

(No Model.)

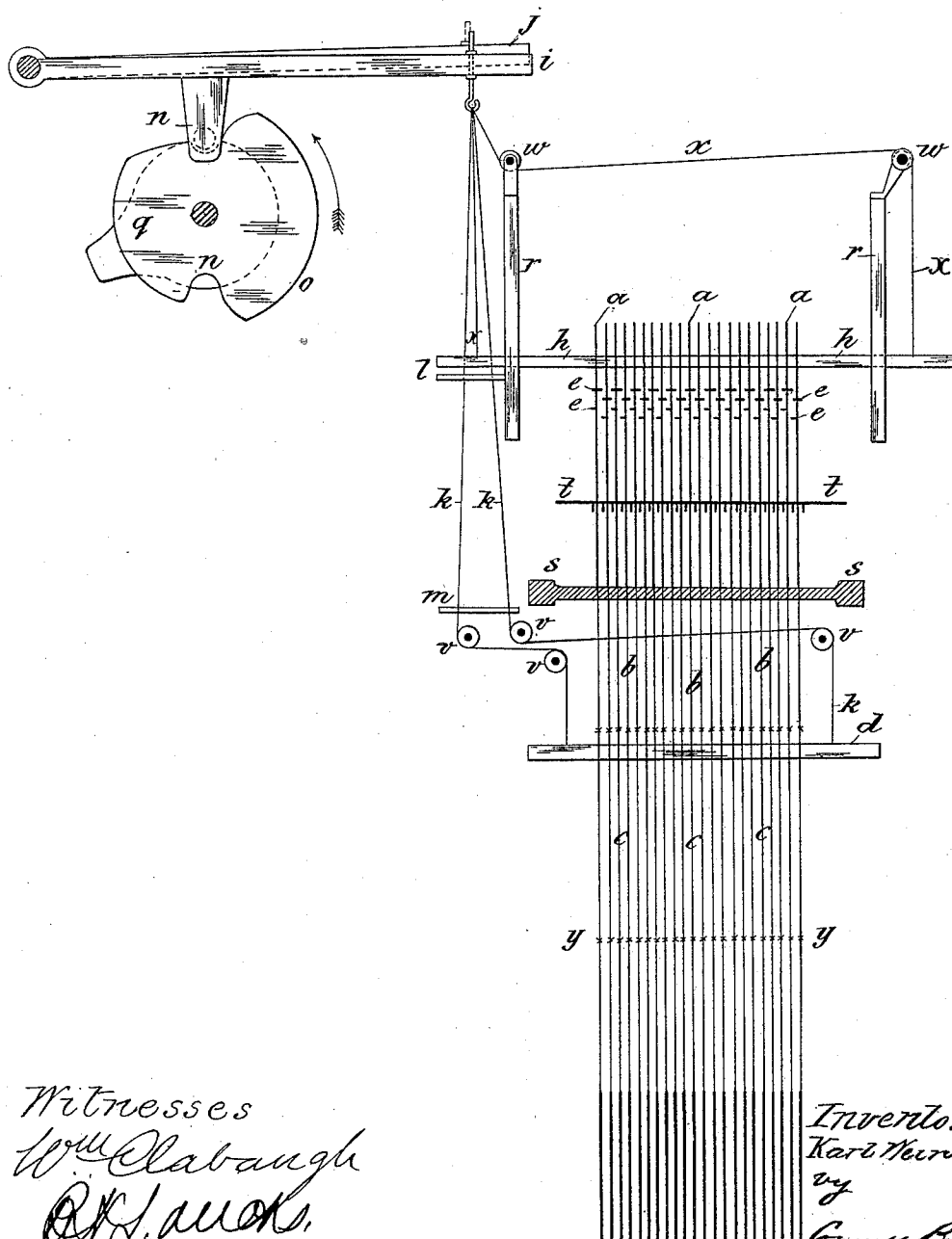
4 Sheets—Sheet 1.

K. WEIN.
SHEDDING MECHANISM FOR LOOMS.

No. 460,414.

Patented Sept. 29, 1891.

Fig. 1.



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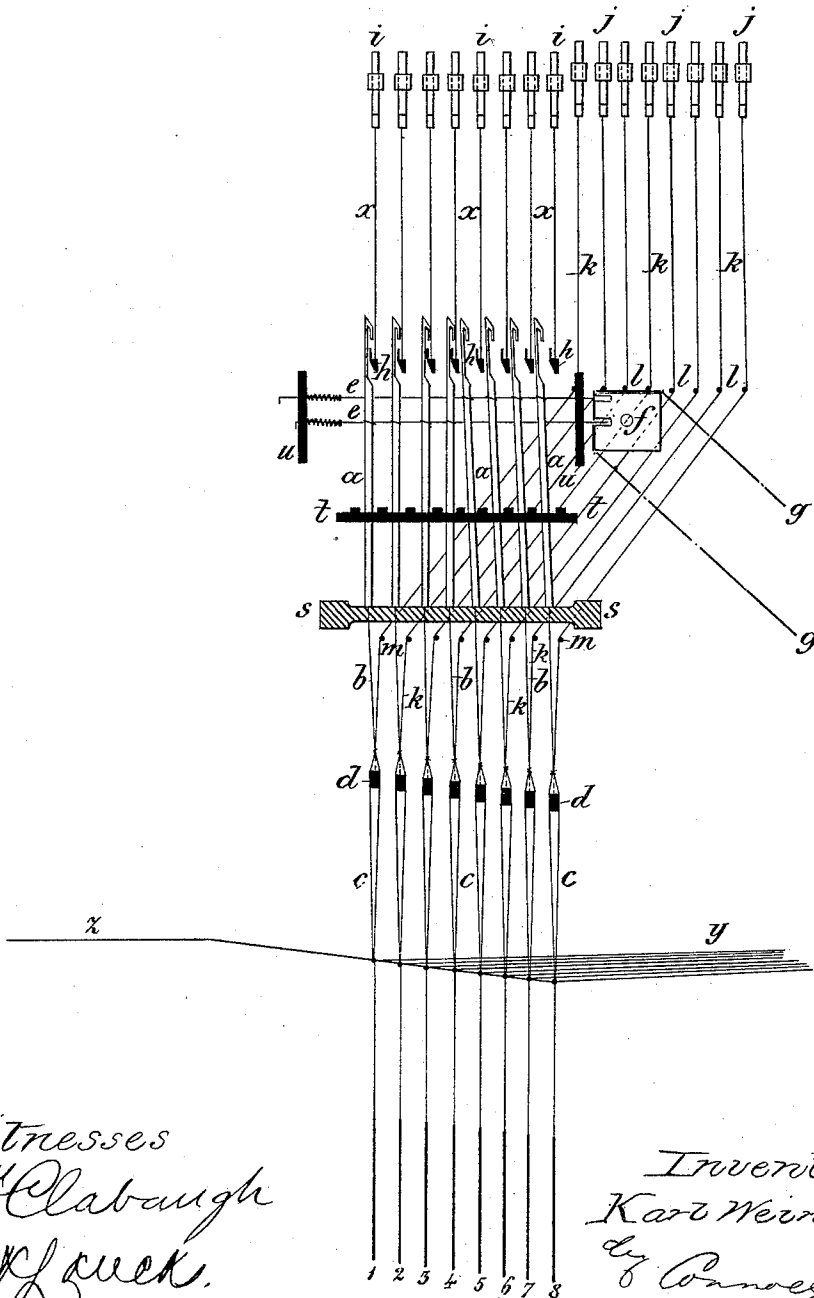
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Fig. 2.



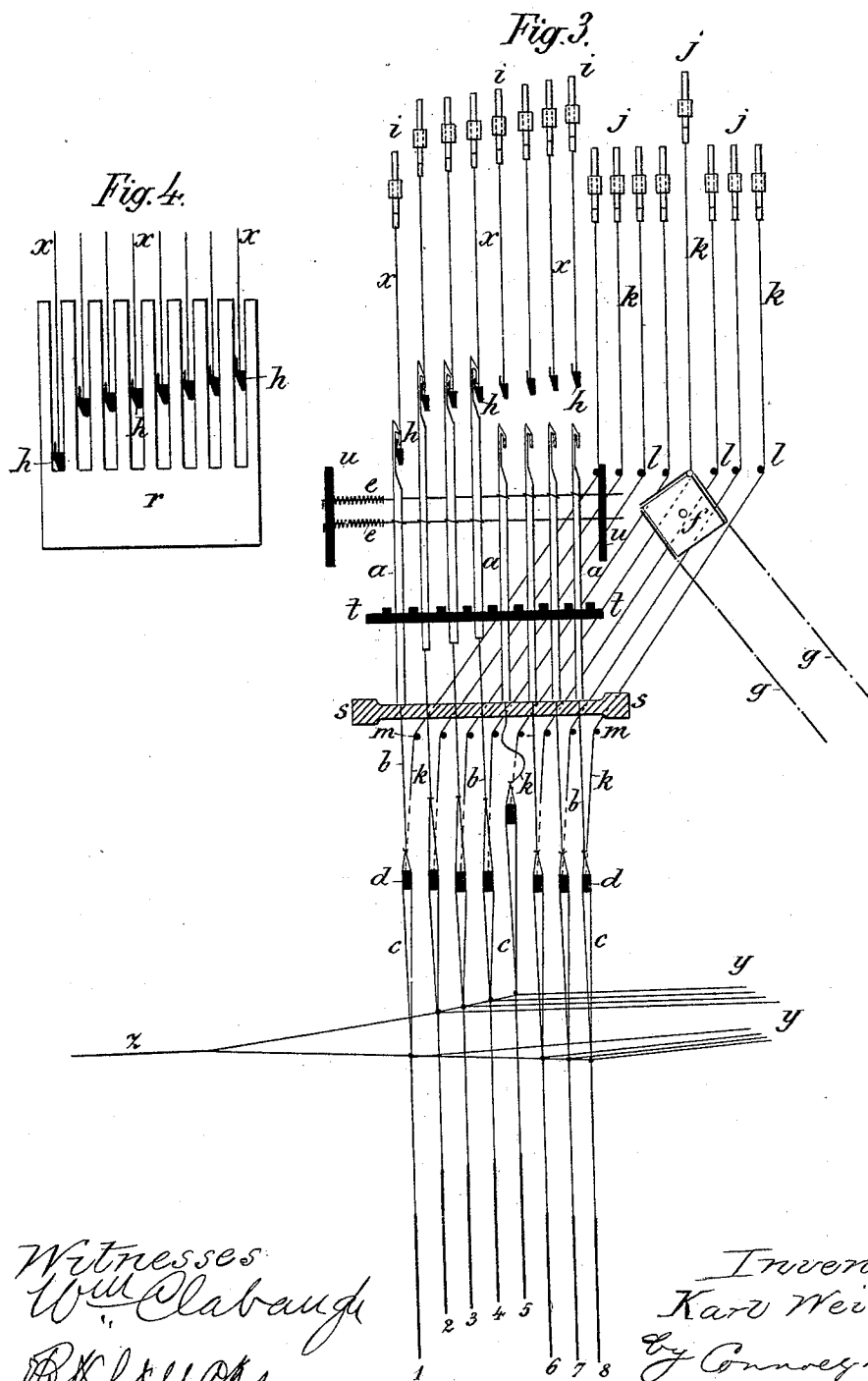
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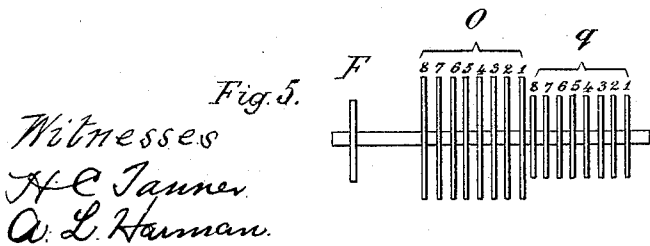
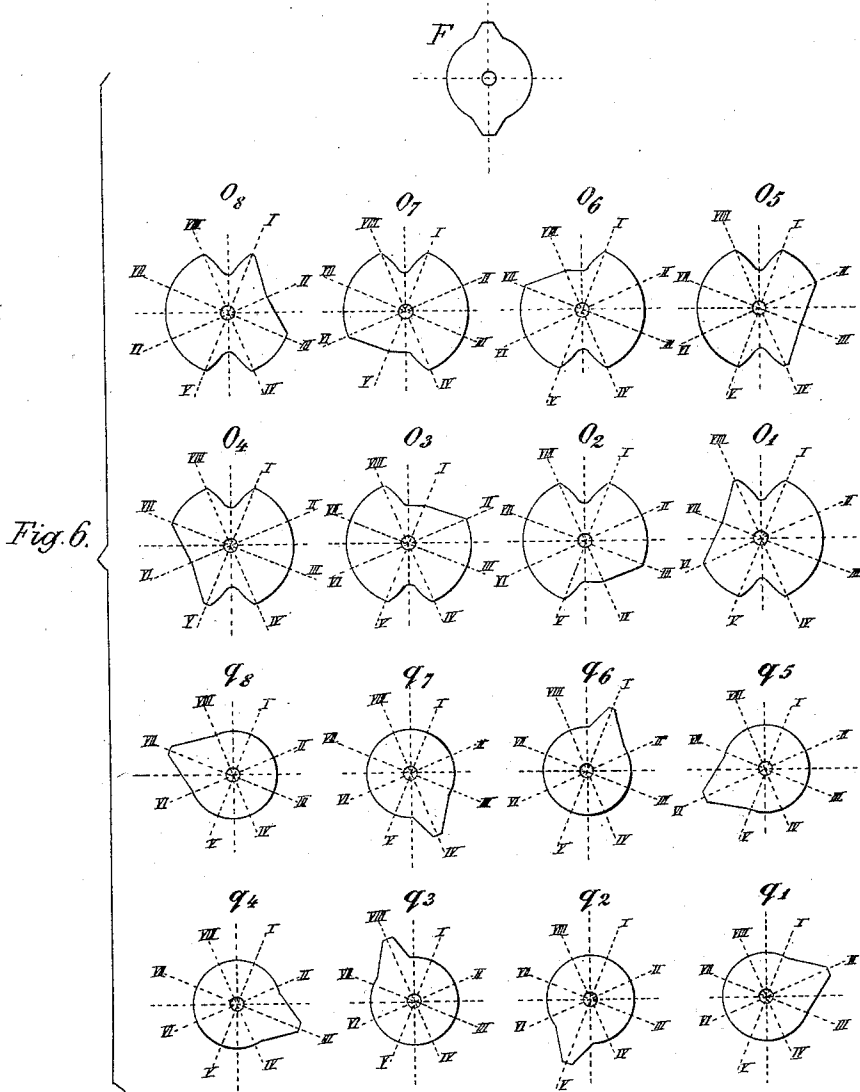
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KARL WEIN, OF KESMARK, AUSTRIA-HUNGARY.

SHEDDING MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 460,414, dated September 29, 1891.

Application filed July 21, 1887. Serial No. 244,854. (No model.) Patented in Germany June 22, 1887, No. 42,447; in England June 27, 1887, No. 9,123; in France June 27, 1887, No. 184,460; in Belgium June 28, 1887, No. 77,991; in Italy June 30, 1887, XXI, 21,915, and in Austria-Hungary October 27, 1887, No. 37 and No. 1,953.

To all whom it may concern:

Be it known that I, KARL WEIN, a subject of the King of Hungary, and a resident of Kesmark, Austria-Hungary, have invented certain new and useful Improvements in Shedding Mechanisms for Looms, (for which I have obtained the following patents: in Germany No. 42,447, dated June 22, 1887; in England, No. 9,123, dated June 27, 1887; in France, No. 184,460, dated June 27, 1887; in Belgium, No. 77,991, dated June 28, 1887; in Italy, No. XXI, 21,915, dated June 30, 1887, and in Austria-Hungary, No. 37 and No. 1,953, dated October 27, 1887,) of which the following is a specification.

The present improvement in looms relates to Jacquard machines; and it consists in novel constructions of the mechanism for lifting and dropping the warp-yarns in weaving linen damask.

The object of this invention is to simplify the construction of looms used for weaving linen damask. Ordinarily in weaving damask, besides the ordinary Jacquard mechanism, a separate front mounting—that is to say, an independent set of leaves—had to be introduced between the Jacquard machine and the batten. By the present improvement this separate front mounting is dispensed with. In ordinary Jacquard looms the bars or knives for lifting the hooks are all fixed to a frame and are not separately movable; further, each horizontal needle holds only a single hook, and, finally, each of the heddles attached to the hooks is lifted only by its respective hook.

According to the present invention each lifting-bar or knife is made separately movable; further, each needle is attached to several hooks, and finally, for the purpose of enabling the heddles attached to the hooks to be lifted and dropped independently of the movement of the hooks, separate shaft-rods are arranged in the heddles carrying the warp-threads.

The accompanying drawings show the present improvements adapted for weaving eight-twilled damask.

Figure 1 is a front view of the improved Jacquard mechanism with closed shed. Fig. 2 is a side view of the same with closed shed.

Fig. 3 is the same with open shed. Fig. 4 is a side view of a guide-plate *r* for the lifting-bars *h*. Figs. 5 and 6 show the cams necessary for the actuation of the shaft-rods *d* and lifting-bars *h*. Fig. 5 is a view of the entire group; and Fig. 6 shows each cam *o'* to *o''* and *q'* to *q''*, separately.

The cam *F*, arranged on the same shaft with the others, is used for actuating the Jacquard cylinder in the ordinary way.

The numerals I to VIII on each of the cams *o* and *q* indicate the relative position of each cam at each of its eight positions during one revolution of the shaft.

The mode of the attachment of the present improvement in Jacquard machines to ordinary hand or power looms does not differ essentially from the well-known mode of making the attachment of an ordinary Jacquard machine to looms, and therefore need not be particularly described.

a are the hooks; *e*, the needles holding the hooks; *u*, the needle-frame; *h*, the bars or knives for lifting the hooks; *b*, the threads connecting the hooks *a* with the heddles *c*. *y* is the warp, and *z* is the fabric. *f* is the Jacquard cylinder, and *g* are the cards. All these parts do not differ in construction, essentially, from the corresponding well-known parts in an ordinary Jacquard loom, except in that the bars *h* are made separately movable and that each of the needles *e* holds several hooks *a*. Each of the bars *h* is separately attached to two chains *x*, one of the chains *x* running over one of the rollers *w* and under the other roller *w* and connected to one of the levers *i*. The bars *h* are guided in their movements up and down by means of two slotted guide-pieces *r*, one of which is shown separately in Fig. 4. The lifting of the levers *i* may be effected by any suitable mechanisms. Fig. 1 shows the use of cams *o*.

d are shaft-rods arranged in the upper part of the heddles *c* and lifted or dropped by means of cords *k*, running over rollers *v* and through guides *m* *l* and connected with levers *j*. The lifting of the levers *j* may be effected by any suitable mechanisms. Fig. 1 shows the use of cams *q*. The arrangement of the shaft-rods *d* in the heddles *c* is such that the

heddles *c* may be raised by the hooks *a* without disturbing the shaft-rods, as shown at 2 3 4 in Fig. 3.

t is a slotted guiding-piece for the hooks *a*.
5 *s* is the plate on which the ends of the hooks rest.

The following description will explain how linen damask is woven with the present improved Jacquard attachment. As in the ordinary weaving of linen damask the cards *g* are perforated only corresponding to the pattern, and therefore without regard to the binding—that is to say, without regard to intermediate intersections of warp and weft—the card-cylinder *f* is not turned—that is to say, the cards are not changed—until four picks with the shuttle have been made. On pressing the card-cylinder *f* against the needles, as shown in Fig. 2, that set of four hooks *a* for whose needle the card *g* is not perforated will be pushed out of the path of bars *h*, and therefore will not be lifted when these bars are raised, as shown in Fig. 3. The other set of four hooks, on the contrary, will remain in the path of their respective bars *h*, Fig. 2, and will be lifted when these bars are raised, as shown in Fig. 3.

As above stated, the cards are perforated only with reference to the pattern to be woven and not with regard to the binding of the fabric. In order to effect this binding, therefore, only seven bars are raised entirely for the first pick of the shuttle, while the eighth bar is raised only so high that it takes hold of its respective hook *a*, Fig. 3. The connection of the warp-yarn lying in the lower shed is effected by the shaft-rods *d*, one of which is lifted, as shown in Fig. 3. Figs. 2 and 3 also show how the shed is formed for the first pick of the shuttle. For the second pick of the shuttle the shed is formed by dropping one of the bars *h*, (but not so far as to let go the hooks resting on the same,) while the bar which was below at the time of the first pick is raised. At the same time, also, one of the shaft-rods *d* is raised, while the shaft-rod which was formerly raised is now dropped. In the same manner as for the second pick of the shuttle the formation of the sheds for the third and fourth picks is effected. All these four picks take place without changing the first Jacquard card. After the fourth pick of the shuttle all the bars *h*, as well as the above last-mentioned shaft-rod, are dropped. The bars are dropped so far that the second card can by aid of the needles move the hooks into or out of the action of the bars. Thereupon again seven bars are lifted, as in the case of the first pick of the shuttle, and so on, as before described. The deeper dropping of the bars at the moment when the Jacquard cylinder acts with its card on the needles and hooks is effected by the depressions *n* in the cam *o*, Fig. 1. This cam is one of the eight cams acting on the eight bar-levers *i*. The cam *q* (drawn in dotted lines in Fig. 1) is one of the eight cams acting on the eight shaft-

rods *j*. All these sixteen cams are fixed to the same axle or shaft, and, as in the particular construction of apparatus shown eight-twilled atlas is to be made, they make a full revolution in the course of eight picks of the shuttle.

In the place of the cams *o* and *q* for lifting the bars and shaft-rods by means of the levers *i* and *j*, other mechanisms may be used without departing from the substance of this invention.

The reason for holding the depressed bar *h* in Fig. 3 in its intermediate position in engagement with the corresponding selected hooks is as follows: The mechanism which effects the raising and lowering of the bars or knives is so arranged that when they have been dropped and by the action of the card on the needles the displacement of certain of the hooks *a* has taken place the said bars are raised so high as to engage in all the hooks left in their path, and seven of the bars in their upward movement lift up the hooks held by them. The one bar *h* left below in Fig. 3 is raised sufficiently to become engaged in the hooks held by it, so that when at the time of the next pick this bar goes up the hooks held by it will be taken up with it. In the same way all those bars which are dropped in the course of the picks or shots to be woven on one card never go so far down as to let go their hooks. Only when all the picks of one card are woven are the bars allowed to drop so far as to release the hooks and allow them to be changed.

As regards the number of hooks held by one needle, this depends upon the number of warp-threads to be contained in the fabric in the corresponding part of the design and upon the number of needles of the jacquard—that is to say, upon the size of the jacquard with which the design is to be woven. In the drawings four hooks are shown as being held by each needle; but without departing from the substance of the invention two or three hooks, or even only one or more than four hooks, may be held by a single needle. In order to simplify the description, the jacquard referred to in the specification is shown with four hooks held by each needle. The following two examples will make this clear.

First example: Suppose a fabric is to be woven in which the design is to be formed of eight hundred warp-threads and a jacquard having four hundred needles is to be used—in this case eight hundred warp-threads to four hundred needles. Therefore two warp-threads and two hooks to each needle have to be used, and there will be about twenty threads to each centimeter breadth of the fabric.

Second example: Suppose with the same jacquard of four hundred needles a fabric of greater fineness is to be woven, which is to be of the same breadth as in the first example, but having sixteen hundred warp-threads

instead of eight hundred—in this case sixteen hundred warp-threads to four hundred needles. Therefore four warp-threads and four hooks to each needle have to be used, and there will be about forty threads to each centimeter breadth of the fabric.

I claim—

1. In combination with each other, the separately-movable lifting-bars *h*, the needles *e*, the hooks *a*, the shaft-rods *d*, and the heddles *c*, substantially as and for the purpose described.

2. In combination with each other, the separately-movable lifting-bars *h*, the slotted guide-plates *r* for the said bars, the needles

e, hooks *a*, the shaft-rods *d*, and the heddles *c*, substantially as and for the purpose described.

3. In combination with each other, the needles *e*, the hooks *a*, the separately-movable bars *h*, the shaft-rods *d*, the heddles *c*, the levers *i j*, and the cams *o* and *q*, substantially as and for the purpose described.

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

KARL WEIN.

Witnesses:

C. O. PAGET,

E. G. J. KOELLER.