

(No Model.)

5 Sheets—Sheet 1.

W. P. UHLINGER.

MACHINE FOR LACING JACQUARD CARDS.

No. 397,763.

Patented Feb. 12, 1889.

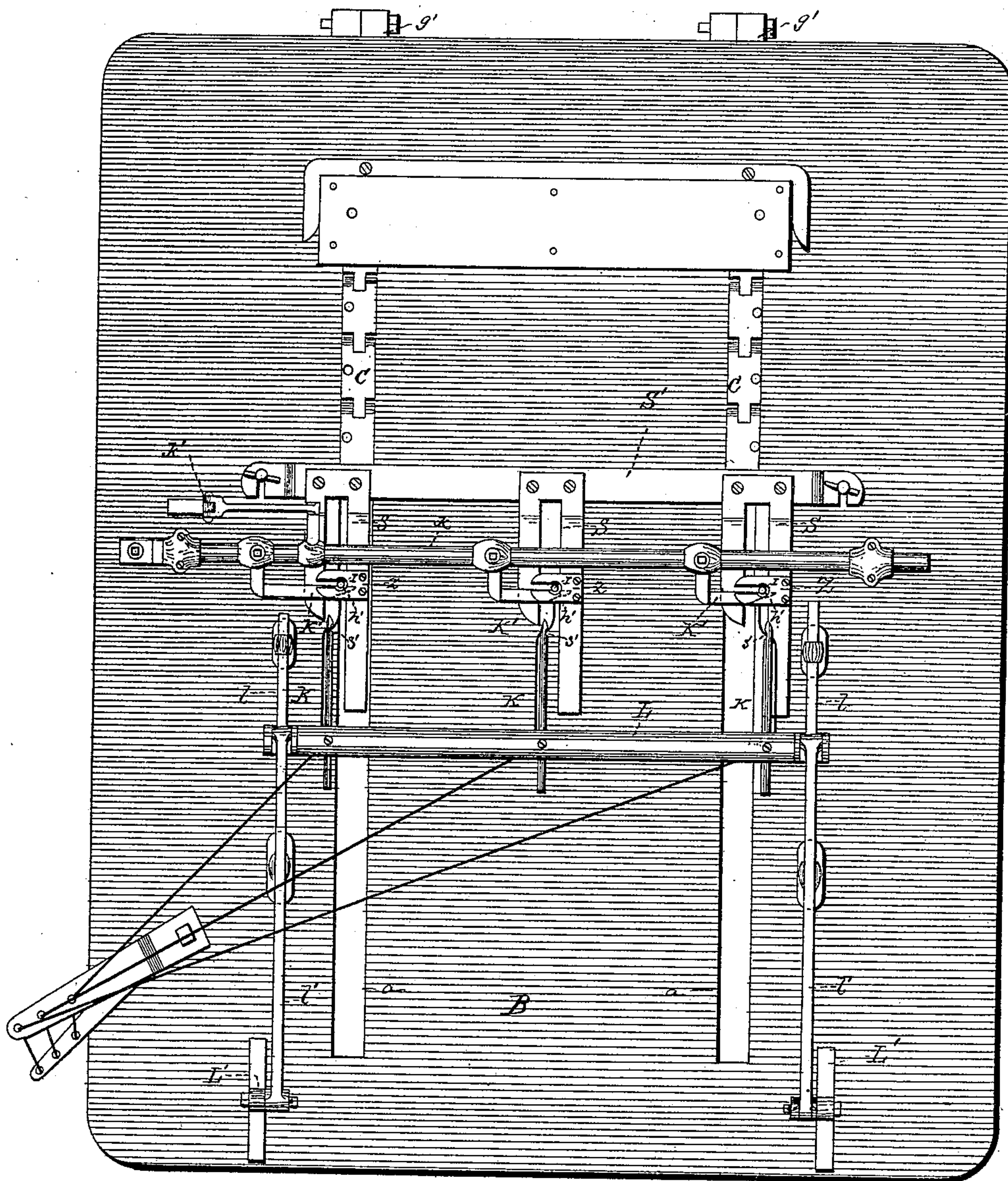


Fig. 1.

WITNESSES,
N. B. Harris -
C. R. Ferguson.

INVENTOR,
William P. Uhlinger,
by E. W. Anderson.
Attorney

(No Model.)

5 Sheets—Sheet 2.

W. P. UHLINGER.

MACHINE FOR LACING JACQUARD CARDS.

No. 397,763.

Patented Feb. 12, 1889.

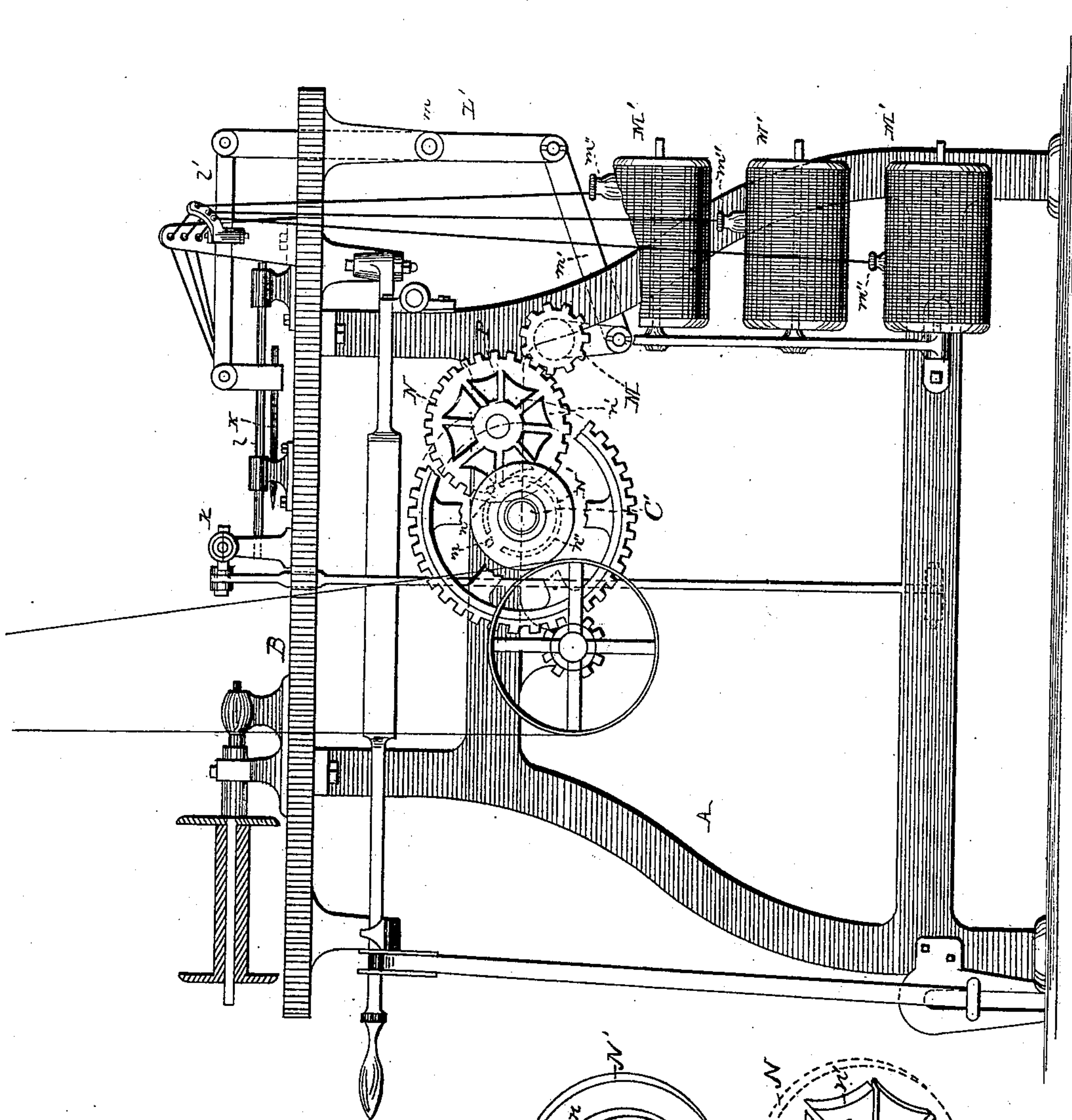


Fig. 2.

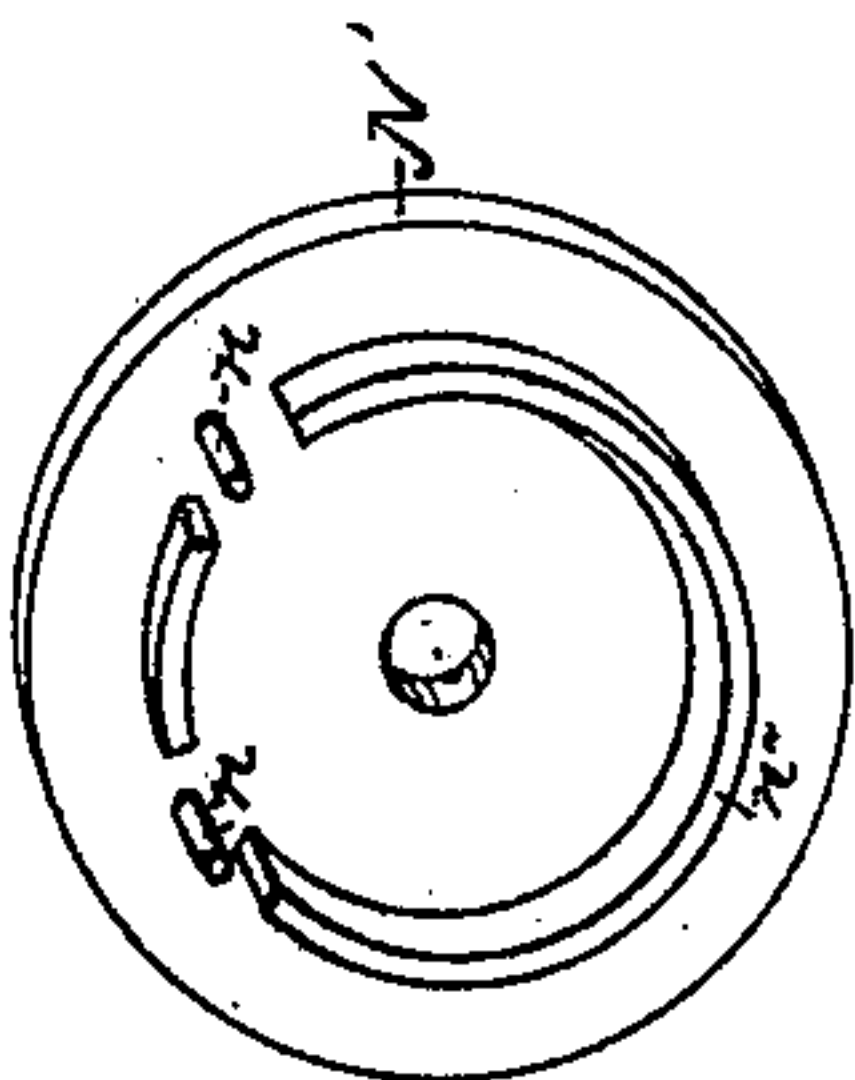


Fig. 6

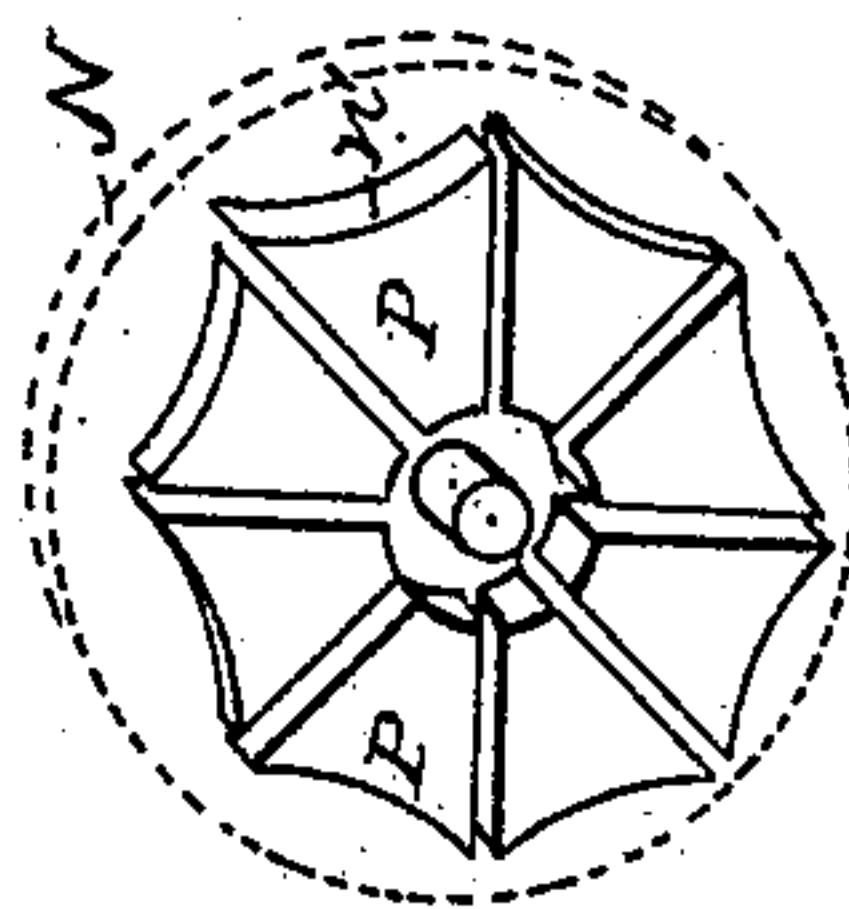


Fig. 7

WITNESSES,

H. B. Harris
C. R. Ferguson

INVENTOR,

William P. Uhlinger
by E. W. Anderson

Attorney.

(No Model.)

5 Sheets—Sheet 3.

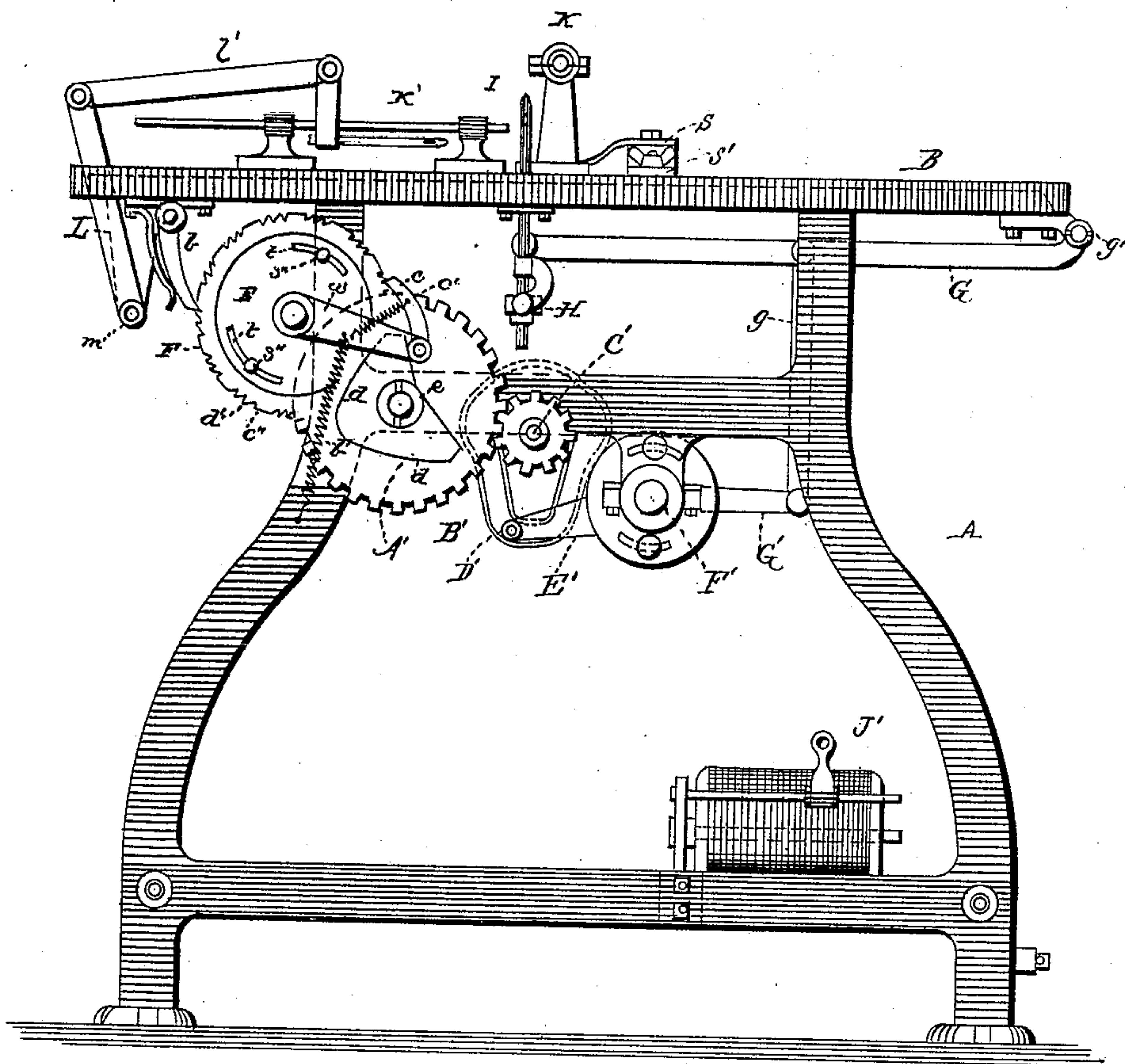
W. P. UHLINGER.

MACHINE FOR LACING JACQUARD CARDS.

No. 397,763.

Patented Feb. 12, 1889.

Fig. 3.



WITNESSES.

H. B. Harris
C. R. Ferguson

INVENTOR.

William P. Uhlinger,
by E. W. Anderson

Attorney.

(No Model.)

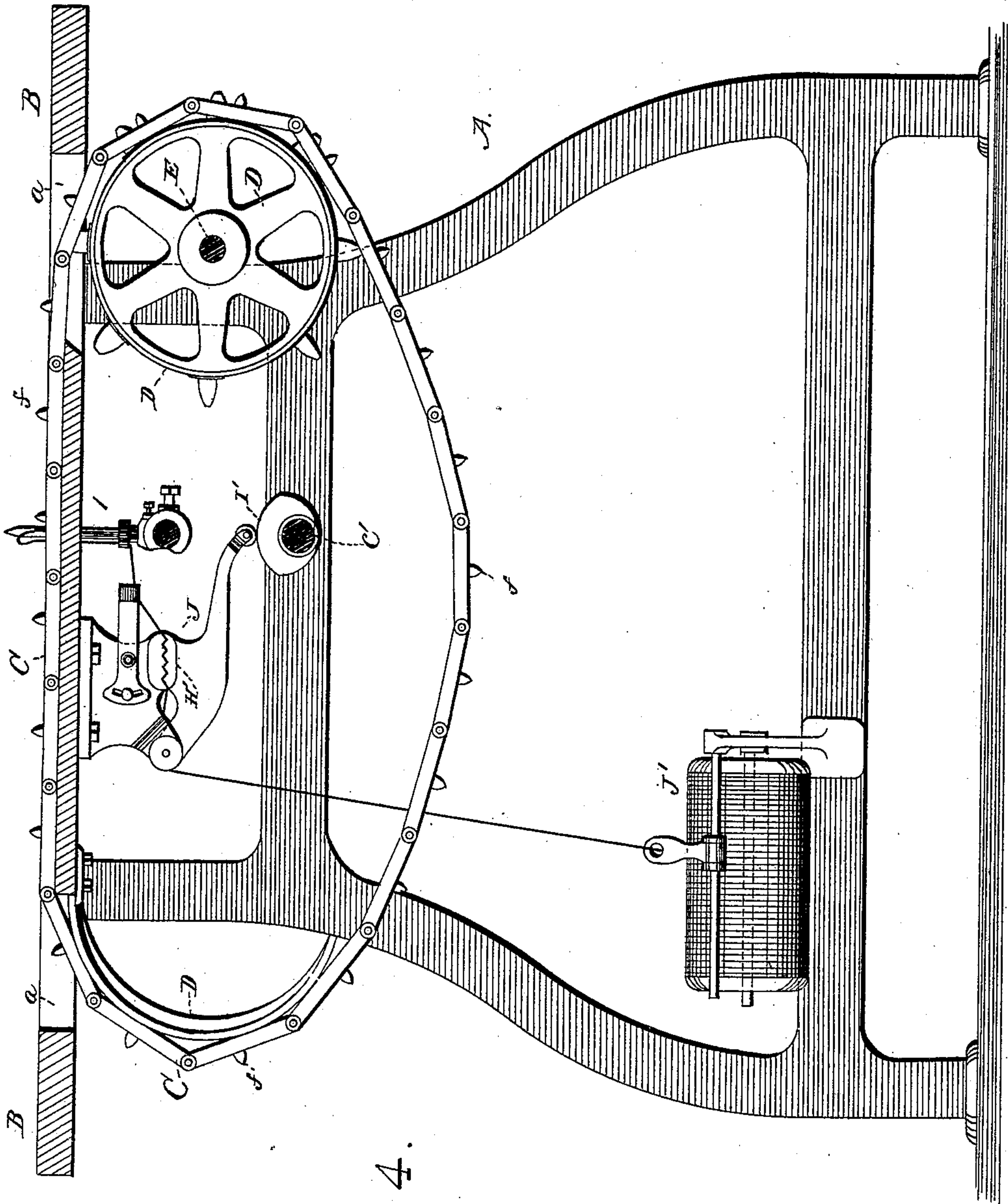
5 Sheets—Sheet 4.

W. P. UHLINGER.

MACHINE FOR LACING JACQUARD CARDS.

No. 397,763.

Patented Feb. 12, 1889.



424

WITNESSES,

N. B. Harris
C. R. Ferguson

INVENTOR,

William P. Uhlinger.
By E. W. Anderson,

Attorney.

(No Model.)

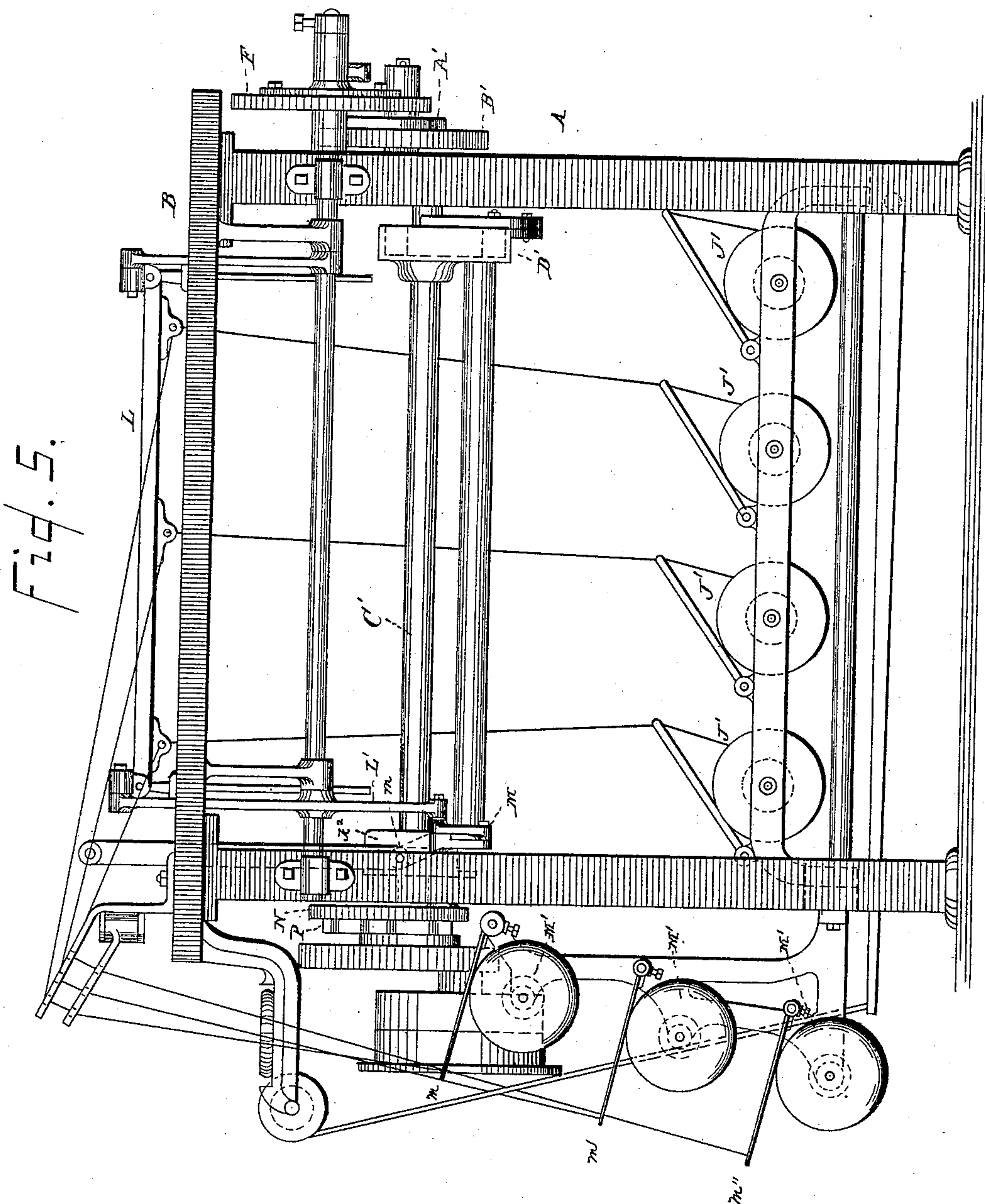
5 Sheets—Sheet 5.

W. P. UHLINGER.

MACHINE FOR LACING JACQUARD CARDS.

No. 397,763.

Patented Feb. 12, 1889.



WITNESSES.

N. B. Harris
C. R. Ingram

INVENTOR.

William P. Uhlinger,
By E. W. Anderson.

Attorney.

UNITED STATES PATENT OFFICE.

WILLIAM P. UHLINGER, OF PHILADELPHIA, PENNSYLVANIA.

MACHINE FOR LACING JACQUARD CARDS.

SPECIFICATION forming part of Letters Patent No. 397,763, dated February 12, 1889.

Application filed January 3, 1888. Serial No. 259,601. (No model.) Patented in England September 7, 1886, No. 11,368.

To all whom it may concern:

Be it known that I, WILLIAM P. UHLINGER, a citizen of the United States, and a resident of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Machines for Lacing Jacquard-Loom Cards, (upon which Letters Patent have been granted to me in Great Britain, No. 11,368, dated September 7, 1886;) and I do 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, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

Figure 1 of the drawings is a top view of the machine. Fig. 2 is a side view. Fig. 3 is a view showing the opposite side. Fig. 4 is a sectional side view, and Fig. 5 is an end view. Fig. 7 is a detail perspective view of the gear-wheel N, showing more clearly its sector-shaped projections P; and Fig. 6 is a like view of the disk N', disclosing more fully its studs *n* and convex portion *n''*.

The invention relates to improvements in machines for lacing Jacquard-loom cards; and it consists in the construction and novel combination of parts, as hereinafter specified.

In the accompanying drawings, the letter A designates the frame, and B the table or bed-plate on which the Jacquard cards are fed to the stitching machinery. The table is slotted at *a* for the passage of the feed-belts C, which for a short distance run flush with the surface of the table. The feed-belts are formed of links, and are adapted to be moved by sprocket-wheels D on a shaft, E, which is provided with a ratchet-wheel, F, which operates in connection with a spring holding-pawl, *b*, and a moving pawl, *c*. The holding-pawl *b* is attached to a fixed portion of the framing, and the operating-pawl *c* is pivoted to an arm, *a'*, which is loose on the shaft E. A spring, *b'*, is attached to the arm *a'*, and a spring, *c'*, to the pawl *c*. The feed movement of the pawl-arm *a'* is governed by a cam, A', of arrow-head form, having the sides *d* and re-entrant *e*, which is for varying the length of stitch. By using this form of cam I am enabled to

feed a ratchet-wheel having a regular succession of several short teeth, *d'*, alternating with long teeth *e''*, as shown. Therefore the feed is adapted to the operation of lacing the Jacquard cards, which are provided with lace-holes which are farther from each other than they are from the edges of the card. The feed is designed to bring the lace-holes to the looper-needle in time for its passage, and the varying feed-cam enables this to be done. In order to form the stitch, the looper is passed up through the lace-holes, and also through the interval between the cards as they are fed, the stitch formed in this interval being the hinge-stitch, or that by which the cards are hinged together. In order to secure the cards in position exactly on the feed-chains and to enable the latter to move them with accuracy, the links of the feed-chains are provided with studs *f*, which engage the peg-holes of the cards. These studs are high enough to avoid any liability of a card slipping off or getting out of position. The feed-cam A' is connected to or formed on a gear-wheel, B', which is turned by a pinion on the main shaft C'. This shaft extends transversely in the direction at right angles to the direction of feed and is located under the middle portion of the table at a distance below it sufficient to allow the proper movements of the looper and needle levers.

The shaft C' is provided with a grooved cam, D', which engages an arm, E', of the rock-shaft F', which is also provided with arms G', which are connected to the looper-levers G by the links *g*. These looper-levers are pivoted to the table, as at *g'*, and are connected in front by short links to the vertically-reciprocating looper-bar H, which is provided with bearings at its ends to move on vertical guides which are secured to the framing. The loopers I are connected to the bar H by suitable clamps, and as they are operated their threaded ends are projected upward through perforation *h'* in the table and withdrawn therefrom at regular intervals governed by the movement of the looper-cam D', the times of the stitch movements of said looper being the same whether the length of stitch is long or short, so that by changing the cams and ratchet I can readily adapt the machine to make stitches

of equal length or of such varying lengths as the style of perforation of the Jacquard card may require.

J indicates the thread-gripping device, the upper jaw of which is fixed to the framing or table, while the under jaw, H', is a pivoted lever, the forward end of which engages the tension-cams I' of the main shaft C'. The lacings on the spools J' are fed through guide apertures to the loopers, and in their course pass between the jaws, which close and open at the proper times to hold the lacing and to loose the same for forming the stitch. These jaws are also provided with adjustable tension-guides.

In order to open the loops of the lacings, which are formed above the table, to provide for the passage of the horizontal needles K, loop-spreaders K' are used, these being attached to a transverse spreader-bar, k, which is reciprocated in guides by means of the lever-arm k', which is pivoted to the framing below. The said arm extends upward and is connected to said spreader-bar by a link. The movement of this lever-arm k' is governed by a peripherally and angularly grooved cam, k², on the main shaft C'.

The needles K are secured to a transverse needle-bar, L, which is provided with horizontal bearings to move on horizontal guides l, said needle-guides and needle-bar being all above the table, and said guides being placed far enough apart to provide for the passage of the Jacquard pattern or series of cards between them as the series is fed forward over the table. The needle-bar is reciprocated by levers L', which are connected to said bar by pitmen l' or otherwise, said levers being fulcrumed at m and being operated by a geared crank, M, having a connection, m', therewith.

The crank-gear M meshes with a gear-wheel, N, of larger diameter than gear M, and carrying at one side a series of projections, P, of substantially sector shape, between which are narrow spaces. The outer or wider end of each projection is slightly concave.

N' is a disk which is secured upon the driving-shaft C', and is provided with two studs, n n, arranged sufficiently far apart to register with the spaces or slots between the projections P, said disk N' being so disposed with relation to the projections P as to permit the said studs (which lie in a circle of greater diameter than that of the circle formed by the portion n'', hereinafter referred to) to enter said spaces or slots and engage the side walls of the projections P, and thus rotate the gear-wheel N. The disk N' is also provided with convex portion n'', describing almost a complete circle, the same extending from points contiguous to opposite sides of the studs n n. The disk N' and projections P, together with the gearing M and N, transmit from the driving-shaft C' an intermittent or reciprocating motion to the needle-bar-operating crank, whereby the required movement is imparted to the horizontal needles,

giving them a forward-and-backward motion in the stitching operation.

The action of the aforesaid mechanism is as follows: The needle-bar crank of the gear M, when the needle is at rest, is in its lowest vertical position. The right-hand stud n on the disk N' (the two studs n n being now in their uppermost position, as seen in Fig. 2) will, as the latter receives motion from the driving-shaft C', engage one of the projections P and carry around the wheel N, and thereby impart a movement to the crank-gear M, that will give the needle-bar, through the intermediate connections, m', L', and l', its maximum backward movement. The other stud n will by this time have been brought into engagement with the succeeding or next approaching projection P, and thus continue the movement of the wheel N, which in turn continues the movement of the crank-gear M and causes the latter to move the needle-bar into its maximum forward position. Upon the escape of the last-referred-to stud n from its engagement with the projection P, the convex portion n'' will have contact with the concave surfaces n' of the projections P, and thus prevent further movement of the latter, and consequently of the needle-bar, until the right-hand stud n shall again be brought around into its former or original position, when the former operation of said parts will be repeated.

The cords for the needles are stored on the spools M', and pass thence by the tensions m'' and guide-perforations to the needles K.

A movable transverse bar, S', extends across the table above the same, and is provided with the fingers S, which serve to hold the cards down as they are fed forward for stitching. This bar is also provided with the loop-spreaders Z, to prevent the lacing-loop from twisting.

The operator places the cards in succession on the table or feed-platform, so that the peg-holes of the cards are engaged by the studs of the feed-chain. These studs are of proper size to fit the peg-holes neatly, so that the cards are held accurately in position as they are fed to the needles, and cannot move from such position in any direction, being governed entirely in the movement by the feed-chain and its operating devices. The feed-chain is moved intermittently either by regular or varying distances, according to the ratchet-and-pawl cam employed. In the illustration the ratchet is cut with two short teeth alternating with a long tooth, the length of the latter depending on the relative distance between the lacing-holes of the card as compared with the distance of such holes from the adjacent edges of said card. The feed-cam is so geared to the main shaft in its relation to its position to the looper-cam and to that which governs the movement of the radial needle-cam that the feed-movement stops when the needle and looper cams are in operation.

The grooves of the looper-cam are of double

or in-and-out curvature, having three of its portions farther from the center than the fourth, and having one of these three portions more eccentric than the other two, so that the looper is first passed up through the perforation of the card a portion of its way, is then held a moment while the horizontal needle is drawn backward, the looper then passing upward its full extent, and then returning a portion of the way. At this point its movement ceases for a moment, the spreader moves reversely, and the needle passes through the lacing-loop formed above the table by the looper. Then the looper moves down out of the way and the feed takes place, the horizontal needle running in position until the looper is again projected along the side thereof for the formation of the next stitch.

Each horizontal needle is made a little concave back of its threaded end, as indicated at *s'*; to provide for the passage of the looper and its cord, so that the lacing is carried upward in loop form and is encircled by a loop of the needle-cord, and as the stitch progresses the needle is carried through the loop of the lacing formed as the looper is descending. This lacing-loop remains on the needle until the reverse movement of the latter, when the said loop passes off and is drawn up by the tension.

In order to facilitate the adjustment of the ratchet, it is usually made in two parts, that portion which is keyed to the shaft being slotted, as at *t*, and clamp-screws *s''*, passing through the slots, serving to secure the ratchet-wheel in position after adjustment. The stitch made is a double-thread stitch, the larger lacing passing along the bottoms of the cards in single line and the smaller needle-cord passing along the upper surfaces thereof, reversing, and then passing forward again, one loop of the latter being around the neck of the lacing-loop, and another loop of the cord extending through said lacing-loop to form a loop to encircle the lacing-loop of the next stitch. At each lacing-loop the lacing, which is the main connection of the cards forming the pattern, is bound in position by two bends or loops of the needle-cord, one

around and the other through and around one of its branches, so that its position is fixed in the stitch. When the spreader-bar *S'* is removed from the table, the work is all laid open and free, so that the cards can be taken out to correct any error or slip in the work.

This machine is designed to facilitate and simplify the operation of lacing Jacquard cards together. But three stitches are required for the breadth of a card, so that the work of the machine is rapidly executed and with very little noise or vibratory effect.

Having described this invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination of the frame, the shaft *C'*, the gear *N*, having the series of sector-shaped projections *P*, having concavities in their outer or wider ends, the disk *N'*, having the studs engaging with the side walls of the projections *P'*, and the crank-gear, together with the needle-bars, and means connecting together said needle-bars and the crank-gear, said disk *N'* also having a convex portion, *n''*, contacting with the concave surface of the sector-shaped projections *P*, substantially as set forth.

2. The combination of the frame, the shaft *C'*, the gear *N*, having the series of sector-shaped projections *P*, having concavities in their outer or middle ends, the disks *N'*, having the studs engaging with the side walls of the projections *P'*, the crank-gear, the needle-bars, means connecting together said needle-bars and the crank-gear, said disk also having a convex portion contacting with the concave surface of the sector-shaped projections *P*, the grooved cam *D*, also carried by shaft *C'*, the rock-shaft *F'*, having the arms *E'* and *G*, the arm *E'* engaging said grooved cam, the looped lever, and link *g*, connecting said looped lever to the arm *G'*, substantially as set forth.

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

WILLIAM P. UHLINGER.

Witnesses:

THOS. M. MONTGOMERY,
ALEX. C. KNORR.