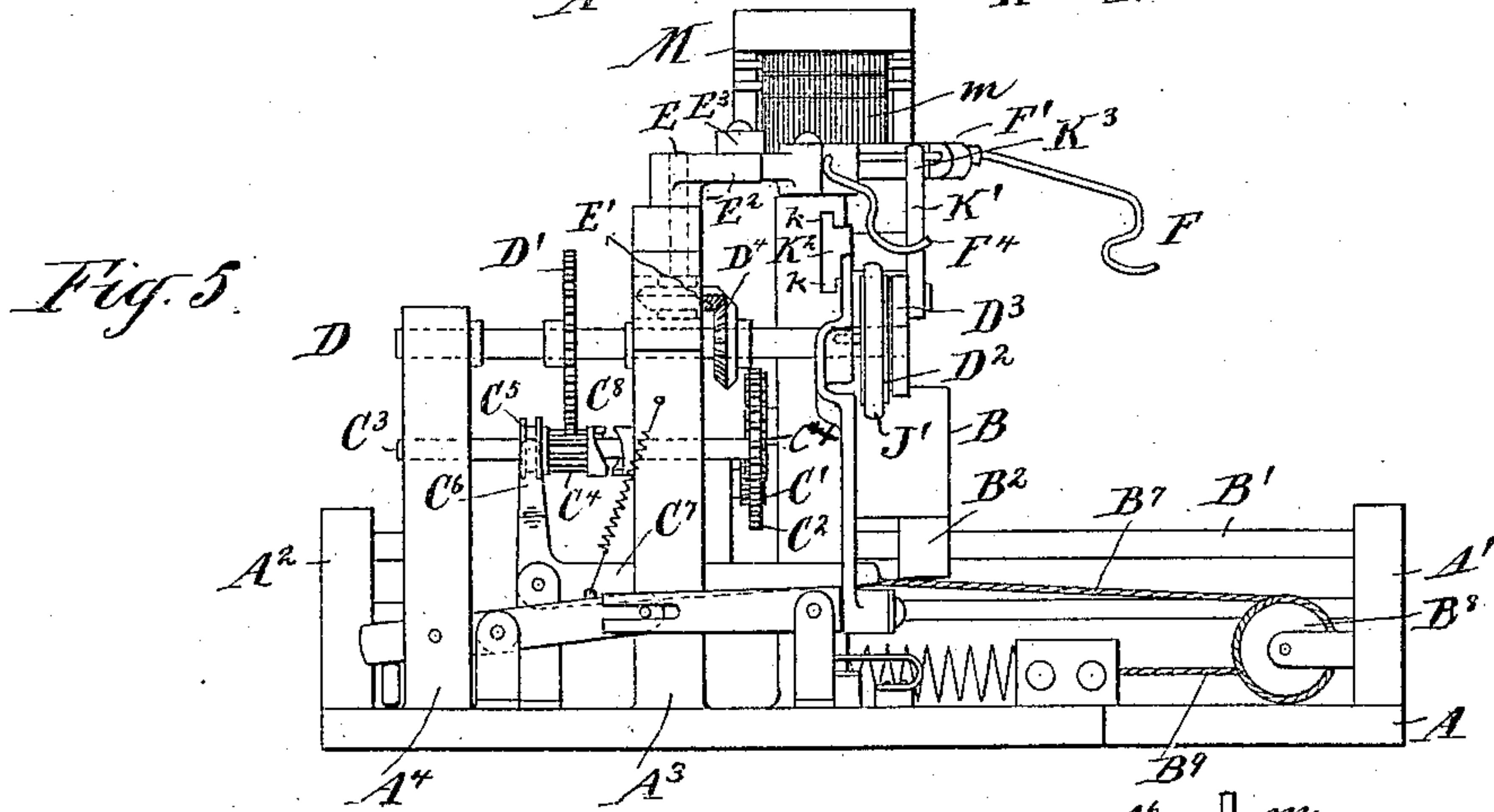
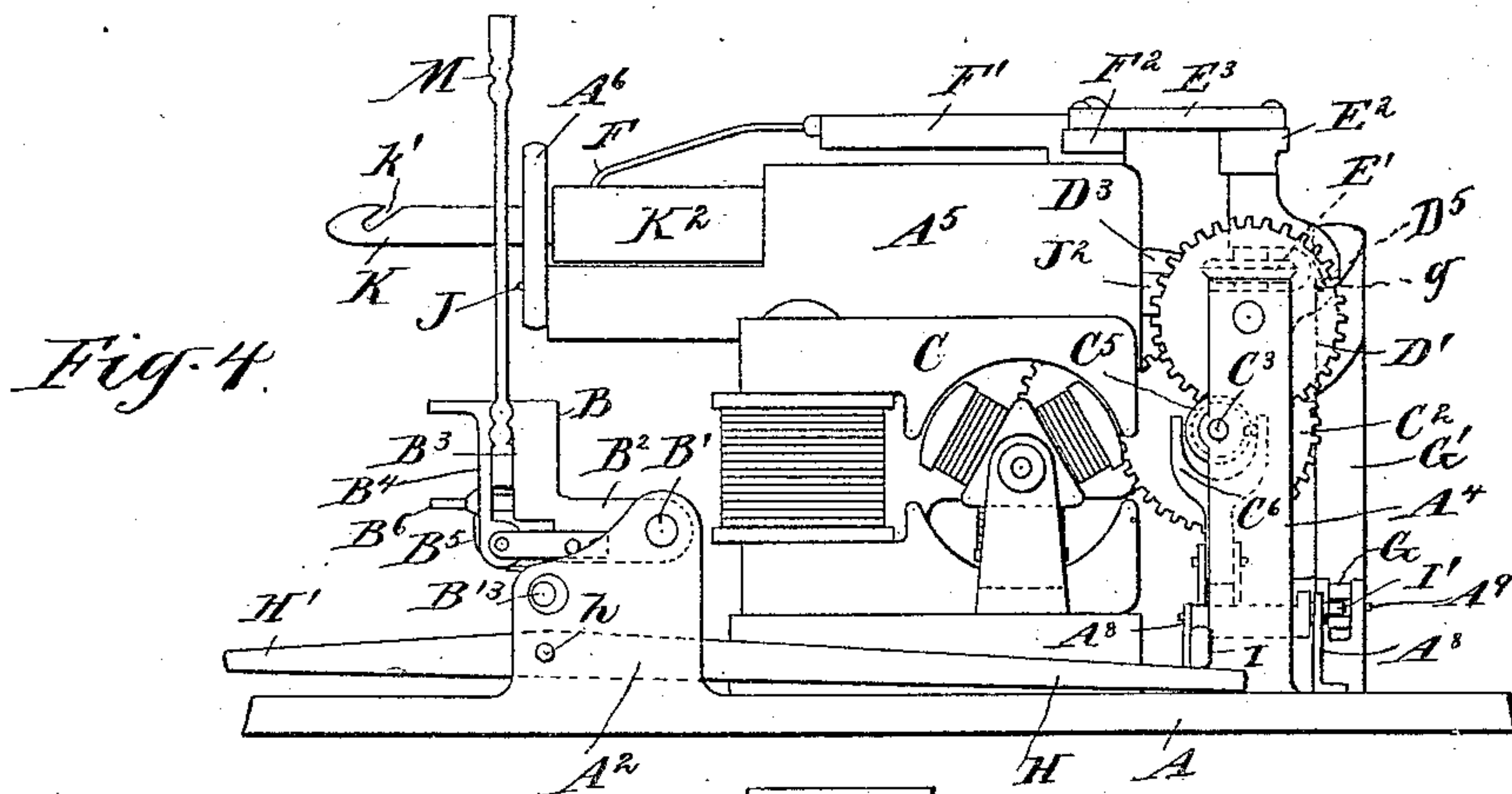
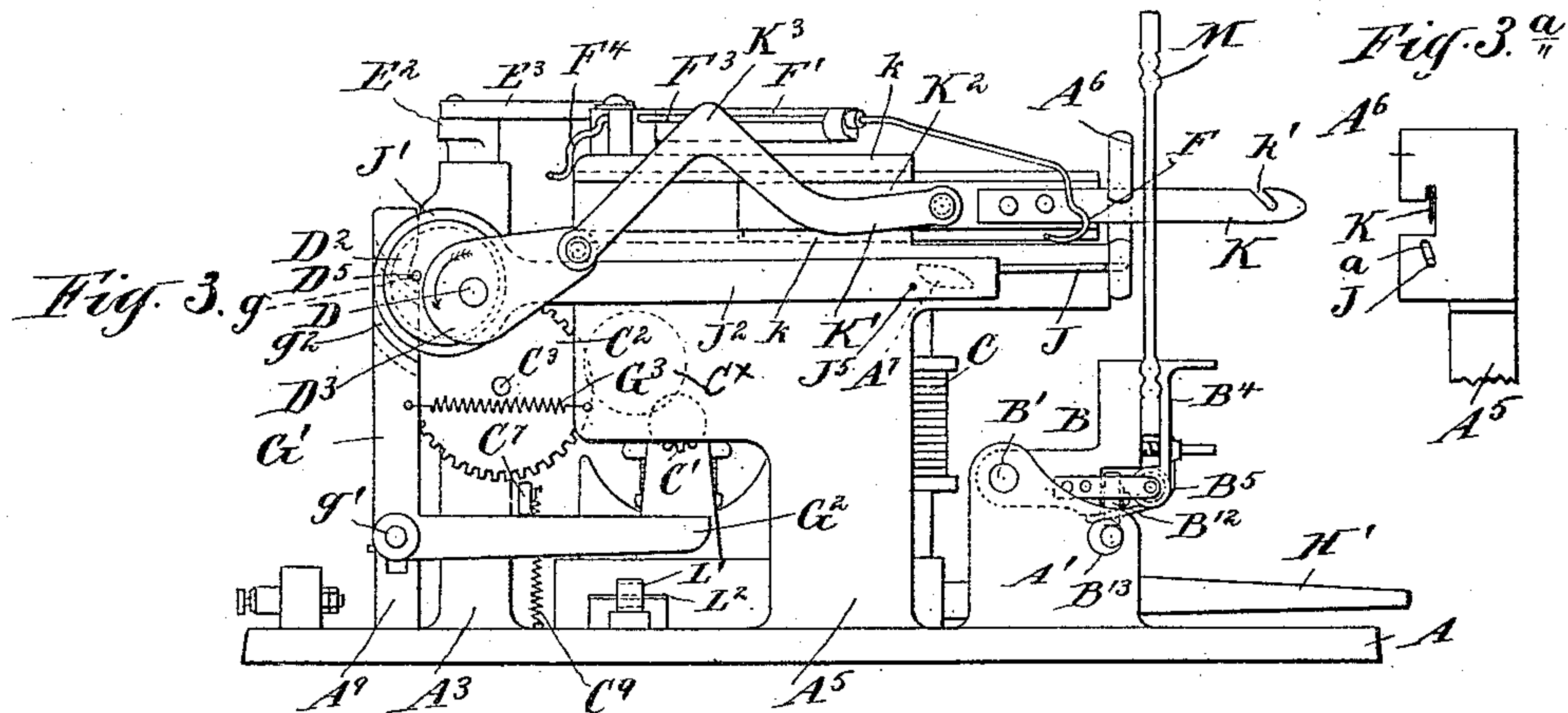


A. P. DIETZ.
WARP DRAWING MACHINE.
APPLICATION FILED FEB. 9, 1909.

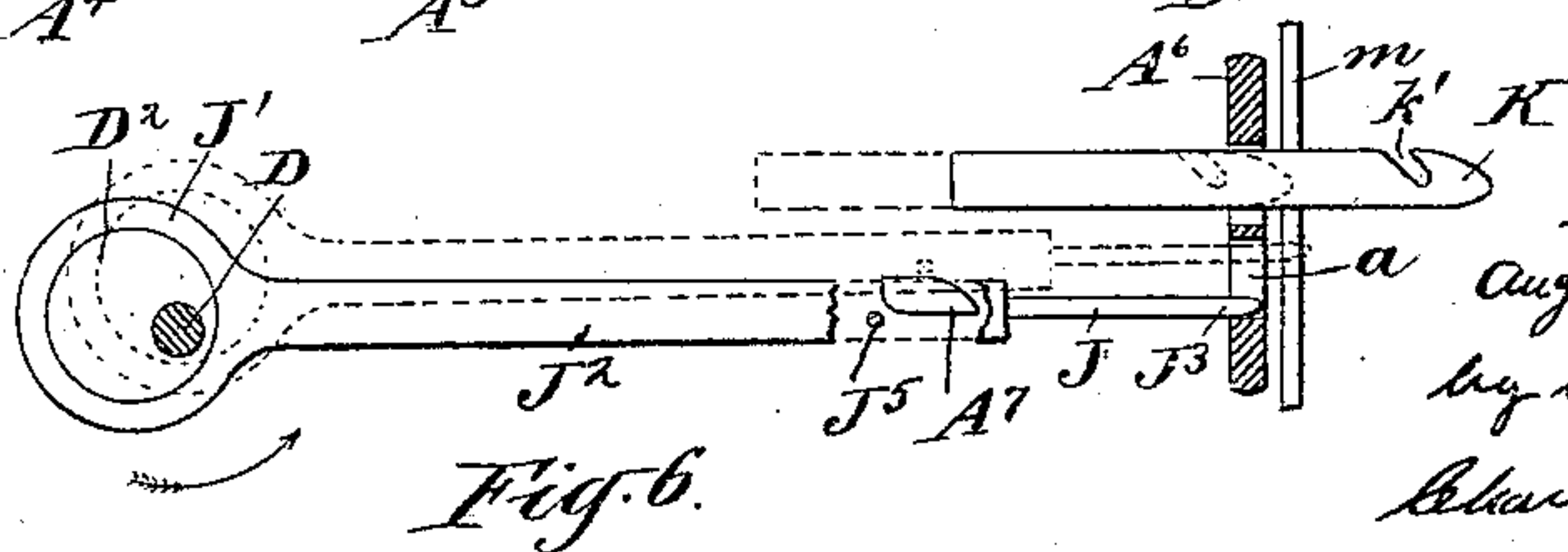
945,022.

Patented Jan. 4, 1910.

2 SHEETS—SHEET 2.



Witnesses:
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C. L. Meyers



Inventor:
August P. Dietz,
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UNITED STATES PATENT OFFICE.

AUGUST P. DIETZ, OF PATERSON, NEW JERSEY.

WARP-DRAWING MACHINE.

945,022.

Specification of Letters Patent.

Patented Jan. 4, 1910.

Application filed February 9, 1909. Serial No. 476,936.

To all whom it may concern:

Be it known that I, AUGUST P. DIETZ, a citizen of the United States, residing in Paterson, in the county of Passaic and State of New Jersey, have invented a certain new and useful Improvement in Warp-Drawing Machines, of which the following is a specification.

The invention relates to machines for drawing-in warp threads, and the object of the invention is to provide mechanism for passing the threads through the reeds and to which the threads may be conveniently presented, drawn through the openings between the dents, and the ends released and thrown clear without subjecting the threads to breaking strains or injurious treatment. This includes improved reed-opening and drawing-in devices by which the spaces between the dents are successively presented and opened with accuracy and certainty, and also means for holding the reed in position with uniform feed tension therefor. Provision is also made for automatically arresting the movements of the mechanism after each drawing-in operation, with means for making such stop without shock, and means conveniently located and operated by the hand for inaugurating a succeeding operation by the act of presenting the next thread.

The invention consists in certain novel features of construction and arrangement by which the above objects are attained, to be hereinafter described.

The accompanying drawings form a part of this specification and show an approved form of the invention.

Figure 1 is a plan view of the complete machine. Fig. 2 is a front elevation. Figs. 3 and 4 are side views of the same, and Fig. 3^a is a front elevation of a portion. Fig. 5 is a rear elevation. Fig. 6 is a side view partly in vertical section showing the opening needle and adjacent portions of the mechanism. Fig. 7 is a plan view of the opening needle on a larger scale, the dents of the reed being in horizontal section.

Similar letters of reference indicate the same parts in all the figures.

A is the base-plate of the machine, carrying the mechanism and adapted to lie upon the breast-beam of the loom and be moved along thereon as required in filling the several reeds which are successively removed for the purpose. At the front are two ver-

tical lugs or bearings A¹ A² in which is mounted a bar B¹ extending through lugs B² B² on the rear of a sliding carriage B having a fixed jaw B³ and a hinged jaw B⁴ actuated by a spring B⁵ and adapted to clamp one end of a reed inserted between the jaws and support it in an approximately vertical position. The jaws are grooved or corrugated to match to the end of the reed and a firm grasp is effected by a thumb-screw B⁶ extending through the loose jaw into the carriage. The latter is moved along the bar by a cord B⁷ attached thereto and wound upon the larger drum B⁸ of a differential windlass turned by the unwinding of a cord B⁹ from the smaller drum B¹⁰ under the contractile force of a spring B¹¹ to which the cord B⁹ is fastened. The spring is secured at the opposite end to the fixed lug A². This arrangement induces a relatively long travel of the carriage for a short contraction of the spring and thus tends to uniformity of tension.

The carriage is supported at the front by a roller B¹² running on a track or rod B¹³ mounted in eccentric bearings in the lugs A¹ A² to permit its adjustment as to height and correspondingly varying the perpendicularity of the reed. The carriage and its reed M are thus moved automatically forward by the engagement and release of successive dents, by mechanism to be described.

C is an electric motor having a pinion C¹ in mesh with an idler C^x which in turn meshes with a gear wheel C² on a short countershaft C³ mounted in vertical standards A³ A⁴ on the base-plate and carrying a loose pinion C⁴ attached to a grooved wheel C⁵ engaged by pins in a yoke C⁶ on a shifting-lever C⁷ by which the pinion may be moved axially on the countershaft C³ and by a clutch C⁸ caused to revolve with the shaft C³ when required. In sliding mesh with the loose pinion is a gear wheel D¹ fast on the main shaft D mounted in the same standards A³ A⁴ above the countershaft C³ and carrying on the inner overhung end an eccentric D² and a crank D³ arranged side by side which actuate the opening needle J and drawing-in hook K respectively, by which the dents *m* of the reed are separated and the warp threads drawn through.

A pitman or connecting-rod K¹ from the crank D³ reciprocates a horizontal slide K² in ways *h* formed in the side face of a vertical bracket or support A⁵, to which the

drawing-in hook is fastened. The latter is a flat thin blade of steel pointed at the free end to pass readily through the space between the dents and having a forwardly inclined notch k^1 at the pointed end in which a warp thread is engaged and on the return movement of the hook drawn through the reed.

The eccentric D^2 is inclosed in a ring J^1 from which extends an eccentric-rod J^2 carrying at its forward end the opening needle J comprising a light bifurcated bar, one leg J^3 of which is longer than the other J^4 and shaped to engage a dent between them and to bend aside the adjacent dents to widen the space. The needle J is supported and guided by a vertical housing A^6 on the front of the bracket A^5 lying adjacent to and just behind the reed; the needle is received in an inclined vertical slot a in this housing and reciprocates therethrough and through the reed. The crank D^3 and eccentric D^2 are so arranged as to alternately thrust and retract the hook and needle and the reciprocations are so timed as to enter the hook in the space formed between adjacent dents above the long leg J^3 of the needle just before the latter is entirely withdrawn. In order to increase the space thus formed and facilitate the entrance of the hook, the needle is forced upward in the reed during the return portion of its movement by the action of a pin J^5 in the rod J^2 on a stationary cam A^7 on the bracket. This cam is shaped to allow the pin to pass idly beneath during the forward or outward movement of the needle but on the return to offer its inclined upper edge in the path of the pin and as the latter rides thereon to raise the needle correspondingly and thus bring the widest part of the space nearer the hook above.

On the main shaft D is a beveled gear wheel D^4 in mesh with a similar gear wheel E^1 on a vertical shaft E in the standard A^3 carrying at its upper end a horizontal crank E^2 to which is connected one end of a link E^3 the other end being pivotally connected to an arm F^2 on a horizontal lever F^1 pivoted on top of the bracket A^5 near the rear and carrying the cast-off hook F . The latter is swung in an arc by the action of the link E^3 and lever F^1 and passes between the point of the retracted drawing-in hook K and rear face of the housing A^6 as the thread is being drawn through, engages the thread, draws it from the notch k^1 and throws the free end to one side clear of the mechanism. As it is necessary for the cast-off hook to be in position thus to catch the thread before the drawing-in hook is retracted it must be sufficiently elevated during its return swing to pass above the drawing-in hook and again drop to its engaging position; this is effected by partially revolving the cast-off hook and thus elevating it.

F^3 is a light shaft, shown as part of the same wire as the cast-off hook, mounted in bearings in the lever F^1 and bent at the rear end to form an arm F^4 which when lifted will partially revolve the shaft portion F^3 and the cast-off hook. The arm F^4 extends over the connecting-rod K^1 , before described, and the bend or cam surface K^3 on such rod acts upon the arm F^4 as the latter is swung inducing the desired turning movement at the proper time and again releasing the arm and permitting it to fall by gravity in position to present its hook to the thread.

On the inner face of the eccentric D^2 is a pin D^5 which at each revolution of the main shaft, and the resultant reciprocations of the drawing-in hook and opening needle, is received in a notch g on a swinging vertical arm G^1 and prevents further movement until again released.

In the use of an electric motor, as here shown, the release is effected through a system of levers and the automatic operation of a switch or electric contact. H is a long starting lever fulcrumed at h in the lug A^2 and having an arm H^1 extending forwardly beyond the edge of the base-plate and conveniently located beneath the hand of the operator in the act of inserting a thread in the drawing-in hook K ; as the thread is placed in the hook the hand by the same downward movement depresses the arm H^1 and elevates the rear end of the lever H on which rests one end of an offset lever I fulcrumed on the base-plate at A^8 ; the other end of the offset lever carries a pin I^1 engaged in the forked end of a lever G fulcrumed at A^9 and carrying on its short end a bell crank lever pivoted thereto at g^1 and standing at a right angle to the lever G , the vertical arm G^1 of the bell crank has the notch g above referred to which receives the pin D^5 on the eccentric. The horizontal arm G^2 of the bell crank extends over a flexible strip L^1 of metal arranged when depressed to make contact with a fixed strip L^2 and complete an electric circuit; the arm G^2 is held against descending by the engagement of the pin D^5 with the vertical arm G^1 , and when freed is urged to descend by the leg C^7 of the shifting lever above described, subject to the force of a spring C^9 and also of a spring G^3 between the vertical arm G^1 and the bracket A^5 .

The electric connections are indicated in Fig. 1; L is a battery or other source of current connected to binding posts on the base-plate from one of which a wire L^3 extends to the flexible strip L^1 , and from the fixed strip L^2 a wire L^4 connects to one pole of the motor. From the other binding post a wire L^5 extends to a switch L^6 and thence to the other pole of the motor.

The operation of the machine may be briefly set forth as follows:—Assuming the

mechanism to be at rest with the drawing-in hook protruding and the pin D^5 engaged in its notch g , the operator places a thread in the hook and by the same movement depresses the arm H^1 of the lever H , tilts the latter and the offset lever I which in turn depresses the forked lever G and swings the vertical arm G^1 of the bell crank lever away from the face of the eccentric and out of engagement with the pin D^5 , at the same time permitting the lever C^7 to descend carrying with it the horizontal arm G^2 of the bell crank to depress the strip L^1 and complete the electric circuit and start the motor; the descent of the lever C^7 also swings its yoke C^6 and slides the pinion C^4 and clutch C^8 into engagement. A revolution is thus inaugurated during which the thread is drawn through the reed and cast off by the hook F , the needle J advanced to engage the next dent, and the drawing-in hook again protruded through the new opening thus formed and the needle retracted and the motion again arrested by the pin D^5 engaging the notch g .

To permit the round of operations to be performed without holding and releasing the lever arm H^1 at the proper times the vertical arm G^1 of the bell crank is provided with a channel g^2 on its inner face through which the pin D^5 may travel after it has been released by the outward and side-wise swing of the vertical arm and the latter may immediately return to its place adjacent to the face of the eccentric without interfering with the movement of the pin until it is struck by the pin and again moved to the vertical to break the electric connection, release the clutch and receive the pin in the notch g .

By arresting the movement after one complete round of operations the operator is given time to select the thread and present it properly, and by initiating the movement by the hand instead of by the thread the action is positive and false starts due to breaking the thread are avoided.

It will be noted that the sweep of the cast-off hook is through a long arc insuring the removal of the thread from the drawing-in hook even though the thread end be quite long. The automatic clutch release mechanism permits the motor to run idly by momentum after the electric contact has been broken, thus avoiding shocks due to the sudden arresting of the moving parts.

The machine is compact, portable and easily manipulated, and by reason of the shape of the base-plate and the location of the several parts of the mechanism thereon, may be conveniently moved and presented for service relatively to the loom.

The source of electric current is shown for convenience as a battery, and the machine may be thus energized but in situations in

which current is available the supply will be taken from an ordinary lamp socket and conveyed by a light cable to the binding posts on the base-plate.

Electric motors of other types than that shown may be employed or other motive power utilized, and various modifications made without departing from the principle of the invention.

I claim:—

1. In a machine of the character set forth, a carriage adapted to support a reed, means for moving said carriage, a reciprocating opening needle arranged to engage a dent in said reed and enlarge the opening between two adjacent dents, and a drawing-in hook independent of and above the needle and reciprocated in such opening, means for reciprocating said needle and giving it also movement toward the said hook.

2. In a machine of the character set forth, a carriage adapted to support a reed, means for moving said carriage, a reciprocating opening needle arranged to engage a dent in said reed and enlarge the opening between two adjacent dents, a drawing-in hook independent of and above the needle and reciprocated in said opening, means for reciprocating said needle and giving it also movement toward the said hook, said needle located relatively to said hook to engage the next succeeding dent and enlarge the next succeeding opening on each withdrawal of said hook.

3. In a machine of the character set forth, a carriage adapted to support a reed, means for moving said carriage, a reciprocating opening needle arranged to engage a dent in said reed and enlarge the opening between two adjacent dents, a drawing-in hook above said needle and reciprocated in said opening, and means for moving said needle toward said hook to increase the size of such opening and facilitate the entrance therein of said hook.

4. In a machine of the character set forth, a carriage adapted to support a reed, means for moving said carriage, a shaft, an eccentric thereon, an eccentric-rod, an opening needle mounted in said rod, and reciprocated by said eccentric, a reciprocating drawing-in hook above said needle, and means for automatically moving said needle toward said hook during a portion of travel of said needle.

5. In a machine of the character set forth, a shaft, an eccentric thereon, an eccentric-rod, an opening needle mounted in said rod, a housing having a slot in which said needle is guided, a pin on said rod, and a fixed cam located in the path of said pin for raising said needle during a portion of its travel, all arranged to serve with a reed and drawing-in hook.

6. In a machine of the character set forth,

a shaft, an eccentric thereon, an eccentric-rod, a pin on said rod, a fixed cam located in the path of said pin for raising the needle during a portion of its travel, an opening
 5 needle mounted in said rod, a drawing-in hook located above said needle and reciprocated by said shaft, means for movably holding a reed in position to receive said drawing-in hook and opening needle, a cast-off
 10 hook arranged to swing between said drawing-in hook and reed, and means for partially revolving said cast-off hook.

7. In a machine of the character set forth, a motor, a shaft driven thereby, a drawing-
 15 in hook and an opening needle reciprocated by said shaft, means for movably holding a reed in position to receive said hook and needle, an eccentric rod in which said opening needle is mounted, a pin on the rod, a
 20 fixed cam located in the path of said pin for raising said needle during a portion of its travel, a stop for automatically arresting said shaft on the completion of a revolution, a clutch between said motor and shaft, and
 25 means for automatically releasing said clutch at the completion of such revolution.

8. In a machine of the character set forth, a motor, a shaft driven thereby, a drawing-
 in hook and an opening needle reciprocated
 30 by said shaft, means for movably holding a reed in position to receive said hook and needle, a stop for automatically arresting said shaft on the completion of a revolution, a lever arranged to be struck by the hand in
 35 the act of inserting a thread in said hook, and means actuated by said lever for moving said stop and permitting said shaft to make another revolution.

9. In a machine of the character set forth,
 40 an electric motor, a shaft driven thereby, a drawing-in hook and an opening needle reciprocated by said shaft, means for movably holding a reed in position to receive said hook and needle, a stop for automatically
 45 arresting said shaft on the completion of a revolution, a lever arranged to be struck by the hand in the act of inserting a thread in said hook, means actuated by said lever for moving said stop, an electric switch closed
 50 by the movement of said stop to energize said motor, and means for automatically opening said switch by the reengagement of said stop.

10. In a machine of the character set
 55 forth, a guide-bar, a carriage slidably mounted thereon, a clamp on said carriage adapted to hold a reed, a track-rod, a roller on said carriage in engagement with said rod, a differential windlass, a cord wound on the smaller drum of said windlass, a spring
 60 tending to unwind said cord, a second cord attached to said carriage and to the larger drum of said windlass and arranged to be wound thereon by the unwinding of the first

mentioned cord to move said carriage yield- 65
 ingly in one direction, a drawing-in hook and an opening needle arranged to reciprocate between succeeding dents of said reed and means for inducing such reciprocations.

11. In a machine of the character set 70
 forth, a horizontal shaft and means for rotating it, an eccentric on said shaft, an opening needle reciprocated by said eccentric, a crank on said shaft, a slide, a connecting-
 75 rod from said crank to said slide, a drawing-in hook mounted on said slide, a horizontally swinging lever vibrated by said shaft, a cast-off hook rotatably mounted in said lever, an arm on said cast-off hook, and a cam surface on said connecting-rod arranged to contact
 80 with said arm and partially rotate said cast-off hook, and means for movably holding a reed in position to receive said opening needle and drawing-in hook.

12. In a machine of the character set 85
 forth, a shaft and an electric motor for rotating it, an eccentric on said shaft and an opening needle reciprocated thereby, a drawing-in hook reciprocated by said shaft, a
 90 lever, a bell crank lever mounted thereon and arranged to be tilted thereby in one direction and to swing thereon in another, a pin in said eccentric arranged to engage a notch in one arm of said bell crank lever to
 95 arrest the rotation of said shaft, and an electric switch arranged to be closed or opened by the other arm of said bell crank lever and control said motor, and means for movably holding a reed in position to receive said
 100 opening needle and drawing-in hook.

13. In a machine of the character set
 forth, a shaft, an electric motor, a clutch
 connecting said motor and shaft, an eccentric
 on said shaft and an opening needle reciprocated thereby, a drawing-in hook reciprocated by said shaft, a lever, a bell crank lever
 105 mounted thereon and arranged to be tilted thereby in one direction and to swing in another direction, a pin in said eccentric arranged to swing said bell crank by contact
 110 against one of its arms and to engage in a notch thereon to arrest the rotation of said shaft and released by the tilting movement, an electric switch arranged to be opened or closed by the swinging movement of said
 115 bell crank, and connections from said bell crank to said clutch whereby the opening of said switch disengages said clutch, and means for movably holding a reed in position to receive said opening needle and draw-
 120 ing-in hook.

In testimony that I claim the invention above set forth I affix my signature, in presence of two witnesses.

AUGUST P. DIETZ.

Witnesses:

WILLIAM W. UHLINGER,
 WALTER SCHNEIDER.