

No. 631,560.

Patented Aug. 22, 1899.

A. CLAVIEZ.

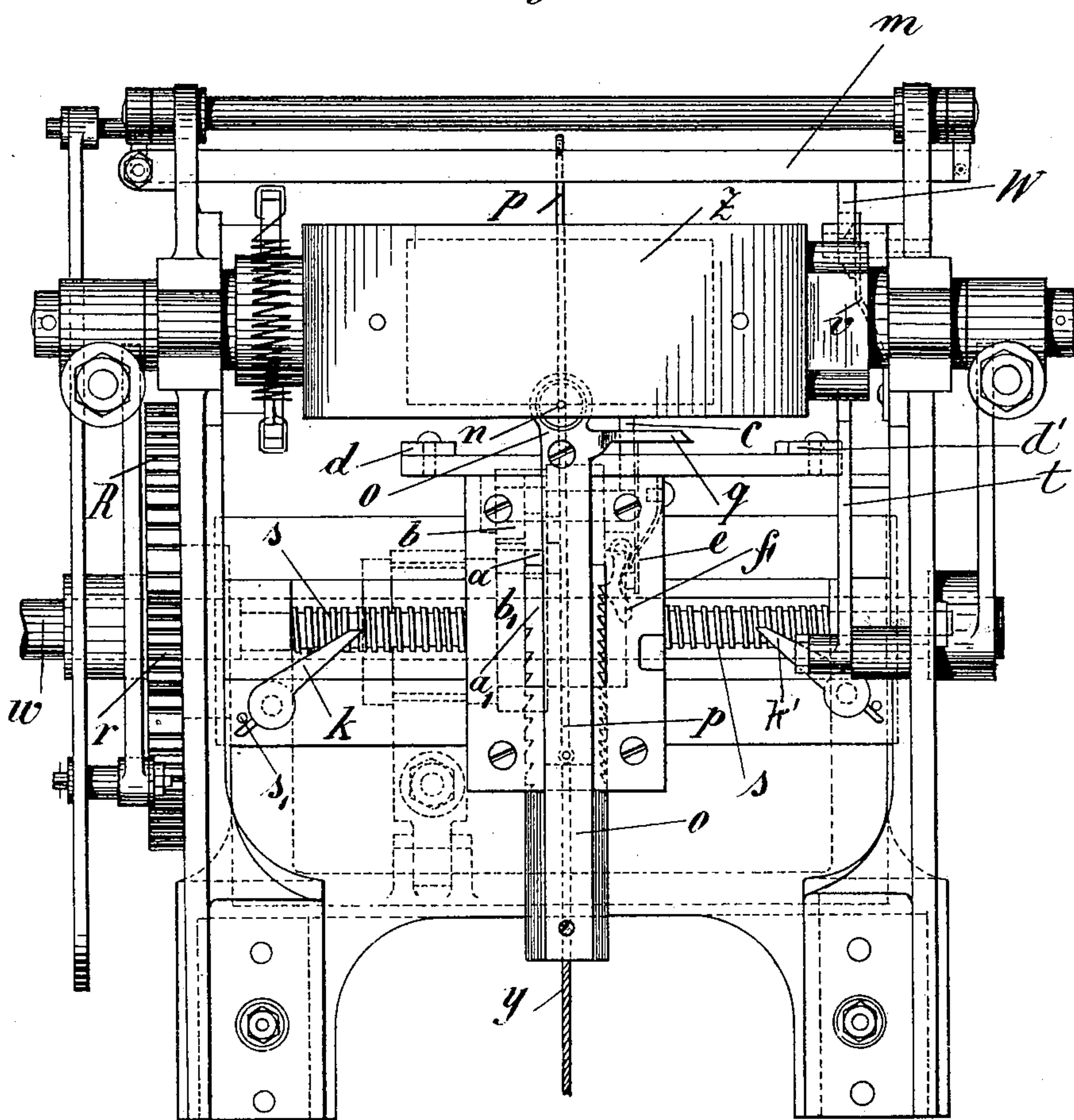
APPARATUS FOR OPERATING CHANGE MECHANISM OF LOOMS.

(Application filed Oct. 2, 1897.)

(No Model.)

4 Sheets—Sheet 1.

Fig. 1.



WITNESSES.

Geo. F. Jackson
M. H. Stutzel

INVENTOR

Alfred Claviez
BY *James H. Rogers*
ATTORNEYS.

No. 631,560.

Patented Aug. 22, 1899.

A. CLAVIEZ.

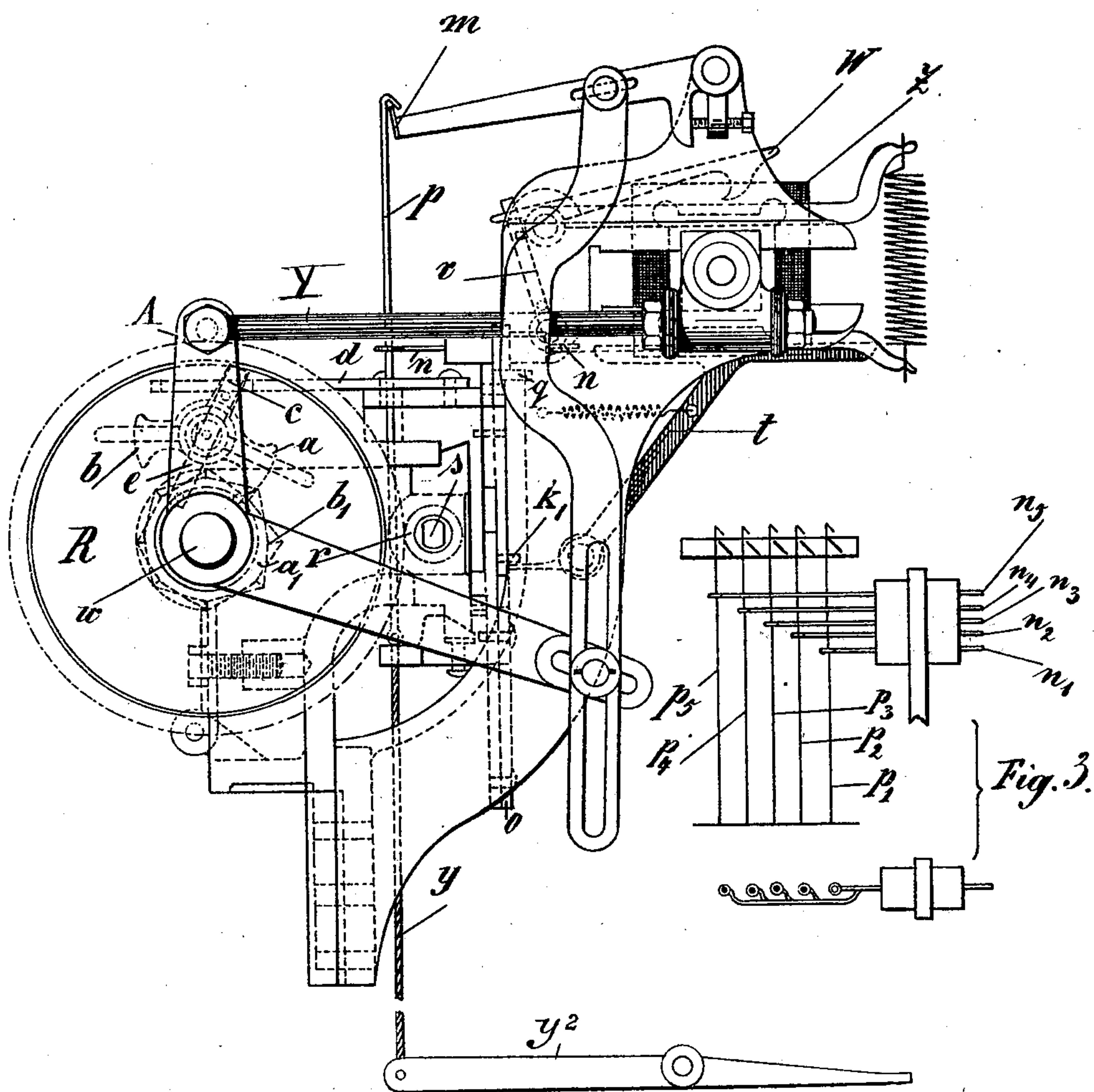
APPARATUS FOR OPERATING CHANGE MECHANISM OF LOOMS.

(Application filed Oct. 2, 1897.)

(No Model.)

4 Sheets—Sheet 2.

Fig. 2.



~~WITNESSES:~~

WITNESSES:
Geo. H. Jackson
M. H. Stutzel

INVENTOR

Alfred Claviez
BY *Frank Raegen*
ATTORNEYS.

No. 631,560.

Patented Aug. 22, 1899.

A. CLAVIEZ.

APPARATUS FOR OPERATING CHANGE MECHANISM OF LOOMS.

(Application filed Oct. 2, 1897.)

No Model.)

4 Sheets—Sheet 3.

Fig. 4.

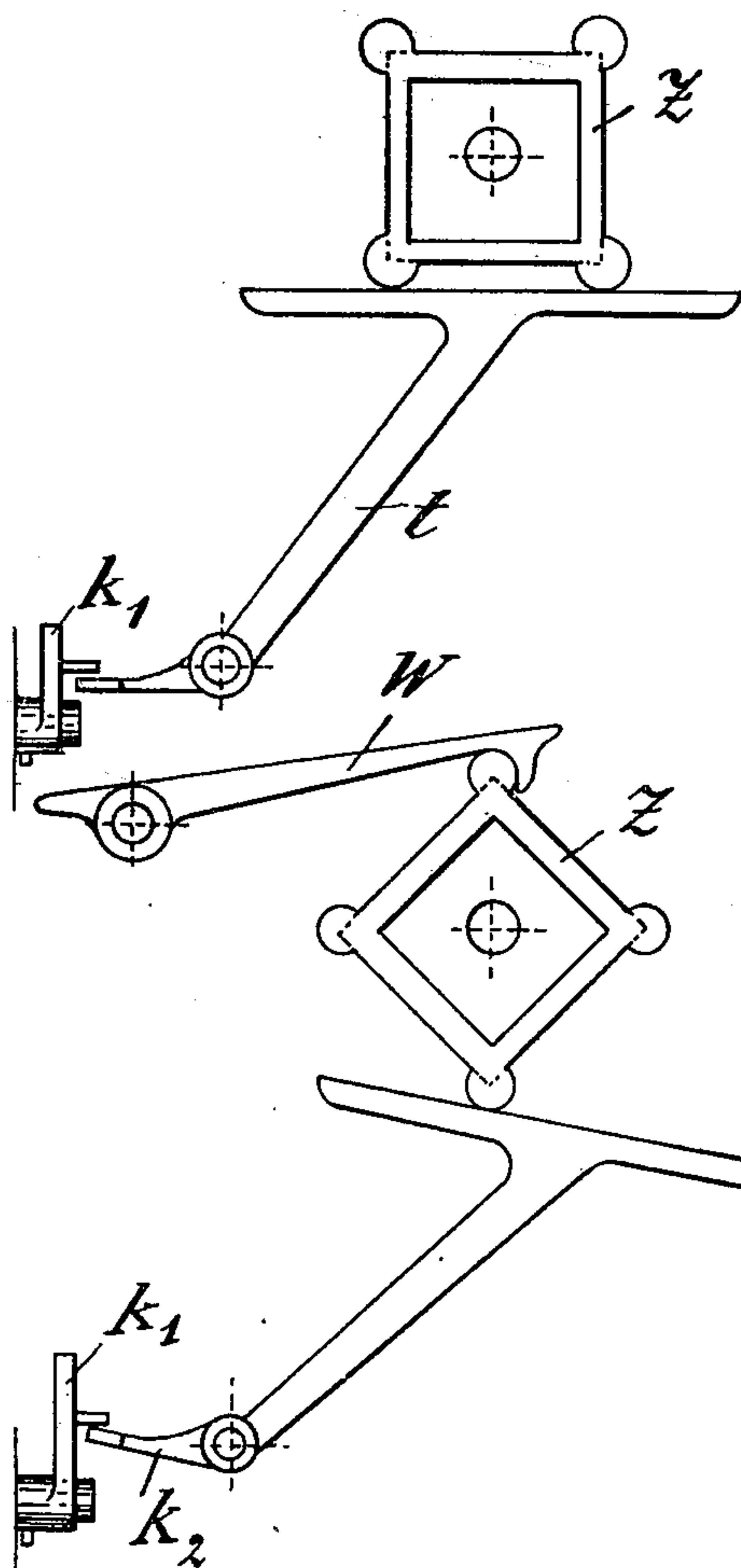


Fig. 6.

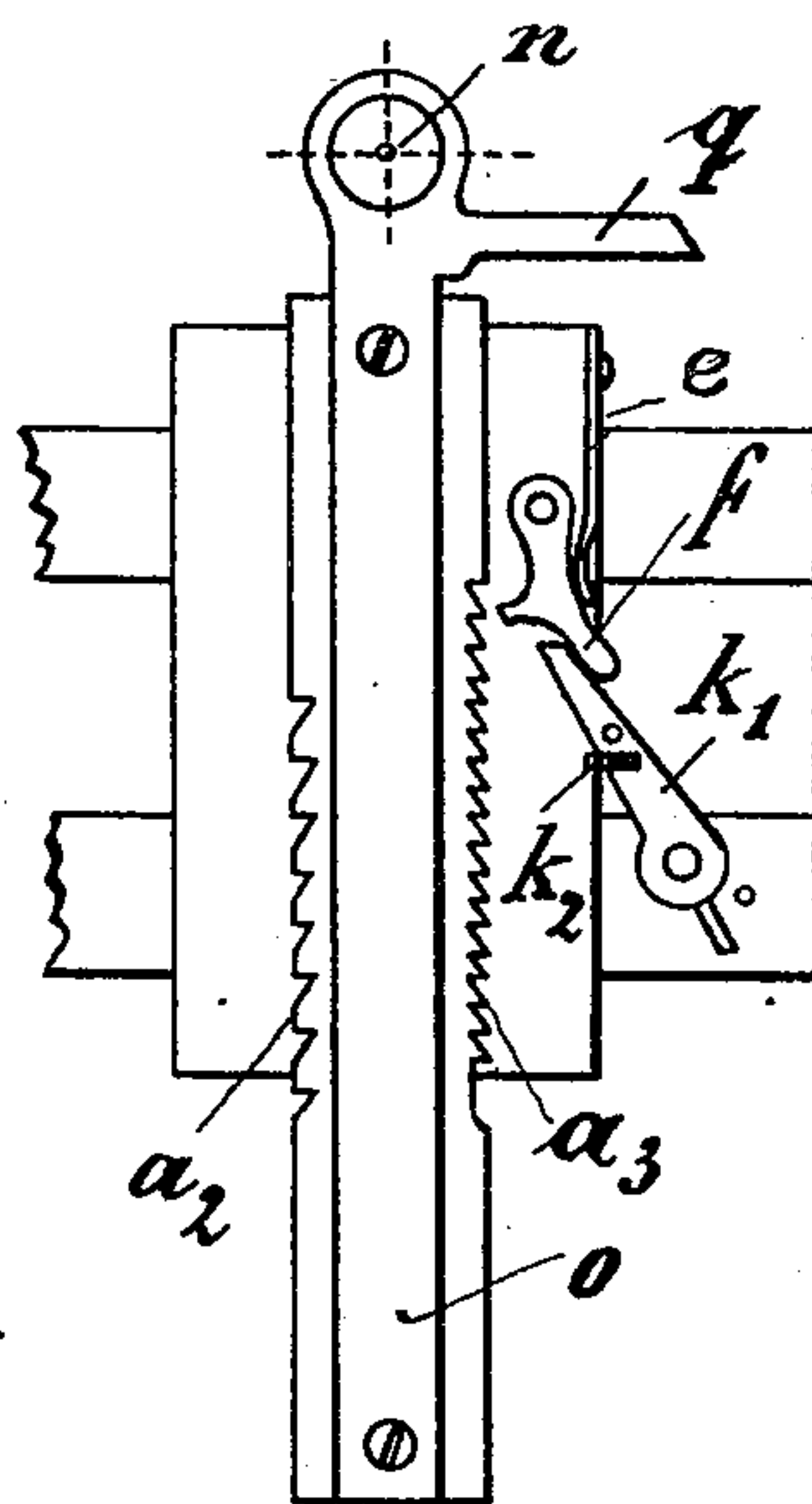


Fig. 5.

WITNESSES:

Geo. H. Jaenel
Ch. Gast

INVENTOR

Alfred Claviez
BY *James H. Ragnum*
ATTORNEYS.

No. 631,560.

Patented Aug. 22, 1899.

A. CLAVIEZ.
APPARATUS FOR OPERATING CHANGE MECHANISM OF LOOMS.

(Application filed Oct. 2, 1897.)

(No Model.)

4 Sheets—Sheet 4.

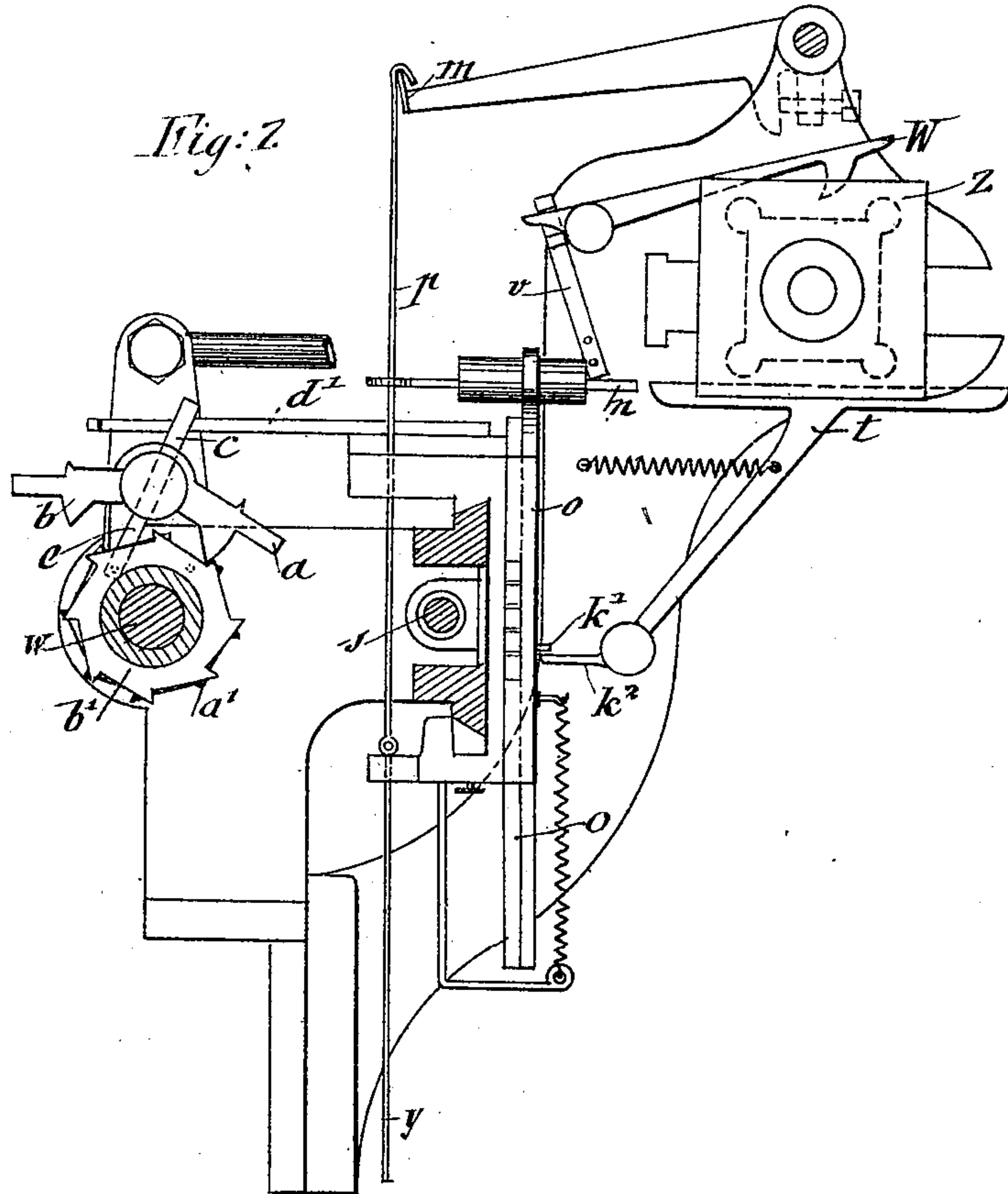


Fig. 9.



Fig. 8.

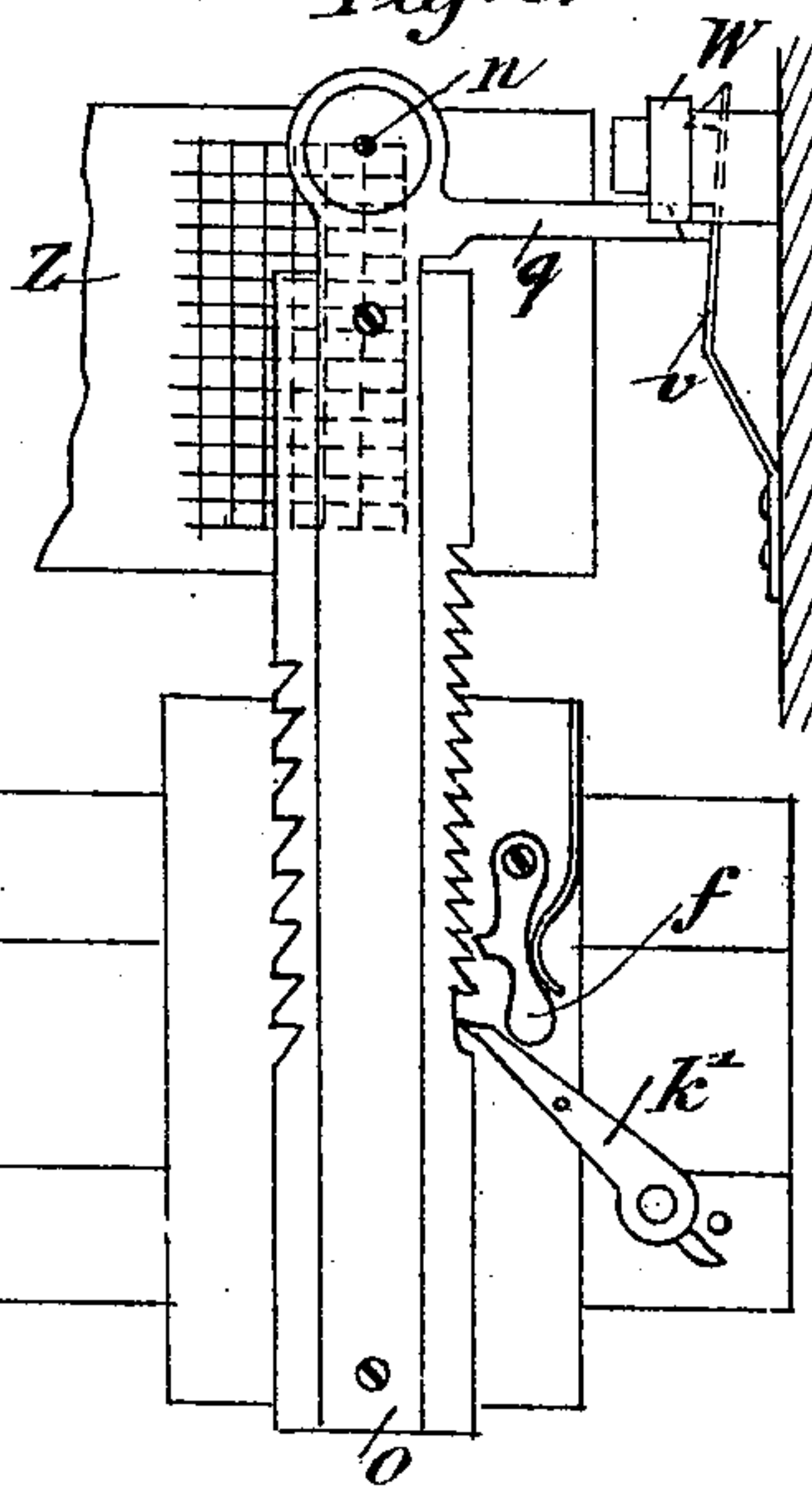


Fig. 10.



WITNESSES:

Geo. S. Wheeler.
Geo. B. Jaeger.

INVENTOR

Alfred Claviez
BY *Grace Regner*
ATTORNEYS.

UNITED STATES PATENT OFFICE.

ALFRED CLAVIEZ, OF LEIPSIK, GERMANY, ASSIGNOR TO THE KUNST-
WEBEREI CLAVIEZ COMPANY, GESELLSCHAFT MIT BESCHRÄNKTER
HAFTUNG, OF SAME PLACE.

APPARATUS FOR OPERATING CHANGE MECHANISM OF LOOMS.

SPECIFICATION forming part of Letters Patent No. 631,560, dated August 22, 1899.

Application filed October 2, 1897. Serial No. 653,796. (No model.)

To all whom it may concern:

Be it known that I, ALFRED CLAVIEZ, a citizen of the German Empire, residing at Leipzig, in the Kingdom of Saxony, Germany, have
5 invented certain new and useful Improvements in Apparatus for Operating the Change Mechanism of Looms, of which the following is a specification.

10 This invention relates to the change mechanism of mechanical looms of all kinds, and has for its object an apparatus for producing any desired change in any desired number of irregular intervals.

The mechanism which forms the subject-
15 matter of the invention has for its object, among others, to facilitate in the manufacture of chenille or Axminster carpets the productions of patterns of large designs in which it is of special importance that only a single
20 card-cylinder with the desired number of holes be used. The mechanism used for this purpose is especially distinguished by the fact that at every fourth pick the card-cylinder abuts once against the actuating-needles. It
25 is therefore connected with the crank-shaft by any suitable mechanism in the proportion of one to four. When the card-cylinder is pressed against the needles after the fourth pick, the hook is pressed down if the card has
30 no hole, and it is not pressed down if there is a hole in the card. As, however, each hole of the pattern-card represents four picks, there can be made with a one thousand three hundred and twenty (1,320) card, for instance,
35 four times one thousand three hundred and twenty (1,320) picks, equal to five thousand two hundred and eighty (5,280) picks, before it is necessary to turn the card-cylinder in order to allow another card to come into play,
40 which also produces the above-named number of picks. It is evident from this that the change mechanism is especially intended for use with particularly large patterns and that an enormous saving of cards is effected. Thus
45 for a very complicated chenille-pattern a very great number of pattern-cards are required.

In the accompanying drawings, Figure 1 is a front view of a loom embodying my invention. Fig. 2 is an end view; Fig. 3, a diagram
50 showing a combination of a series of needles.

Figs. 4, 5, and 6 are detail views of portions of the mechanism. Fig. 7 is a vertical transverse section of the loom, parts being in elevation. Fig. 8 is a detail front view of the
55 needle-carrier shown in connection with the spring for actuating the turning-hook for the card-cylinder. Figs. 9 and 10 are detail plan views of the pawl-shifting fingers.

Similar letters of reference indicate corresponding parts. 60

In order that the invention may be the better understood, the main working parts of the apparatus will be first briefly described.

Z is the card cylinder or roller over which the pattern-cards run; *n*, a needle or pin which
65 is mounted on the needle-carrier *o*; *p*, the hook, which is connected by the cord *y* with any customary change mechanism of an apparatus used for producing the pattern in textile
70 fabrics, and *m* the actuating bar or knife for raising the hook *p*. The pull-cord *y* may, for instance, actuate the turning-hook of any desired jacquard-machine, inasmuch as after
75 the raising of the hook *p* by the bar *m* the outward shifting of the turning-hook takes place. Even in shaft-machines the pull-cord *y* may serve for the purpose of actuating the turning-hook for the card-cylinder.
80 It appears, therefore, that any desired device by which a multiple-woven fabric is produced can be connected with the pull-cord *y*. By the combination of several hooks with each other, as shown in Fig. 3, for instance, and to be more particularly referred to hereinafter, it is possible to increase the efficiency of
85 the apparatus. There is consequently not a mere controlling but a positive function accomplished by the pull-cord *y* and the hook *p*. Furthermore, the revolving or lift-box changes can likewise be accomplished by the
90 same.

In the copending application of Emil Claviez, Serial No. 642,078, filed June 24, 1897, is shown and described a shuttle-change mechanism in which an electromagnet is used. The
95 present invention can be used in connection with the same apparatus by displacing the armature of the electromagnet by a part which is shifted by means of a pivoted lever y^2 , such as shown in Fig. 2, this lever being raised and
100

lowered by means of the connecting-cord y , so that the desired change of motion can be effected every time the cord y is acted upon by the hook p .

5 The needle or pin n of the needle-carrier o travels with the latter from hole to hole of the card cylinder or roller Z , and when it reaches the last hole of a horizontal row of holes it rises up to the next row above and
10 runs along this row from hole to hole. When the needle n has finally reached the last hole of the uppermost row of the card-cylinder, the latter turns automatically, the needle in the needle-carrier o drops into a peculiar sup-
15 port down to the first hole of the lowest row, and the operation commences again. In traveling over the card-cylinder Z when the needle n encounters a hole in the pattern-card the hook p is not pressed back, but remains
20 suspended on the knife m , and on the latter rising it is lifted with it, and thus the change apparatus attached to the hook by the cord y is set in operation. If, on the other hand, the needle or pin n encounters the pattern-
25 card where there is no hole present, the hook p is pressed back by the needle or pin, the knife m moves upward without it in the usual manner, and the change apparatus attached to this hook remains stationary—that is to
30 say, is not operated.

The construction of the apparatus so far as it is necessary to explain the same, so that it can be fully understood, is as follows:

35 w is a rock-shaft to which oscillating motion is imparted by means of a suitable crank, which motion is in turn imparted by means of pawls a and b , oscillated by said rock-shaft, to two ratchet-wheels a' and b' , the teeth of
40 which are presented in opposite direction, as shown in dotted lines in Fig. 2. The intermittent rotary motion imparted to the ratchet-wheels a' and b' is in turn imparted to a gear-wheel R and by means of the latter and an intermediate pinion r to a screw-spindle s ,
45 which passes through a correspondingly-threaded nut on the guide-frame of the needle-carrier o and by which a progressive or step-by-step movement is imparted to said needle-carrier. Below one end of the screw-
50 spindle s is a pawl k , which by means of a pin s' is held in inclined position, as shown in Fig. 1, so that when the needle-carrier o and its nut have traveled so far to the left that the needle n has passed the last hole but
55 one of the horizontal row said pawl will engage a rack a^2 on the needle-carrier. A further movement forward to the extent of one hole or division then causes the pawl to move toward the vertical, so that it acts upwardly
60 to cause the needle and the needle-carrier o to rise to the next horizontal row. In order that the needle-carrier o may not of itself—that is to say, prematurely—drop back into its former position, a pawl or catch f , Fig. 1,
65 is pivoted on the supporting-frame and engages the rack-teeth a^2 on the opposite side of the needle-carrier o .

Pivoted to the opposite side of the frame of the apparatus from pawl k is a pawl k' , which is held in inclined position similarly to
70 the pawl k , so that each time the needle-carrier completes its movement to the right it is caused to be shifted upwardly by the action of the pawl k' on rack a^2 of the needle-carrier, due to said pawl k being oscillated by the con-
75 tact of the carrier toward the vertical. The pawl k' never swings far enough during the travel of the needle, excepting when the latter is finishing the uppermost row of holes, to have any effect upon the catch f . By means of
80 a suitable spring e the catch f is pressed continually between the teeth, while the clearance of the catch f from the teeth is produced by the disengaging-pawl k' at the completion of the movement toward the right hand—that is
85 to say, when the needle n has completed the uppermost row of holes the entire needle-carrier is dropped by its own weight through the medium of the pawl k' engaging a projecting heel or part of the catch f . This disengage-
90 ment of the catch f by the pawl k' at the time when the needle n is opposite the next to the last hole in the card will be more clearly stated hereinafter in connection with the de-
95 scription of lever t . (Shown in Figs. 4 and 5.)

During the rotary motion of the spindle s the needle-carrier is caused to move forward step by step. The support o of the needle-carrier is moved so far to the left that when
100 a finger d' in the path of a shifting lever c of the pawls a and b is struck by the shifting lever it produces in this manner, through the medium of a spring e , a release of the shift-
105 ing pawls, so that the pawl b , which heretofore turned the wheel R , is thrown out of its corresponding ratchet-wheel, while the pawl a is caused to engage its ratchet-wheel, so that the needle-carrier and the needle are moved from the left toward the right. At the
110 moment of the striking of the lever c against the finger d' , when the last left-hand hole of the card-cylinder has been reached, the needle is raised by pawl k for the next row of holes, so that the movement can begin again. On the other hand, when the lever c strikes
115 the other finger d it is rocked in the opposite direction, so that the pawl a is thrown out of and pawl b thrown into engagement with its corresponding ratchet-wheel. The needle-support o now moves forward from hole to
120 hole toward the right, this movement being produced by the oscillating motion of the pawl a . The pawl a is shifted and the pawl b engaged with its corresponding ratchet-wheel at the end of the right-hand movement of the
125 needle-carrier by a finger d engaging the lever c . It may here be remarked that the pawls a and b respectively engage special ratchet-wheels a' and b' , which are fixed on a sleeve or part of the gear-wheel R , so that the
130 pawl a can turn the wheel R in one direction, while the pawl b turns the same in opposite direction. When the needle n has passed the last hole but one of the upper row of the card-

cylinder Z, a projection q on the needle-carrier o engages with a spring v , which is provided with a pin for coöperating with the heel of a pivoted hook W for the purpose of holding said hook in inactive position. The engagement of the projection q with the spring v releases the hook W, so that the same drops on the card-cylinder Z. The needle n then passes the last hole of the uppermost row of the card-cylinder, and the latter moves back by means of the customary apparatus and is turned on its axis. By the turning of the card-cylinder a pivoted lever t , which is shown in detail in Figs. 4 and 5, is oscillated. This lever is provided with a toe-piece or catch k^2 , which engages a nose on the pawl k' and lifts the same, so that it can engage the heel on the disengaging-pawl f , thereby releasing the latter from the rack a^3 of the needle-carrier and permitting the same to drop until the needle n corresponds with the lowermost row of holes. The needle-carrier is then again in its initial position and can repeat its movement in the manner hereinbefore described.

The disengaging of the hook p from the reciprocating knife m has been referred to. By this is meant the left-hand motion of the hook by a needle n , so that the knife m in rising cannot lift the hook. When there is a hole in the card, the lifting of the hook p is produced, and consequently the cord y is likewise pulled up. The same action takes place in revolving and box-changing mechanisms in which the turning-hook which is necessary for the pattern is thrown in or out of action, as required. When a shaft is connected with a cord y , the same is likewise under the influence of the card-cylinder Z, either raised or lowered, and it is therefore in this manner possible to obtain a number of designs for the reason that one hole corresponds to four picks, as before stated. The connection between the rock-shaft w and the card-cylinder is made by a crank A on the said shaft and a connecting-rod Y. It is obvious that a shaft connected with the cord y is in raised position four picks and in lowered four picks. It may here be pointed out that in place of a single needle or pin and a single hook a series of needles and hooks may be employed, and a diagrammatic view of such an arrangement is shown in Fig. 5, where five needles and five hooks are indicated. In this case the series of needles and hooks are arranged one behind the other, the needles $n^1 n^2 n^3 n^4 n^5$ being arranged one above the other in the needle-carrier o . Not only is one needle, as in Fig. 2, operated, but the operation is multiplied by five, the five hooks $p^1 p^2 p^3 p^4 p^5$ corresponding therewith. The construction of the needle-carrier o is the same as in Figs. 1 and 2, with the difference, however, that five rows of holes of the card on the card-cylinder have to be brought opposite the needles n^1 to n^5 . It is evident that the five rows of needles have to be worked simultaneously by the card on the card-cylinder. It is not neces-

sary that each needle be taken along by the card-cylinder, as this is governed by the corresponding card. For instance, the needles $n^1 n^3 n^5$ may meet an imperforate part of the card. Consequently the hooks p^2 and p^4 are raised and the others remain in lowered position and do not work. The needle-carrier o moves toward the left until it arrives at the last row of holes. The needle-carrier is then lifted, so that the needle n^1 is in line with the second row of the card-cylinder, the needle n^2 in line with the third row, and so on. In other words, the entire series of needles has been raised one step to the next series of holes. Only when the needle n^5 has passed the uppermost row and during the left-hand motion the last left-hand hole commences the return of the entire needle-carrier into its former position, as shown in Fig. 1, and then begins the turning of the card-cylinder. It appears from this that the entire series of picks by the series of needles can be made before the card-cylinder has to be turned. The card-cylinder has one thousand three hundred and twenty (1,320) holes, and for each hole four picks can be made, so that five times four times one thousand three hundred and twenty (1,320)—namely, twenty-six thousand four hundred (26,400)—picks have been made before it is necessary that the card-cylinder be turned. It therefore appears that by the use of a group or series of needles the operative capacity of the mechanism can be considerably increased. If we take a card-cylinder with one thousand three hundred and twenty (1,320) holes, as before, and if in connection with the card-cylinder sixteen shafts, then each shaft requires the sixteenth part of the one thousand three hundred and twenty (1,320) holes, and consequently eighty-two picks. As it is necessary for each shaft to have one needle, sixteen needles must be used, for which each needle requires the sixteenth part of the card-cylinder. The needles which are required for actuating the sixteen shafts are likewise arranged one above the other and are moved, likewise, from one row of holes to the next. It therefore follows that with the use of shaft-machines a saving of cards is obtained, and it is also obvious that one hole in the card-cylinder corresponds to one pick.

Having thus described my invention, what I claim is—

1. In apparatus for operating the change mechanism of looms, the combination of the card-cylinder a needle-carrier, a needle or pin, means for shifting said needle-carrier and needle from one side to the other, means for imparting an upward step-by-step movement to the needle-carrier at the end of each row of holes of the card-cylinder, means for holding the needle-carrier in its upwardly-shifted position, and means for releasing the needle-carrier at the end of the last row of holes on the card-cylinder, so that said needle-carrier returns by gravity to normal position, substantially as set forth.

2. In apparatus for operating the change mechanism of looms, the combination of the card-cylinder a needle-carrier, a needle or pin, a screw-spindle on which the needle-carrier is threaded, means for turning said spindle, means for imparting an upward step-by-step movement to the needle-carrier at the end of each row of holes of the card-cylinder, means for holding the needle-carrier in its upwardly-shifted position, and means for releasing the needle-carrier at the end of the last row of holes of the card-cylinder, substantially as set forth.

3. In apparatus for operating the change mechanism of looms, the combination of the card-cylinder a toothed needle-carrier, a needle or pin, means for shifting said needle-carrier and needle from one side to the other, means for imparting an upward step-by-step movement to the needle-carrier at the end of each row of holes of the card-cylinder, a detaining-catch for engaging the teeth on the needle-carrier, and holding the latter in its upwardly-shifted position, and means for releasing the needle-carrier from said catch at the end of the last row of holes of the card-cylinder, substantially as set forth.

4. In apparatus for operating the change mechanism of looms, the combination of the card-cylinder a toothed needle-carrier, a needle or pin, means for shifting said needle-car-

rier and needle from one side to the other, a pawl for engaging the teeth on the needle-carrier, means for oscillating said pawl, whereby a step-by-step movement is imparted to said needle-carrier, means for holding the needle-carrier in its upwardly-shifted position, and means for releasing the needle-carrier at the end of the last row of holes of the card-cylinder, substantially as set forth.

5. In apparatus for operating the change mechanism of looms, the combination of the card-cylinder a toothed needle-carrier, a needle or pin, means for shifting said needle-carrier and needle from one side to the other, means for imparting an upward step-by-step movement to the needle-carrier at the end of each row of holes of the card-cylinder, a detaining-catch for engaging the teeth on the needle-carrier, and holding the latter in its upwardly-shifted position, and an oscillating pivoted pawl adapted to engage said catch and throw it out of engagement with the toothed needle-carrier, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ALFRED CLAVIEZ.

Witnesses:

RUDOLPH FRICKE,
BRUNO JACOB.