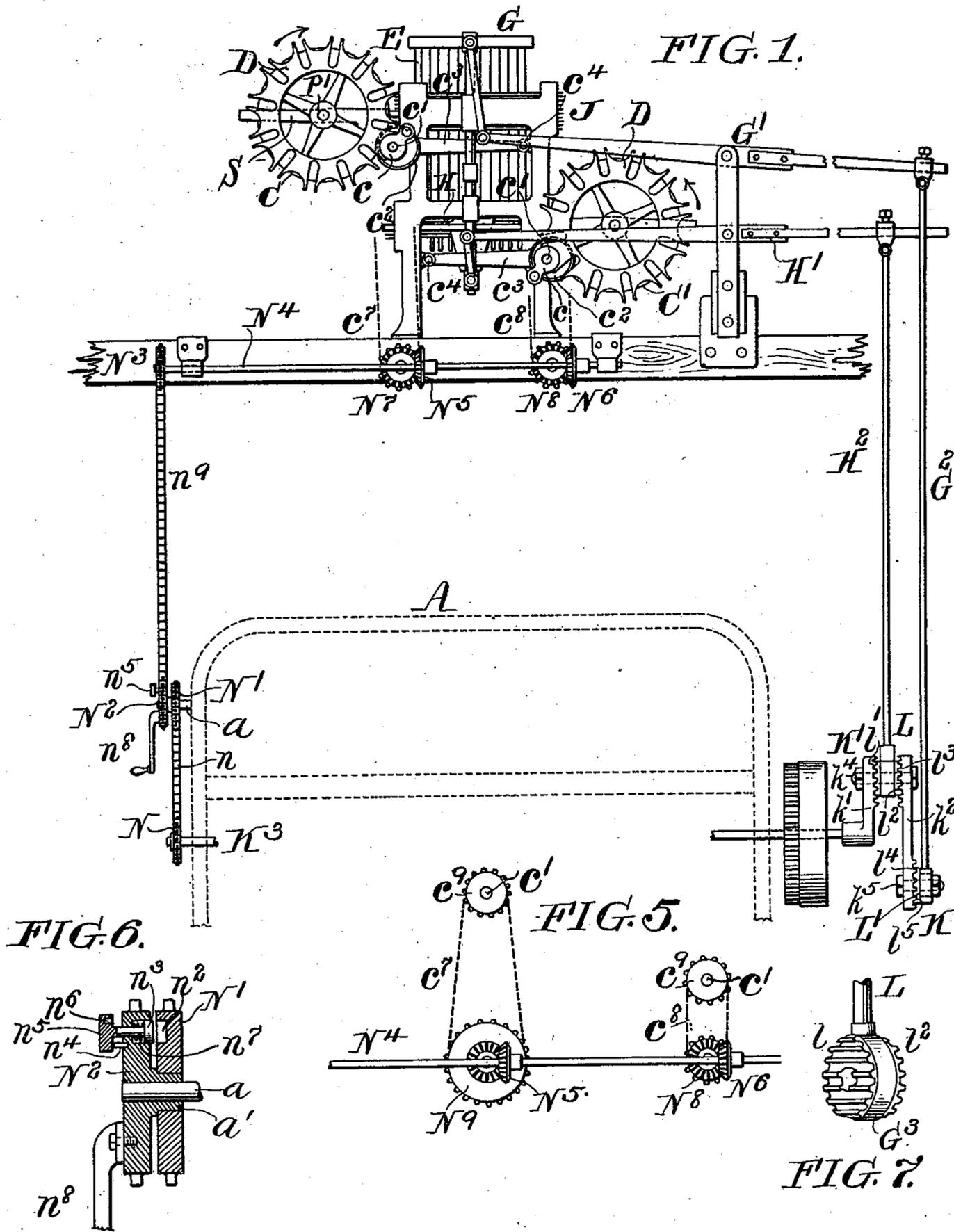


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JACQUARD MECHANISM FOR LOOMS.

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JACQUARD MECHANISM FOR LOOMS.

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To all whom it may concern:

Be it known that I, OTTO W. SCHAUM, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia, in the State of Pennsylvania, have invented a new and useful Improvement in Jacquard Mechanism for Looms, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part thereof.

My invention relates to Jacquard mechanism for looms, and has for its main object to provide a Jacquard apparatus, which, in many classes of work, will enable the designer to set up a pattern with about half the cards now necessary, and also to operate the jacquard much more satisfactorily than has heretofore been possible.

In certain classes of work, such, for instance, as weaving-quilts, it has heretofore been usual to provide a full-punched card, or, if a slight pattern were desired, a nearly full-punched card alternately with the main pattern-cards, thus necessitating a full or nearly full lift every other pick. It has been proposed to do away with the necessity of these full-punched cards, by arranging mechanical devices which will actuate all the hooks alternately with the pattern-cards. This last arrangement, however, does not permit anything but a full lift to be made, and does not lend itself to weaves wherein a certain number of picks of the pattern-threads are to alternate with another number of backing-picks. My present arrangement not only does away with nearly half the cards previously required, but it enables the operator to introduce any variety of auxiliary patterns independent of the main pattern, and alternately therewith in any desired ratio. To effect this improved operation, my invention consists, mainly, in providing two sets of needles to one set of hooks, some or all of which hooks are engaged directly with needles, both sets so that a hook is under the influence of two needles and actuating each set of needles by an independent indicator mechanism.

My invention also consists in various improvements in the details of the apparatus, which will be more clearly pointed out in the claims which are appended to and form part of this specification.

My invention will be best understood as explained in connection with the accompanying drawings, in which—

Figure 1 is a view of my improved Jacquard apparatus mounted in position on a loom, the frame of the loom being indicated in dotted lines. Fig. 2 is an enlarged view, partly in section, of my improved Jacquard apparatus. Fig. 3 is an enlarged view of one of the peg-wheels which I prefer to use as a card-presenting device. Fig. 4 is a detail view of the peg-wheel shown in Fig. 3, illustrating it and the presser-plate connected thereto in another position. Fig. 5 is a view of a modified form of drive-gear for operating the two indicating devices, as shown in Fig. 1, in a different ratio from the drive mechanism shown in that figure. Figs. 6 and 7 are views of details; and Fig. 8 is an enlarged view of one of the hooks, showing the manner in which the two needles operate upon it.

J is a Jacquard apparatus and is provided, as best shown in Figs. 1 and 2, with a set of hooks E, which are normally carried by any suitable support, as the hook-plate H, which has a series of grids *h* on which the hooks normally rest.

G is a griff-board having knives or griffs, which are adapted to engage with the hooks E and lift them to form the shed.

I have shown my improvement applied to a rise-and-fall jacquard; but it will be understood that it can be applied with almost, if not quite, as good results to any sort of jacquard.

F F' are two independent sets of needles, preferably arranged, as shown, one on one side and one on the other side of the hook-plate H or other support, which carries the hooks, and my hooks E are engaged by needles in both sets, so that a hook will be under the influence of two needles, and, as best shown in Fig. 8, I prefer to have one of the needles, which controls a hook, operate in one direction above the hook-support, and to have the other operate in the other direction below the hook-support.

C C' are indicator mechanisms, shown as card-presenting cylinders. In the arrangement shown these cylinders are constructed and operated substantially in the same manner as in the Jacquard apparatus shown in

United States Patent No. 507,635, granted to me on October 31, 1893, and though I prefer to employ the particular device there shown, it will, of course, be understood that any suitable card-presenting mechanism can be employed. As shown, the cylinder C has secured to it the star-wheel D, and this star-wheel is driven from a shaft c' , which is given a constant rotary motion from any suitable source of power. This shaft is journaled in the frame S, which supports the shaft P' of the cylinder. An eccentric c^2 , mounted on the shaft c' and connected to the main frame of the machine at c^4 by a suitable link c^3 , serves to reciprocate the said presenting-cylinder. Also mounted on the shaft c' is a pin-carrying plate c , which serves to give an intermittent rotary motion to the star-wheel D, and consequently to the cylinder C. The cylinder C' is shown provided with the same operative mechanism. The indicator mechanism C operates on the needles F and serves through them to move certain of the hooks out of the path of the griffs g . The indicator mechanism C' operates the needles F', and serves through them to operate the hooks in substantially the same way.

The action of the two needles on a hook is best shown in Fig. 8, where the hook is shown in the position it occupies just before the indication. It is supported on the grid h , and the needle F, which engages the hook at f , exerts its force, as indicated by the arrow, and moves the hook back to the position indicated in dotted lines. The needle F', which engages directly with the hook at f , exerts its force in the opposite direction, as indicated by its arrow; but as it operates on the other side of the fulcrum or support h of the hook from the point of action of the needle F, it moves the hook out of the path of the griff into the same position to which it is moved by this needle F.

In operation, where an article is to be woven which would need full-punched cards alternating with the pattern-cards, the pattern-cards are fed, say, by the cylinder C, and a few full-punched cards rotate on the cylinder C'. Each card-presenting mechanism then is run at half the speed of the loom, one of the cylinders presenting a pattern and the other a full-punched card. As a result of this, the loom can be driven at nearly twice the speed which has heretofore been possible without increasing the speed of the card-presenting devices. It will also be possible, of course, to run a pattern on the second cylinder C'. Thus an elaborate pattern which would run the entire length of an article may be indicated by the cylinder C, while a simple constantly-recurring pattern may be indicated by the cylinder C'.

My jacquard will also be found very advantageous in weaving such articles as table-covers where the ends have a comparatively elaborate pattern and the main body of the cover is either plain or provided with a sim-

ple pattern. Heretofore it has been usual to provide a card for each pick, necessitating a very great number of cards.

By my invention the end pattern can be set in one cylinder, as C. This, when its pattern is completed, can be put out of operation and a plain pattern on the other cylinder put into operation.

Various other arrangements will of course suggest themselves to an operator, and I have simply described one or two applications of the apparatus to indicate something of the wide scope of its usefulness.

In Fig. 1 I have shown the two cylinders C C' working pick and pick, in Fig. 2, the cylinder C being back and the cylinder C' just making an indication, and to operate them in this manner any suitable driving mechanism can be used. As shown, a rotating shaft K³ on the loom-frame A transmits motion to a shaft N⁴ by means of sprockets N N' and chain n , and sprockets N² N³ and chain n^9 . Bevel-gears N⁵ N⁶ on the shaft N⁴ mesh with gears N⁷ N⁸, which operate, by means of suitable chains c^7 c^8 , sprocket-wheels, as c^9 , (see Fig. 5,) on the shafts c' c' . The driving-gears for both the cylinders are of the same size, and the cylinder, if rightly set, will operate pick and pick. It is, however, very simple to operate either of the card-presenting mechanisms two or more times to one pick of the other mechanism. One way of doing this is shown in Fig. 5, where the connections, with the exception of the gear N⁷, are the same as those shown in Fig. 1. The gear N⁷, however, is replaced by a gear N⁹ of twice the diameter of the gear N⁸, and therefore the cylinder C will rotate twice as fast as the cylinder C', and therefore will regulate two picks to one of the cylinder C'. Any other ratio can obviously be provided by driving one cylinder so much faster than the other, and this can be done by any suitable drive-gear from some operating part of the loom. I will here remark that I prefer to operate the cylinders or card-presenting mechanisms in opposite directions, as indicated by the arrows in Fig. 1. This makes the ratio of the distance from the fulcrum to the engaging points of the upper set of needles to the distance from the fulcrum to the engaging points of the lower set of needles substantially equal on all the hooks.

In a rise-and-fall machine, such as is here shown, the hook marked e' is at the position which it occupies just before indication, and when the hook-plate is raised to the line indicated at h' and in this position, it will be seen that the distance from h to f , where a needle of the upper set engages with the hook, is substantially equal to the distance from h' to f' , where a needle of the lower set engages with it. The same ratio will hold for all the other needles.

In a card-presenting apparatus of the character shown, where peg-wheels, as P, serve to carry and present the cards and where a

presser-plate R, independent, as far as rotary motion is concerned, of the peg-wheels, serves to support the cards as they move against the needle ends; it very often happens that, as the peg-wheels revolve, the edges of the presser-plate will have a tendency to push the cards from the pegs and break the lacings. This action is illustrated in Fig. 4, where the presser-plate R is indicated in dotted lines in its usual position and where the cards T are shown in the position they are compelled to take in being drawn over the edges of the plate. To overcome this, I provide means independent of the mechanism which reciprocates the whole of the card-presenting apparatus for drawing back the presser-plate when it is not in operation and when the peg-wheels are being rotated. This is very conveniently effected by a cam which rotates with the peg-wheels.

As shown, S is the frame which supports the peg-wheels and presser-plate and also the shaft c' . A rod S' , mounted in suitable bearings, supports the frame S in the usual way. The presser-plate is usually supported rigidly on the frame S, but in my present arrangement I arrange it so that it can slide to and from the needles and needle-board, which I have indicated in dotted lines at F^3 . A pin s , fitting in a socket r' , affords a very convenient sliding support for the presser-plate, springs S^2 serving to draw the plate toward the shaft P' , on which the peg-wheels rotate. A cam-runner r on the plate R engages with a suitable cam P^3 on the wheels, which cam is so shaped that it pushes the plate forward into operative position as the card arrives in position, and the card-presenting mechanism moves forward to make an indication and permits it to move back under the influence of the springs S^2 out of the way of the cards as they are carried along by the peg-wheels.

In the connection from the power-shaft of the loom to the jacquard it is usual to provide two gears, which can be readily locked or disconnected, whereby the operator can at will disconnect the jacquard from the power-shaft and operate it by hand. $N' N^2$ are such gears. The gear N^2 is provided, however, with a hub a' , which projects, as shown, and the gear N' is mounted on the hub, thus making a very compact arrangement and greatly reducing wear. The gear N^2 is mounted on the stud a , which is secured to the frame of the loom A. To lock the two gears together, I provide a hole n^2 in the gear N' and a pin n^3 on the gear N^2 , which, when pressed into the hole n^2 by a spring n^7 , serves to lock the two gears together. To hold the pin out of engagement with the hole n^2 , a pin n^4 is arranged in the gear N^2 . When the head n^5 of the pin n^3 is drawn out into the position shown, it abuts against the pin n^4 and permits the gears to turn independently one of the other. On rotating the pin n^3 the hole n^2 in

the head n^5 will register with the pin n^4 and the pins n^3 will lock the two gears together. A crank n^8 serves to operate the gear N^2 and the jacquard when the two gears are separated. It will, of course, be understood that the projecting hub could be formed with the gear N' , if desired.

I have shown the griff-board and hook-plate, each movable, and operated by independent levers $G' H'$, which are operated from cranks on a drive-shaft, as K^2 , by means of links $G^2 H^2$. Heretofore it has been usual to adjust the throw of the levers $G' H'$ and consequently the opening of the shed by adjusting the position of the links $G^2 H^2$ on the levers, which necessitate an operative climbing up to the jacquard, which is usually set above the loom. By my improved cranks I am able to effect the adjustment at the loom itself. k' is a crank, which is provided with teeth l' . L is a crank-pin, which has on its faces teeth l^2 . A second crank k^2 with teeth at l^3 and l^4 is provided with a pin L' , which has teeth at l^5 . When the cranks are set up, the teeth in the pins and cranks are engaged, as shown to the right of Fig. 1, and the whole secured firmly by bolts $k^4 k^5$. The pins are adapted to receive collars secured to the ends of the links $G^2 H^2$, whereby these links are reciprocated. To adjust the throw of the shed, the pins $L L'$ are adjusted in or out, a distance corresponding to one or more teeth, suitable slots for the bolts being provided in the cranks, this, of course, shortening or lengthening the throw of the links. The teeth serve to keep the parts in definite alignment and also as guides to indicate the amount of adjustment required. If but one crank is required, a pin, as L' , toothed only on one side, can be secured to the face of the crank k .

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination in a Jacquard apparatus of a hook-support, two sets of needles, arranged one on either side of the hook-support, a set of Jacquard hooks engaged by needles in both sets, and a card-presenting indicator mechanism for each set of needles.

2. The combination in a Jacquard apparatus of a hook-plate on which the hooks are normally supported, a set of needles arranged above the hook-plate, a second set of needles arranged below the hook-plate, a set of hooks engaged by needles in both sets so that a hook will be under the influence of two needles, and card-presenting indicating mechanisms arranged on opposite sides of the Jacquard apparatus, one for operating each set of needles.

3. The combination in a Jacquard apparatus of a movable hook-plate, a set of needles arranged above, and an independent set of needles arranged below said hook-plate, a set of hooks engaged by needles in both sets so that a hook will be under the influence of

two needles, griffs, means for raising and lowering the griffs and hook-plate and card-presenting indicator mechanisms for each set of needles.

5 4. The combination in a Jacquard apparatus of two sets of needles with a set of hooks, engaged directly by needles in both sets, a hook-plate situated between the sets of needles, card-presenting indicator mechanism for
10 actuating each set of needles one situated above and the other below the hook-plate, and independent means for driving said indicator mechanisms.

15 5. The combination in a Jacquard apparatus of two sets of needles, a set of hooks, some or all of which are engaged by needles in both sets, and independent indicator mechanisms for actuating each set of needles, each of said indicator mechanisms consisting of peg-
20 wheels P provided with a cam P³ supported on a frame S, a presser-plate R supported on said frame so as to slide thereon and having a roller r engaging with the cam P³ and springs s² for drawing the presser-plate back

from the path of the cards, all substantially 25 as and for the purpose specified.

6. The combination in a Jacquard apparatus, of reciprocating mechanism for actuating the card-presenting apparatus, suitable peg-wheels, a presser-plate adapted to recip- 30 rocate with but not to rotate with the peg-wheels, and means, independent of the mechanism which reciprocates the whole card-presenting apparatus, for drawing back the presser-plate out of the path of the cards. 35

7. The combination in a Jacquard apparatus of peg-wheels having a suitable cam secured to and rotating with said wheels, a presser-plate which reciprocates with but does not rotate with the peg-wheels and means con- 40 necting the plate and cam as specified whereby the plate is moved out of the path of the cards at suitable intervals.

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Witnesses:

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