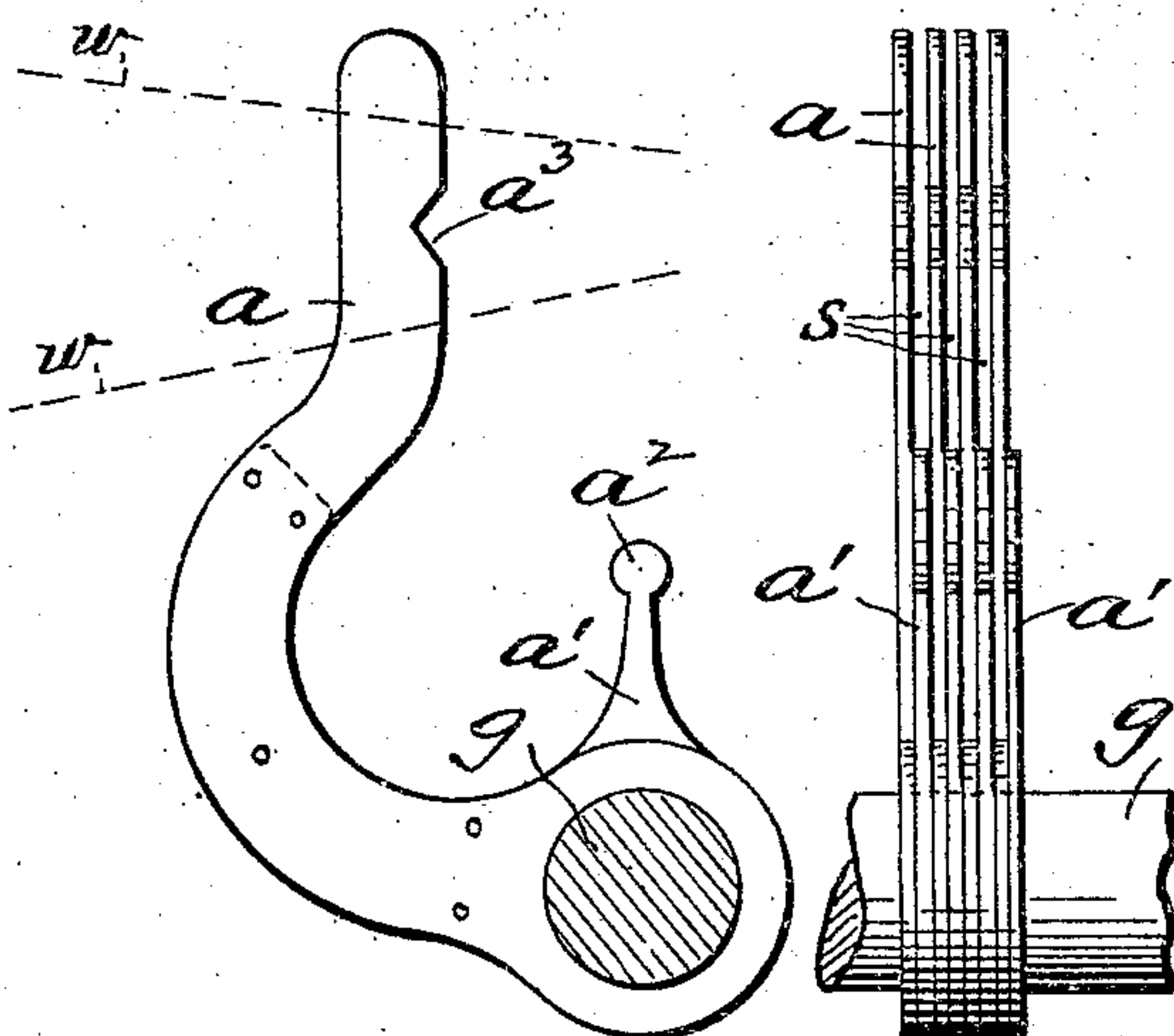


FIG. 7.

FIG. 8.

FIG. 9.

FIG. 10.



WITNESSES.

C. T. Hannigan.
Calvin H. Brown

INVENTOR.

Levi E. Salisbury.
By Geo. H. Remington.
Atty.

UNITED STATES PATENT OFFICE.

LEVI E. SALISBURY, OF PROVIDENCE, RHODE ISLAND.

POWER-LOOM FOR WEAVING TEXTILE FABRICS.

955,211.

Specification of Letters Patent.

Patented Apr. 19, 1910.

Application filed November 6, 1907. Serial No. 400,922.

To all whom it may concern:

Be it known that I, LEVI E. SALISBURY, a citizen of the United States of America, and a resident of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Power-Looms for Weaving Textile Fabrics, of which the following is a specification.

10 My present invention relates to improvements in looms for weaving textile fabrics.

While the invention forming the subject of this application for patent may be employed in any loom in which the harnesses and reeds are divided transversely into independent sections actuated in a predetermined order or succession, the invention is more particularly adapted to looms in which non-reciprocating shuttles are arranged to follow one another at regular intervals in a continuous manner, each shuttle being automatically charged with a length of weft-yarn to produce one pick which it delivers between the warp-yarns, the latter being properly shed immediately in advance of and in unison with the traveling shuttle; at the same time the reed sections are being successively actuated at the rear of the shuttle to beat up the thus delivered weft-yarn into the fabric.

30 In my U. S. Patent No. 720,181 is illustrated and described an automatic multiple-shuttle loom embodying the above named features and adapted to produce woven textile fabrics in the manner indicated.

In looms as usually devised, wherein the reed is mounted in a single swinging lathe or lay which extends entirely across the loom, a large percentage of the power for driving the loom is required to oscillate the lathe in beating up the weft or filling yarn. In looms having the reed divided transversely into sections which are actuated in a successive manner the percentage of power for actuating the reed is or may be materially reduced. In some cases, however, it is a difficult matter to properly adjust the reed sections and the means for operating them so as to impart a uniform degree of force or pressure upon the pick throughout its length, being the width of the cloth, the re-

sult being the production of goods having more or less imperfections therein.

The object I have in view in my present invention is to provide continuous multiple-shuttle or positive motion shuttle looms with a novel manner of and means for beating up each weft-yarn or pick concurrently with its delivery from the rear end of the shuttle; or in other words the pick is acted upon by the reed while the shuttle is still being propelled through the shedded warp-yarns.

To this end the invention consists, essentially, in segregating, supporting and guiding the several "dents" composing the reed, combined with means for positively swinging the dents one after another in a successive manner forth and back from the normal position to engage the weft-yarn as in beating it up.

It also consists in constructing the dent-actuating mechanism so that the act of engaging the unbeaten pick and pressing it laterally into the fabric is not accomplished instantly by one dent alone but by a plurality or continuously changing series of the dents, the latter when advanced having the working face of said series arranged to form a continuously produced angle with respect to the last laid and beaten up pick so that the weft-yarn then being acted upon by the dents is gradually forced home into the fabric concurrently with the delivery of said yarn from the shuttle. At regular intervals across the loom some of the dents comprising the reed are further constructed so as to form a combined support and guide for the traveling shuttles, said guides being in alinement when the dents are in the normal rearward position. When the loom is in operation the action of the mechanism causes the dents of the reed to present a wave-like movement, one wave following another uniformly across the loom, a shuttle being disposed between the waves and traveling in unison with them.

In the two accompanying sheets of drawings, Figure 1 represents a plan view of a multiple-shuttle loom embodying my present invention, many of the parts not deemed essential herewith being omitted. Fig. 2 is a transverse sectional view, enlarged, taken

substantially on line 2 2 of Fig. 1. Fig. 3 is a plan view, still further enlarged, showing a portion of the shuttle and cam-carrying chain, and also showing a part of the chain-supporting frame. Fig. 4 is a transverse section, taken on line 4 4 of Fig. 3, and also showing the relation of the dent-supporting rod or shaft to the chain. Fig. 5 is a longitudinal sectional view, taken on the irregular line 5 5 of Fig. 4. Fig. 6 is an inverted plan view showing a portion of the chain-supporting frame. Fig. 7 is a side elevation of one of the reed dents loosely supported on said rod or shaft, the dents being in the retracted or normal position. Fig. 8 is a corresponding front or edge view showing a plurality of the dents. Fig. 9 is a side view, similar to Fig. 7, showing a dent adapted to receive a shuttle, the latter being indicated by dotted lines. Fig. 10 is a corresponding front view of the same, and Fig. 11 is a plan view representing in a somewhat exaggerated manner a portion of the woven fabric and the relation of the dents to the last delivered weft-yarn while the latter is being acted upon by the reed, the line of section being taken substantially at and parallel with the upper surface of the fabric.

The general construction and manner of operation of the loom, portions of which are represented in the drawings herewith, are set forth in my said patented loom and to which reference may be had for a more detailed description.

In the annexed drawings A designates a part of the loom frame, *w* the warp-yarns, P the harnesses divided transversely into short lengths or sub-sections, H a horizontal chain-guide or track secured to the breast-beam *t* and disposed between the latter and the harnesses, and I a continuous or endless chain for carrying the self-threading shuttles J and the reed-actuating means; the reed-moving links alternate with the shuttle-carrying links.

The present invention resides more especially, as before stated, in the novel reed, its action and means for effecting the same. The reed, as a whole, is indicated by R, and consists of the laterally separated individual members or "dents" *a* arranged and supported on a fixed rod or shaft *g* located below the chain-guide H. The dents *a* are cut or punched from suitable thin sheet-metal stock, as steel. Each dent extends upwardly through the upper and lower warps *w* (see Figs. 2 and 7), the front edge of the free end of the members *a* being cut at an angle or otherwise adapted to present a substantially perpendicular working face, as *a*³, to the transverse edge of the fabric *z* when

they are advanced, as in beating up the weft. To one side of each of the members *a* is riveted or otherwise secured a shorter sheet-metal member *a*¹. The said two parts, *a* *a*¹, constitute a dent proper; these are assembled closely in a successive manner on the shaft *g*, the upper portions being separated laterally by spaces *s* each alining with and equal in thickness to that of a member *a*¹, as indicated in Fig. 8. As thus devised and arranged the dents of the reed R are independently movable, the upper ends being unsupported and adapted to freely receive therebetween in the respective spaces *s* one or more of the warps *w*.

The means, as drawn, for actuating and controlling the movements of the members of the reed are as follows: The several links of the chain I are jointed at *k* and are provided with a continuous cam-groove or track *m*. The groove portion in each alternate link, however, is deflected at an angle toward the front of the loom, see *m*¹, Fig. 3, thence it extends a short distance at a slight angle, *m*², into a straight part, *m*³, and is deflected rearwardly therefrom into a part, *m*⁴, terminating in part *m*, the latter being in alinement with the corresponding portion formed in the front or advance end of the link. The drawing represents the cam-carrying members of the links as being secured to thin top plates *i*, the ends *o* of the links abutting when moving in a straight course. The upper end of said member *a*¹ of each dent is enlarged, see *a*², and extends into the cam-groove, at the same time contacting with the adjacent sides thereof.

In order to allow the members *a*¹ of the dents to pass upwardly through the underside of the chain-guide H the latter has an opening, *n*, therethrough extending the length of the reed, its width permitting free axial movement of the members from the normal to the working or beating up position. The members *a*¹ may be laterally guided by means of correspondingly spaced short interposed light metal bars *f* having their ends suitably mounted in the two parallel strips *e* removably secured to the underside of frame H. See Figs. 4, 5 and 6. In this arrangement the members *a*¹ of the dents may be readily introduced in the respective spaces *f*¹ separating the bars. See Fig. 5. If desired thin cap plates *e*¹ may be secured to said strips *e* and overlap the ends of the bars, thus locking the latter in place. This construction readily permits the substitution of reeds having coarser or finer dents as the case may be, at the same time of course changing the bar-carrying strips *e* for others corresponding with the reed thus selected.

The operation of the loom, or rather that of the parts illustrated in the drawings, may be described as follows: The alternate links of the continuously traveling chain I, carrying the weft-holding shuttles J, deliver the weft or pick yarn w^1 successively between the upper and lower series of suitably shedded warps w ; the cams carried by the intermediate links of the chain at the same time causing the dents of the reed R to beat up the weft into the web z . The dents adjacent each shuttle support the latter and are maintained temporarily stationary in the rearward or normal alining position, said alinement being formed concurrently and in unison with the shuttle's forward movement. As soon as the shuttle commences to place its yarn w^1 between the warps the next succeeding short sections of the harnesses P are shed so as to inclose said yarn, the forward portion, m^1 , of the cam groove of the link immediately following the shuttle next causes the dents to successively advance axially and engage said yarn and gradually press it home into the web being woven, the cam part m^4 acting to return the dents to the normal alining position again in advance of the next succeeding shuttle. This novel feature is illustrated somewhat diagrammatically and in enlarged scale in Fig. 11. Assuming the chain to be moving toward the right, the advance or unacted upon portion of the weft-yarn, marked w^4 , then being delivered by the corresponding shuttle (not shown), is successively engaged by the deflected dents a , see arrow, which in turn are acted upon by the slightly inclined cam part m^2 (shown in Fig. 3) thus arranging the corresponding dents into a continuously produced series, marked r^2 ; their working edges, indicated at m^5 , being inclined with respect to the normally beaten up weft-yarns of the fabric. Thus it will be seen that instead of fully beating up the weft by a single quick and direct action of the dent the latter is actuated in a gradual or step-by-step manner, as it may be termed. The active dents may be maintained in the fully advanced position in contact with the pick a short distance, corresponding say to the length of the cam part m^3 , Fig. 3, after which the dents are successively retracted by means of the rearward deflecting cam part m^4 into the straight normally inactive position, preparatory to being again acted upon by the next succeeding cam-link to repeat the cycle of operations.

What I claim as my invention, and desire to secure by United States Letters Patent, is:—

1. In a loom, the combination of a reed composed of a plurality of pivotally mount-

ed dents, each capable of movement through a circular arc, mechanism adapted for moving the outer or free ends of the dents in a consecutive order from their normal position to a point near the normal position of the fell of the fabric being woven, means coöperating with said mechanism adapted to complete the said movement of the dents, and means for swinging the dents back to the normal position.

2. In a multiple-shuttle power loom for producing textile fabrics, a continuously traveling chain having each of the alternate links thereof adapted to support and carry a weft-shuttle and having the intermediate links provided with a cam device, in combination with a fixed rod or shaft, and a shuttle engaging reed comprising a plurality of suitably spaced normally alining individual dent members supported by and capable of independent angular movement on said shaft, the upper or free end portions of the dents being constructed so as to extend through the warps and having another portion in continuous contact with said traveling chain, whereby each said cam device of the latter causes the dents to swing successively from the rearward or normal position to beat up the weft-yarn and to return them back again to the normal position to be acted upon by the next succeeding cam, substantially as described.

3. In a loom of the character described, the combination with a reed consisting of laterally separated individually actuated dents, and a shaft having the latter mounted and angularly movable thereon, of a suitably supported traveling cam having the dents operatively connected therewith, said cam being constructed so that when in action, as in moving across the loom, it operates to successively advance the said individual dents in regular order to gradually beat up the weft-yarn and to return said dents to the rearward or normal position immediately thereafter.

4. In a loom of the character described, a reed consisting of suitably mounted individually movable dent members, each having its upper portion adapted to extend freely through the adjacent warps, and having some of the said dents provided with shuttle-supporting means arranged to form a normally alining race-way for the shuttles.

5. In a loom, the combination of a reed consisting of individually movable dent members, means adapted when in use for quickly advancing the dents singly and in a successive order to a position contiguous to the web being produced, and means adapted to coöperate with said other means for completing the advance movement of the dents

in a relatively slower manner to beat up the weft-thread into the fabric.

6. In a loom of the character described, the combination of a reed having the dents thereof pivotally mounted and capable of individual angular movement in vertical planes between and parallel with the warps, and a continuously traveling reed-controlling device having the dents engaging there-
10 with, the latter arranged to quickly and successively advance the dents singly from the normal or alining position to a point near

the weft-thread lying horizontally between the warps, and to then cause each dent to engage the weft and beat it up into the fabric in a relatively gradual manner, and quickly return the dent back to said normal position. 15

Signed at Providence, R. I., this 28th day of October, 1907.

LEVI E. SALISBURY.

Witnesses:

GEO. H. REMINGTON,
HENRY P. STONE.