

(No Model.)

4 Sheets—Sheet 1.

C. M. HINE.
PLAITING MACHINE.

No. 422,215.

Patented Feb. 25, 1890.

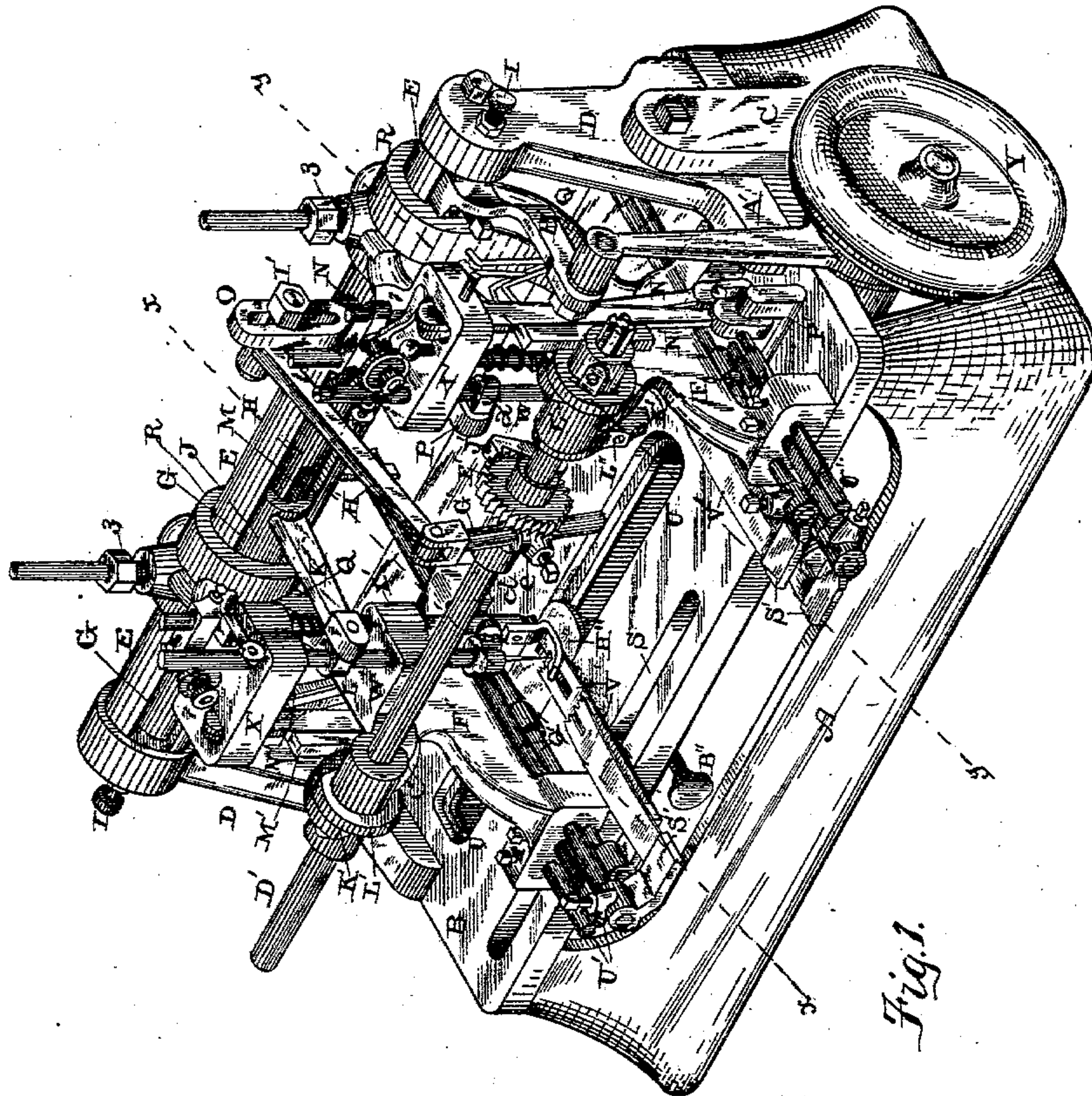


Fig. 1.

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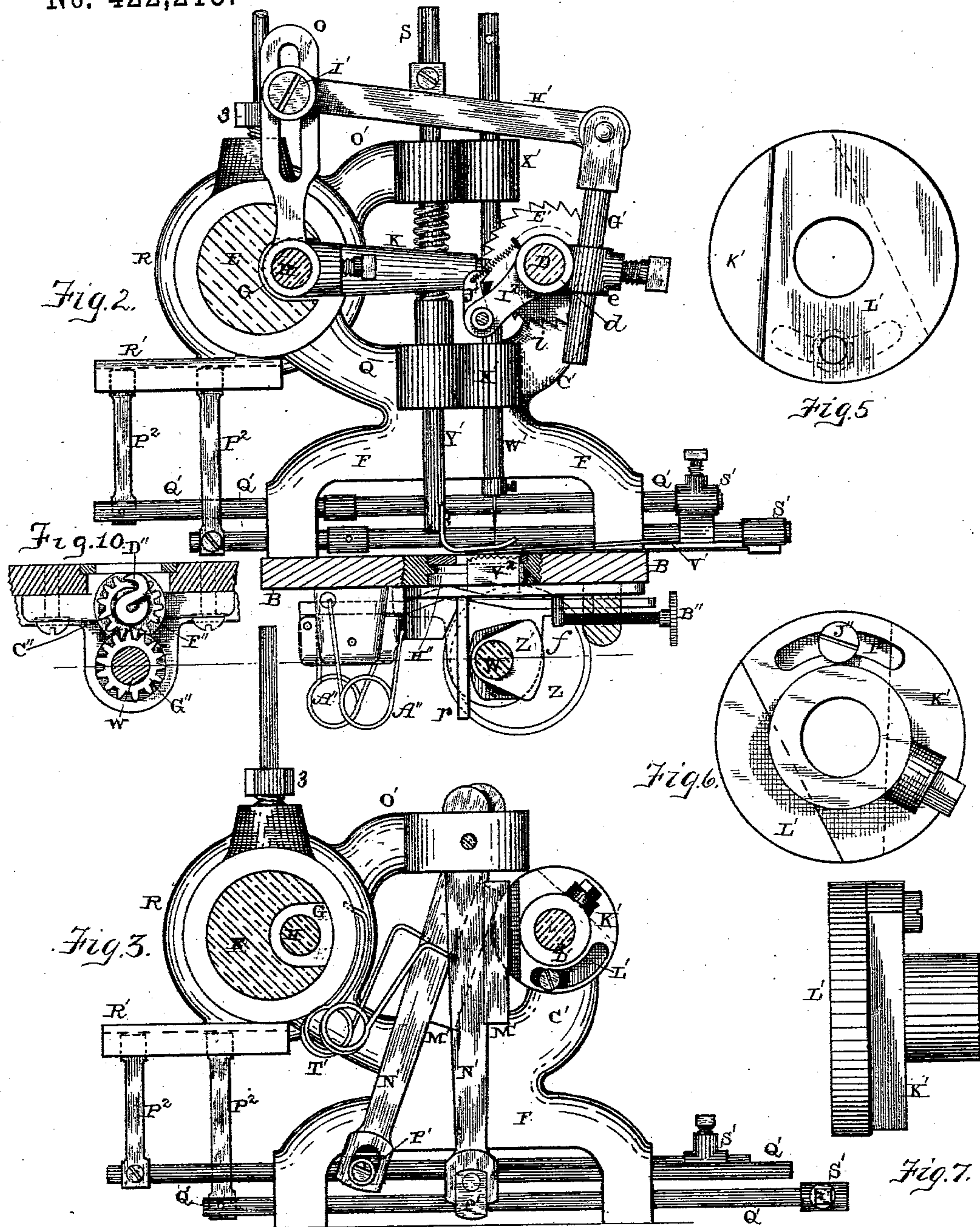
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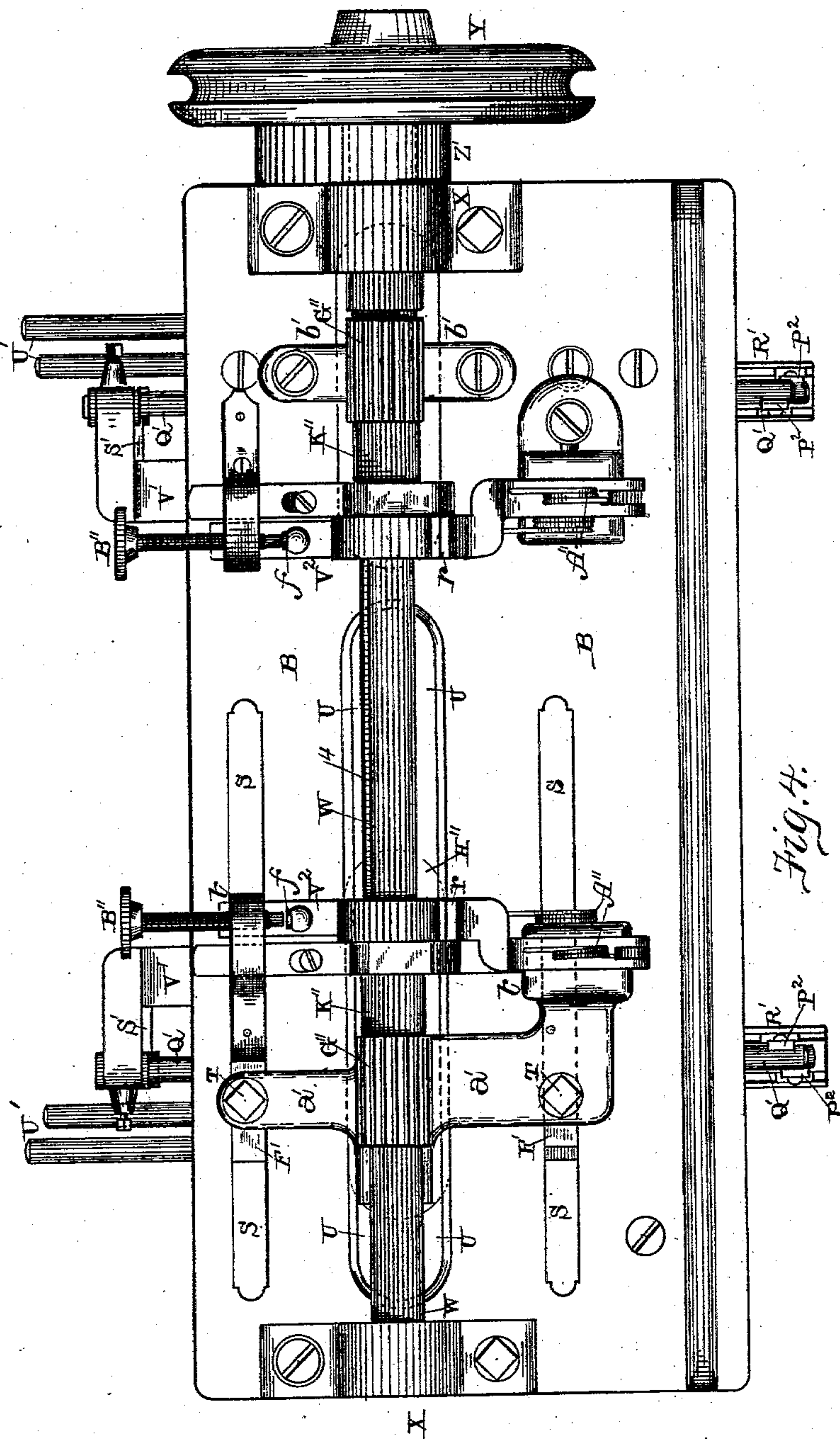


Fig. 4.

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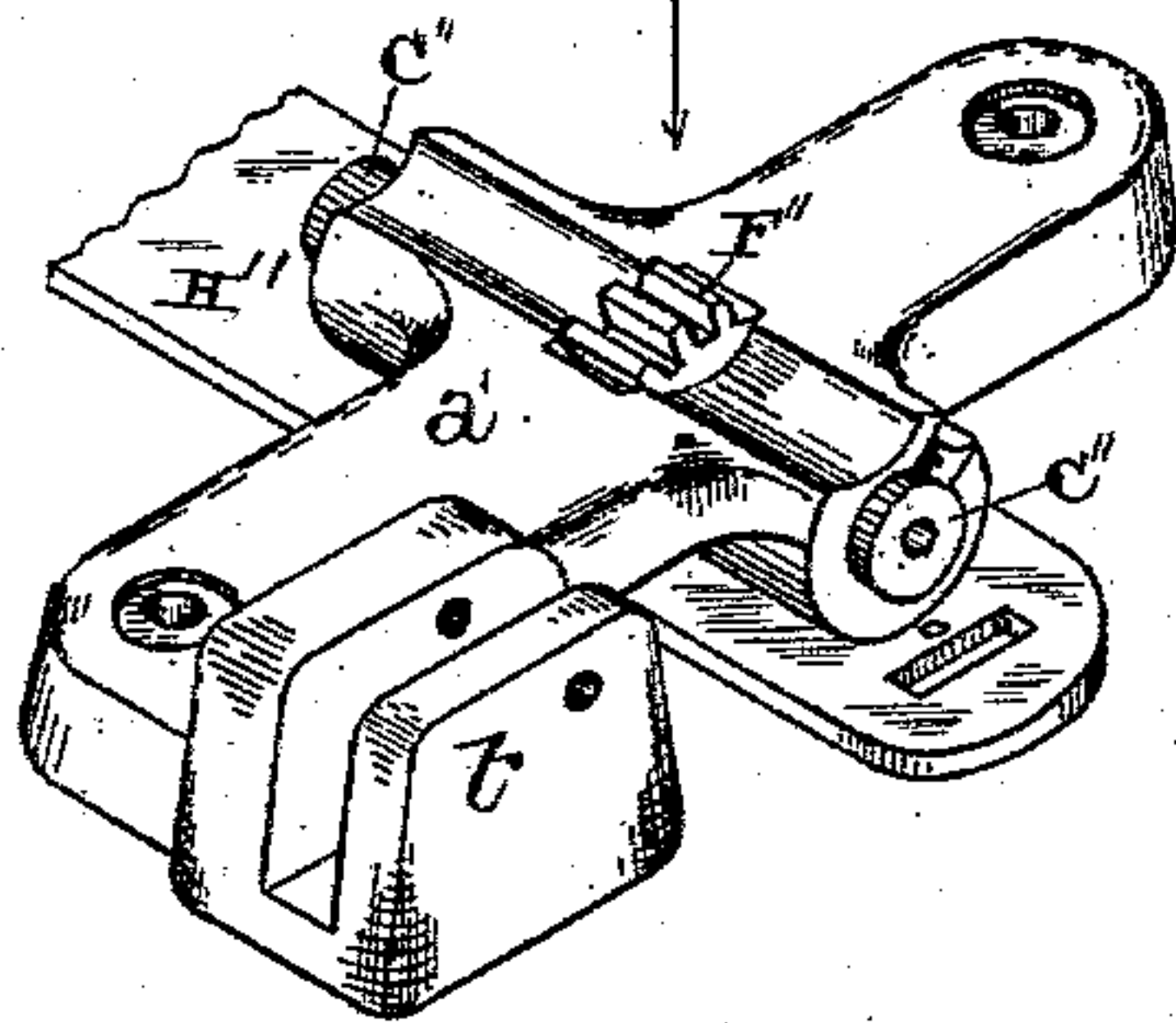
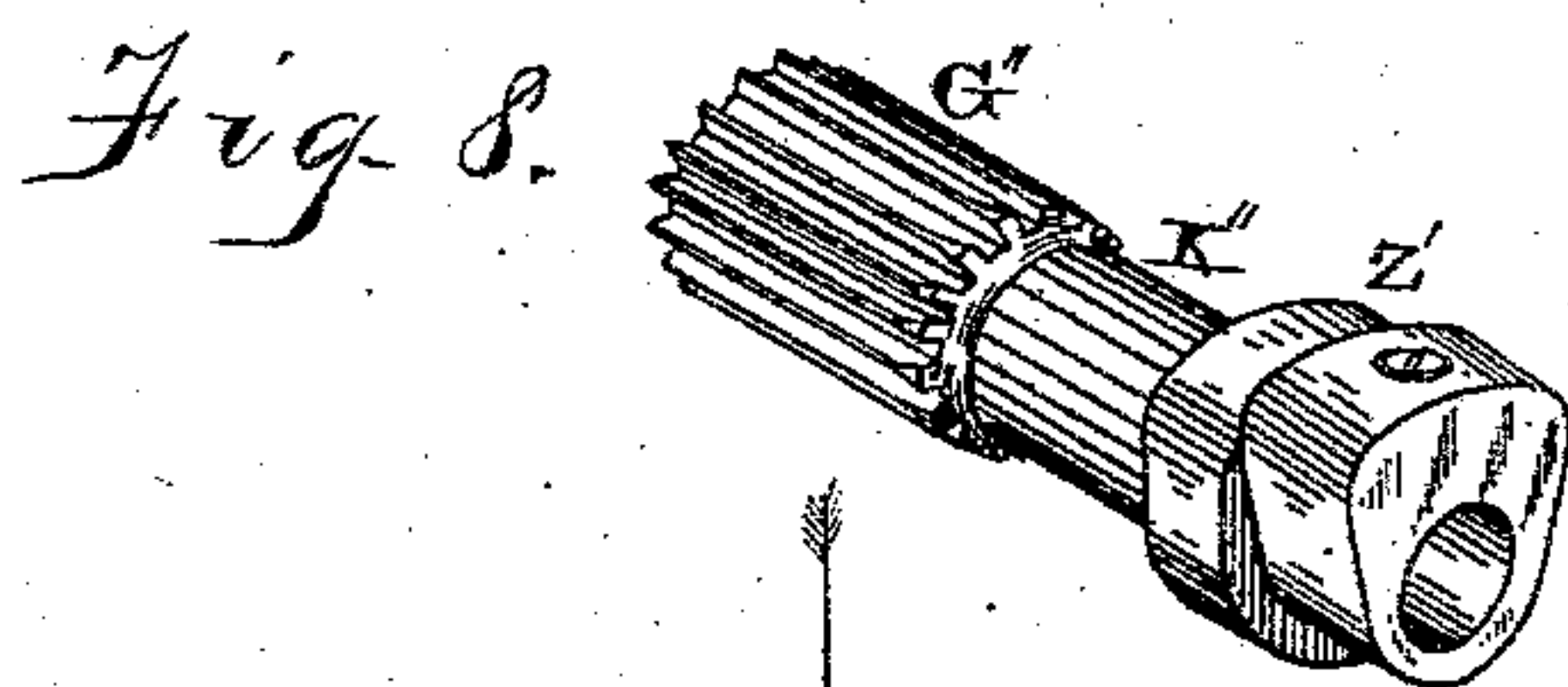


Fig. 9.

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UNITED STATES PATENT OFFICE.

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PLAITING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 422,215, dated February 25, 1890.

Application filed September 18, 1889. Serial No. 324,323. (No model.)

To all whom it may concern:

Be it known that I, CHARLES M. HINE, of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Double-Plaiter Machines; 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 pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to an improvement in double-plaiting machines; and it consists in the combination and arrangement of parts, which will be more fully described hereinafter, and especially pointed out in the claims.

The objects of my invention are to produce a double-plaiter machine of the special construction hereinafter described, and illustrated in the accompanying drawings, which enables the distance between the stitching mechanisms and plaiting mechanisms to be varied at will, according to the width of the material being plaited, to regulate the movement of the plaiter-blades, and to shift their relative position so as to lay the plaits on each side alternate one to the other, or both in the same direction, or in a reverse direction, or one side of the plait wider than the other, as desired, to increase or diminish the speed of the plaiter-operating shaft relative to the revolutions of the main shaft and to the movement of the oscillating shaft, and to assemble together the parts, and to so construct the supporting-frame that these objects are readily, easily, and simply accomplished.

Figure 1 is a perspective of a machine which embodies my invention complete. Fig. 2 is a cross-section taken through Fig. 1 on the dotted line *x x*, looking toward the rigid casting. Fig. 3 is a similar view taken on the dotted line *y y*, looking toward the rigid casting from the reverse side. Fig. 4 is a plan view of the under side of the machine. Figs. 5 and 6 are side views of the cams. Fig. 7 is an edge view of the cams. Fig. 8 is a perspective of the gearing and feeding cams. Fig. 9 is an inverted perspective of the looper-

shaft and the bearing therefor. Fig. 10 is a detached vertical section showing the gears *G''* and *F''*, the shafts *W* and *C''*, and the hook *D''*.

A represents the base of the machine, upon the top of which rests the horizontal base-plate *B*, upon which and to which the mechanisms hereinafter described are supported and journaled. This horizontal plate *B* is pivoted to the upper ends of the vertical supports *C*, which rise upward from the ends of the base *A*, near its rear side, as shown, and which enables the horizontal plate to be turned upward for the purpose of giving ready and easy access to the mechanism secured to its under side. Extending upward from each end of this plate *B*, near its rear side, are the vertical main supports *D*, between which the horizontal beam *E* is held in any suitable manner. Also extending from this plate *B*, inside of the supports *D*, are the castings *F F'*, and which are preferably of the peculiar shape here shown, for the purpose of forming bearings for the sliding plaiter-rods, the needle-bars, and the presser-bars.

The horizontal beam *E* is provided with a longitudinal groove *G*, preferably *U*-shaped, as shown, and in which the oscillating shaft *H* is placed, and which shaft is supported at each end by conical adjustable bearings formed by the screws *I*, which pass through the supports *D* and into conical cavities formed in the ends of the shaft. Secured to this shaft is a sleeve *J*, which carries an arm *K*, that projects outward through the groove in the beam and has pivoted to its outer end a needle-bar socket *L*. This arm is moved back and forth by having the sleeve *J* slide easily upon the shaft *H*, and is oscillated with said shaft by providing the sleeve with an inwardly-extending projection that fits and slides in the longitudinal groove *M* made in the shaft. Also made in the horizontal beam *E* is a transverse groove *N*, in which the upright slotted lever *O* moves as it is oscillated by the operating-shaft *H*, to which it is attached. A second arm *P*, similar to the arm *K*, is secured to the shaft *H* at the right-hand side of the machine, and which also carries

at its outer end the pivoted needle-bar socket *a*, similar to the socket *L*, which is pivoted to the outer end of the arm *K*. The castings *F F'* have extending rearward therefrom the arms *Q*, which are provided with the sleeves *R*, that surround the beam *E* and assist in supporting them in an upright position. These sleeves are provided with set-screws *3*, by means of which they are clamped in any desired position upon the beam. The casting *F* at the right of the machine is rigidly attached to the horizontal plate *B*, while the casting *F'* at the left of the machine is moved back and forth upon the plate for the purpose of adjusting it nearer to or farther from the plaiting and stitching mechanism placed at the opposite end of the machine.

Made in the plate *B* are the longitudinal slots *S*, through which pass the screws *T*, Fig. 4, which screw into the base of the casting *F'*, and by means of which the casting is readily adjusted and securely held in its adjusted position. Also made in this plate *B* is a longitudinal slot *U*, in which the feeder *V²* and needle-plate move back and forth with the casting *F'* and the mechanism which is attached thereto.

W indicates the main operating-shaft, which is journaled to the under side of the plate *B* in the bearings *X*, which are secured to the opposite ends of said plate, and to the outer extending end of which shaft is secured the ordinary band-operating wheel *Y*, and between this wheel and the plate upon said shaft is the eccentric *Z*. The pitman *A'* is provided with a sleeve at its lower end that surrounds the eccentric *Z*, and has its upper end pivoted to the outer end of the lever *B'*, which has its inner end secured to the oscillating shaft *H*, and by means of which said shaft is oscillated through the medium of the main shaft and the cam *Z* secured thereto.

Extending outward and upward from the castings *F F'* are the supporting-arms *C'*, in which is journaled the plaiter-operating shaft *D'*, which extends parallel with the beam *E* and the oscillating shaft *H*, which is placed therein. Secured upon this plaiter-operating shaft *D'* is a ratchet-wheel *E'*. Placed loosely upon this shaft is an oscillating sleeve *d*, which is provided with a socket *e* for the reception of the vertical arm *G'* and a set-screw for securing the said arm at any desired adjustment.

Pivoted between arms secured to or formed upon the upper end of the rod *G'* is the connecting rod or arm *H'*, which has its opposite end pivoted upon a screw-threaded pin *I'*, which moves back and forth in the slot made in the upper end of the oscillating arm *O*. Also secured to the downwardly-projecting arm *I²* of the sleeve *d* is the spring-actuated pawl *J'*, which engages the ratchet-wheel *E'*, secured upon the shaft *D'*.

Placed upon each end of the plaiter-operating shaft *D'*, outside of its bearings, are the

two cams *K' L'*, which engage the hardened surfaces *M'* of the pivoted operating-levers *N'*, which have their upper ends pivoted in the arms *X'*, extending outward from the sleeves *R*. The lower ends of these levers *N'* are loosely connected to the sockets *P'*, which are secured, respectively, to the sliding rods or bars *Q'*, which have their bearings in the bases of the castings *F F'*. Attached to the rear ends of these sliding rods *Q'* are upwardly-projecting guiding-arms *P²*, which have their upper ends engaging horizontal grooves made in the horizontal arms *R'*, which extend outward from the sleeves *R*. The object of these guiding-arms *P'* is to secure the sliding rods *Q'* in their proper position and prevent them from having any turning or oscillating movement whatever. Secured upon the opposite ends of these sliding rods *Q'* are the hangers *S'*, which carry the plaiter-blades, and which have their inner ends provided with a socket and a set-screw, by means of which they are secured to the said rods and either adjusted back and forth thereon or entirely removed to allow the plaiter-blades to be sharpened, or to have others containing different-shaped plaiter-blades secured in their stead.

For the purpose of returning the levers *N'* to their original position after they have been operated upon by the cams *K' L'* the springs *T'* are provided, and which have their ends secured, respectively, to the sleeves *R'* and the said levers. The movement of the lower ends of the levers *N'* is adjusted by means of the endwise-moving stop-rods *U'*, which pass through the base or feet of the castings *F F'*, and are held in their adjusted position by means of set-screws, and which rods engage the lower ends of the levers. The plaiter-blades *V'* have their outer ends rigidly attached to the outer ends of the hangers in any desired manner.

W' indicates the needle-bars, which pass vertically through arms *X'*, formed upon the castings *F F'*, and which arms also form bearings for the presser-bars *Y'*.

Secured to the main shaft *W* are the feeder-operating cams *Z'*, which as the main shaft revolves engage a downwardly-projecting arm *r* of the feeder *V²*, and which, together with the springs *A''*, impart to the feeder up-and-down and back-and-forth motions, thus feeding the material which is being plaited. The speed at which the material is fed is regulated by the adjusting-screw *B''*, which has its inner end engaging downwardly-projecting pins *f*, secured to the feeder *V²*. The bearings *t* for the adjustable feeder are supported independent of the horizontal bed-plate *B*, and are engaged by or connected to the adjustable casting *F'*, so that when this casting and the stitching mechanism are moved nearer to the casting *F* the feeder is moved with it.

Journaled in castings *a' b'* under the horizontal bed-plate, just above the main driving-

shaft, are small supplementary shafts C'', to which are secured the hooks or loopers D'', as shown in Fig. 2. Also secured upon these supplementary shafts C'' are the cog-wheels F'', which engage the cog-wheels G'', secured to the main shaft below the cog-wheels F''.

Placed in the groove U, made in the bed-plate, is the sliding needle-plate H'', which moves back and forth with the stitch-forming mechanism and forms a bearing for the material which is placed between it and the presser-foot while being plaited. The revolution of the plaiter-operating shaft D' relative to the oscillations of the shaft H is regulated by means of the adjustable pin I' and the adjustable bar G'. When it is desired to increase the speed of this shaft D', the rod G' is lowered in the socket of the sleeve F' and the pin I' moved upward in the slot formed in the oscillating lever O. Should it be desired to decrease the revolution of this shaft D', the rod G' is raised and the pin I lowered, which shortens the distance of the pin I from the center of the oscillating shaft, thus shortening the distance traveled by said pin, and lengthens the distance of the upper end of the rod G' from the center of the shaft D', thus decreasing the number of teeth engaged by the pawl J'. By this means of adjustment the pawl J' is made to engage one or more cogs upon the ratchet-wheel E, thus either decreasing or increasing its speed relative to the oscillations made by the shaft H and regulating the rapidity at which the plaits are formed.

The cog-gearing G'' and the feed-cams are cut on one piece, which slides upon the main shaft in the form of a sleeve K'', and the main shaft is provided with a longitudinal groove 4 to permit the feed and looper devices to slide along upon it to any required distance at the same time that the upper portion of the stitching mechanism and plaiting device is moved, they being attached thereto by screws through the slots in the bed-plate.

In order to prevent the operating-shaft D' from having any backward movement as the pawl J' moves backward over the ratchet-wheel E' or from any pressure of the levers on the cams, a brake L'' is provided, which consists of a vertical standard extending upward from the base-plate B and surrounding the shaft D'. Passing through this standard, which is provided with a slit of suitable length below the shaft D', is a screw, by means of which the brake L'' is made to grasp the shaft with any desired degree of pressure.

From the above description it will be seen that the stitching mechanism, feeding mechanism, plaiting mechanism, and the loop-forming mechanism are all operated by the main shaft W, and that one set of such mechanisms is so constructed that it can be moved backward and forward upon the bed-plate B, thus regulating the distance between the two stitching and plaiting mechanisms according

to the width of the material which is being plaited.

The cams K' are secured to the operating-shaft D', while the cams L' are loosely placed upon the shaft and provided with a circular slot I'', through which passes the securing-screw J''. By means of this construction these two cams can be quickly and readily adjusted in relation to each other so as to give the sliding bars and the plaiter-blades secured thereto any desired movement in relation to each other. The style of the plait can also be varied by causing the plaiter-blades at one of the stitch-forming mechanisms to travel farther than the other, or at a different period of time from the other, thus laying the plaits on each side alternate one to the other, or both in the same direction or in a reverse direction, or to make one side of the plait wider than the other. This construction also enables the stitch-forming mechanism and the plaiting mechanism at the left hand of the machine to be readily and quickly adjusted in relation to the other stitch forming and plaiting mechanism without in any manner interfering with the operation of the machine.

While I here show one form of cams for operating upon the pivoted levers, I do not limit myself to this particular form, for it may be varied and a cam of any desired shape placed in its stead. These cams being adjustable upon the shaft and adjustable in relation to each other, they may be so arranged as to operate alternately or in unison, or the blades of each separate pair be operated alternately or in unison with a like blade in the other pair. These adjustments also permit the forming of a box-plait, right-hand side plaits, or left-hand side plaits on either or both edges of a fabric at the same time.

Having thus described my invention, I claim—

1. In a double-plaiter, the combination, with the bed-plate, the main shaft, an oscillating shaft carrying needle-bar-operating arms, and a plaiter-operating shaft operated by the oscillating shaft, of two needle-bars operated by the oscillating shaft, two plaiters operated by the plaiter-shaft, and an operating-arm connecting the oscillating and main shafts, substantially as shown and described.

2. In a double-plaiter, the combination of a single main shaft, an oscillating shaft, two needle-bars operated thereby, a rod connecting the main and oscillating shafts, and two separate shafts carrying loopers placed at opposite ends of the main shaft and engaging gears upon the main and looper shafts, substantially as specified.

3. In a double-plaiter, the combination of two stitching and plaiting mechanisms, one of the plaiting and stitching mechanisms being adjustable in relation to the other, the main shaft which operates both, the feeding mechanisms, the looper-shafts, the cams,

gears for operating the looper-shafts, and cams for operating the feeder, the cams and gearing being formed of one piece, whereby they can slide upon the shaft to any desired extent, for the purpose set forth.

4. In a double-plaiter, the combination, with two stitching and plaiting mechanisms, the main shaft, intermediate arms and shafts for operating them by the main shaft, and the bed-plate provided with longitudinal slots, of an adjustable casting which supports one stitching and plaiting mechanism, feeding and looping mechanisms, and bearings for them below the bed-plate, and bolts or screws which pass through the slots and connect the said bearings to the adjustable casting, whereby the feeding and looping mechanisms are adjusted with the plaiting and stitching mechanisms, substantially as specified.

5. In a double-plaiter, the combination of the bed-plate provided with vertical supports, the beam secured thereto, provided with a longitudinal groove, the oscillating shaft placed in the groove, bearings therefor at each end, arms connected thereto for operating the needle-bars and plaiter-shaft, the plaiter-shaft, and means whereby the main shaft operates the oscillating shaft, one of the needle-bar arms being adjustably connected to the oscillating shaft, whereby it can be adjusted through said longitudinal groove, substantially as set forth.

6. In a double-plaiter, the combination of the bed-plate, the main shaft, the oscillating shaft, a cam upon the main shaft, an operating-arm upon the oscillating shaft, a rod connecting the cam and the arm, a plaiter-operating shaft, two needle-bars, arms secured to the oscillating shaft for operating the needle-bars, two sets of plaiters, levers for operating them, and cams upon each end of the plaiter-shaft for engaging the levers, substantially as described.

7. In a double-plaiting and stitching machine, the combination, with the bed-plate, the main shaft, a longitudinal oscillating shaft operated by the main shaft, and a parallel longitudinal plaiter-operating shaft, of a plaiting mechanism placed at each end of the bed-plate and adjustable cams secured to opposite ends of the plaiter-operating shaft for operating the plaiters, whereby the movements of the two plaiters can be regulated in relation to each other for producing varied styles of plaits, substantially as set forth.

8. In a double-plaiter, the combination of the bed-plate, the main shaft, the oscillating shaft operated thereby, needle-bar arms connected to the oscillating shaft, a slotted arm secured to said shaft, a plaiter-operating shaft, a ratchet-wheel secured to the plaiter-shaft, a sleeve placed on the plaiter-shaft and provided with a pawl for engaging the ratchet-wheel and with a socket, a vertically-adjustable rod secured in said socket, and an arm connecting the slotted arm and the adjustable

rod, whereby the pawl is made to engage one or more ratchet-teeth, and the revolutions of the plaiter-shaft relative to the movements of the oscillating shaft are regulated, substantially as described.

9. A supporting-frame for a double-plaiter, consisting of a bed-plate, the vertical supports, the beam secured between them, the vertical castings having arms provided with sleeves which surround the beam, and projections forming bearings for the needle and presser-foot bars and supports for the upper ends of the plaiter-operating levers, bases or feet provided with journals for the sliding plaiter-rods, and arms provided with bearings for the plaiter-operating shaft, whereby the operating parts are compactly and adjustably supported in relation to each other.

10. In a double-plaiting machine, the combination, with the bed-plate provided with longitudinal slots for the passage of the screws which secure the adjustable casting in place and a third longitudinal slot into which projects the feeder and in which slides the needle-plate of the main shaft below the bed-plate, of the stationary casting F, the adjustable casting F', the stitch-forming and plaiting mechanisms supported by the adjustable casting, intermediate arms and shafts connecting with the main shaft, the feeder, the cams for operating it, the looper-shaft, and the transverse casting beneath the bed-plate, provided with bearings for the looper-shaft and feeder, and screws or bolts which pass through the said casting and the slots and secure it to the adjustable casting F', whereby they are all adjusted laterally together, substantially as set forth.

11. In a double-plaiter, the combination of the bed-plate, the main shaft, the oscillating shaft, the plaiter-shaft, means for operating it, the needle-bars, arms secured to the oscillating shaft and connected to the needle-bars, an arm secured to the oscillating shaft and connected to the main shaft by a rod, the sliding rods carrying plaiter-blades and sockets, the pivoted levers having their lower ends loosely connected to the sockets, springs for returning the levers to position, adjustable cams secured to each end of the plaiter-shaft which engage the said levers, and adjustable stop-rods, which engage the lower ends of the levers for limiting their movements, whereby the said plaiter-blades can be given a simultaneous motion, an alternate motion, or one pair a shorter motion than the other, for producing plates of various styles, substantially as specified.

12. In a double-plaiter, the combination of the bed-plate, the supporting-beam, the supporting-castings having sleeves provided with the slotted horizontal arms R', the sliding rods carrying the plaiter-blades, the guiding-arms extending upward therefrom and engaging the slotted arms R' for preventing the sliding rods from turning with the stitch-

forming mechanism, the levers for operating the sliding rods, the main shaft, and intermediate mechanism for operating the stitch-forming mechanism and the said levers, substantially as specified.

13. In a double-plaiter, the combination of two stitch-forming mechanisms, a main shaft, intermediate shafts and arms for operating them, a plaiter-shaft and means for operating it, two pairs of sliding rods, two pairs of plaiter-blades secured, respectively, thereto one above the other, a separate lever for operating each rod, and two adjustable cams upon each end of the plaiter-shaft,

which engage, respectively, the said levers, each pair of cams being adjustable independent of the other, whereby either pair of blades may be operated alternately or in unison with the other pair, or each blade in each pair operated alternately or in unison, whereby greatly-varied plaits are formed, substantially as shown and described.

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

C. M. HINE.

Witnesses:

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WM. K. GRAY.