(No Model.) 3 Sheets—Sheet 1.

H. WYMAN.

PATTERN MECHANISM FOR LOOMS.

No. 509,712. Patented Nov. 28, 1893.

Fig: 1.

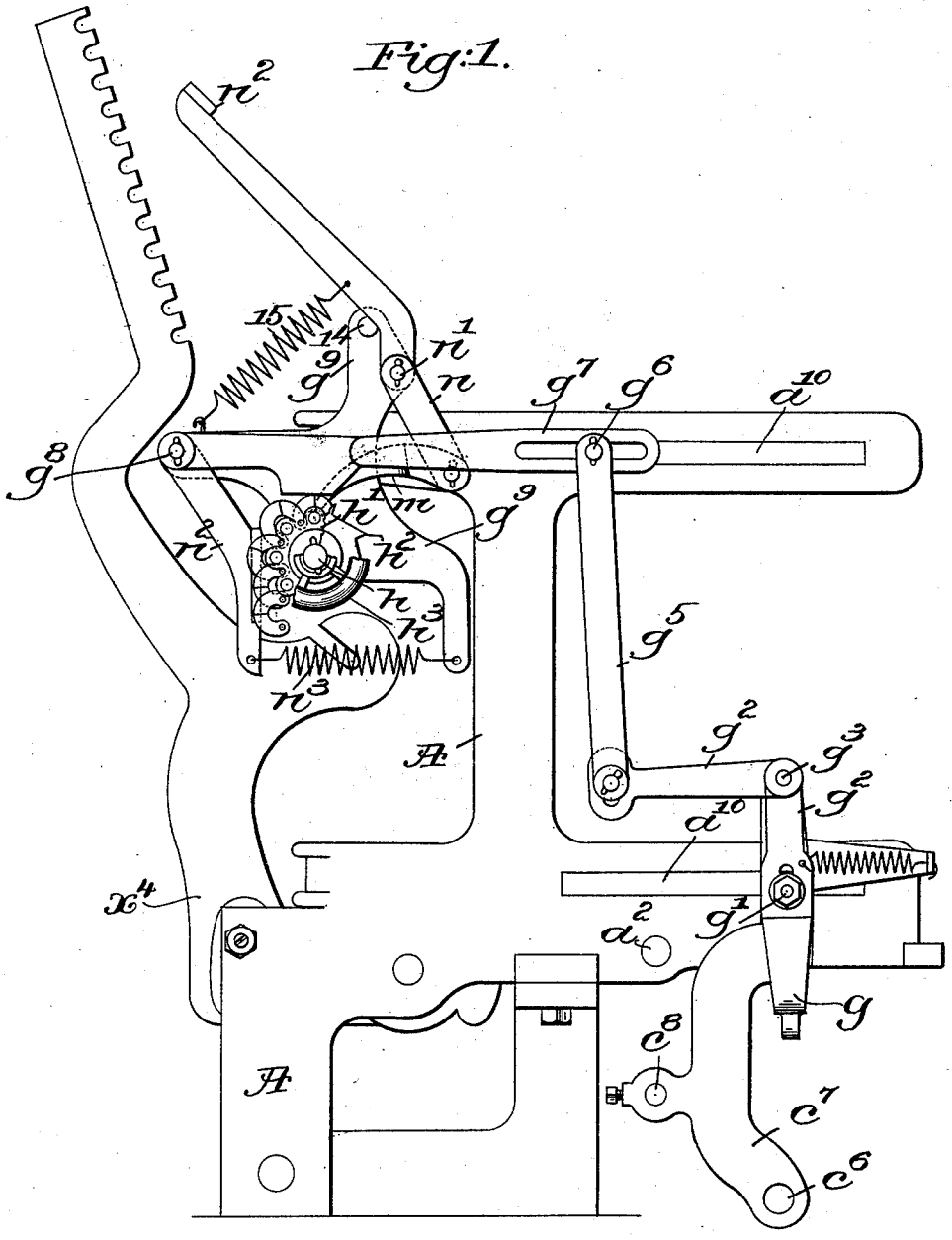

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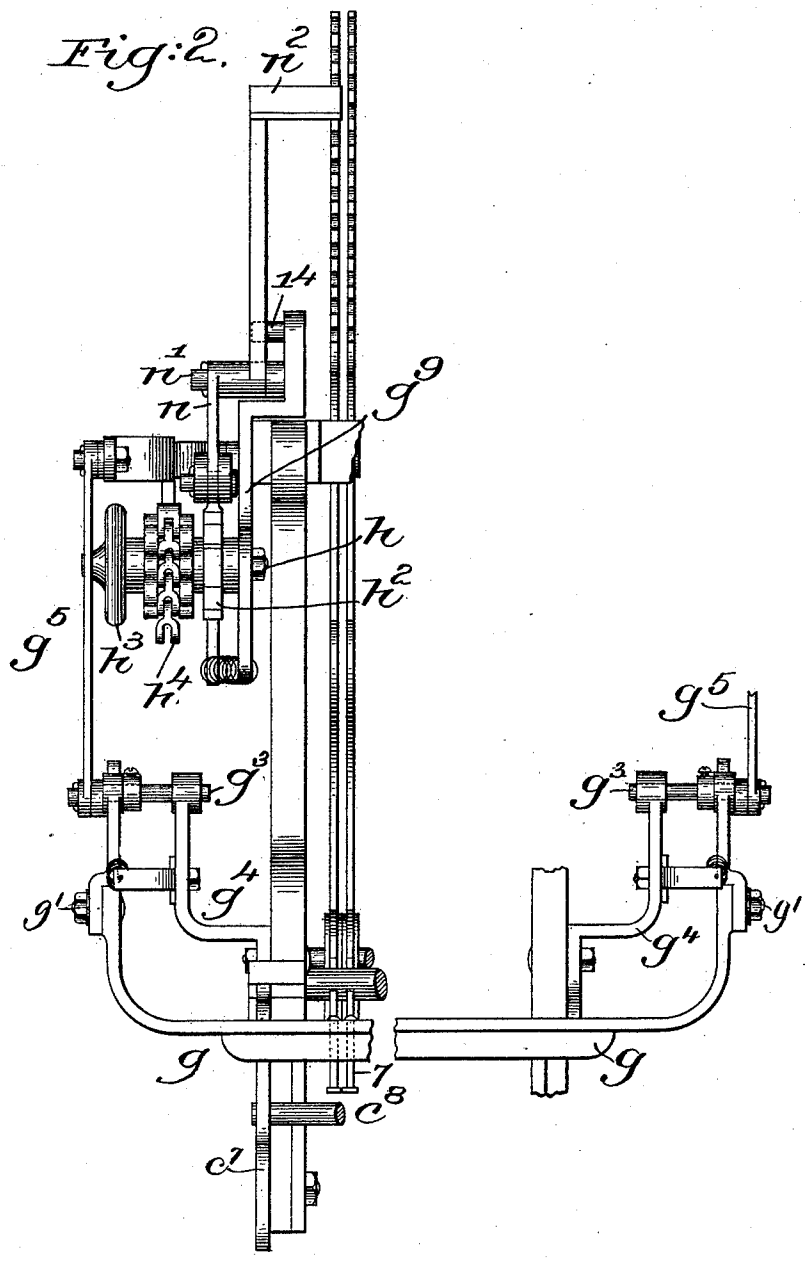
Fig. 2.



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(No Model.) 3 Sheets—Sheet 3.

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PATTERN MECHANISM FOR LOOMS.

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Fig. 3.

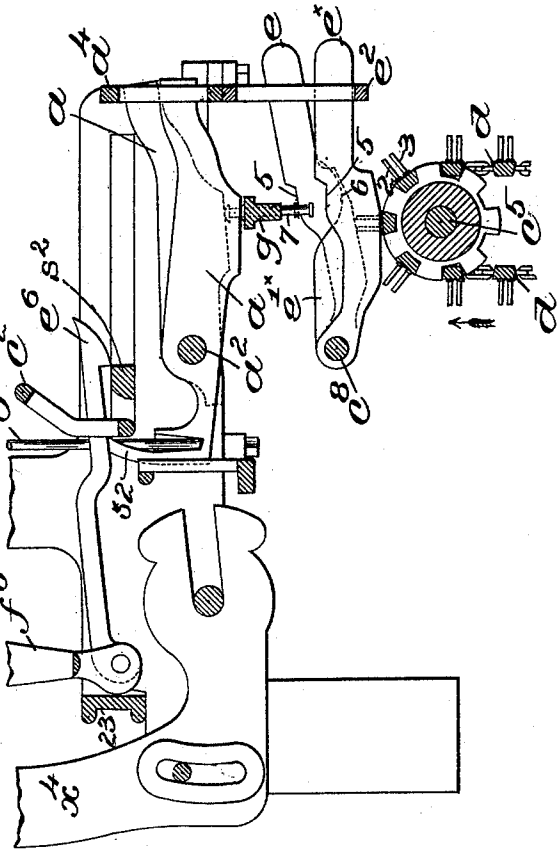


Fig. 5.

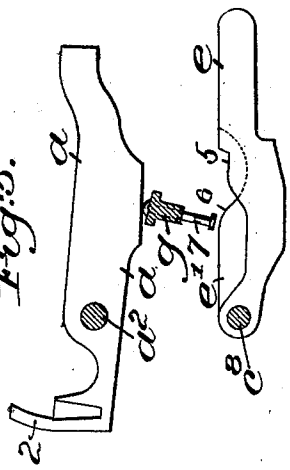
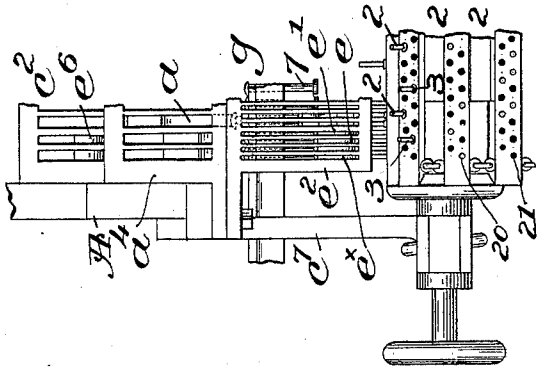


Fig. 6.

Fig. 4.



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UNITED STATES PATENT OFFICE.

HORACE WYMAN, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO THE CROMPTON LOOM WORKS, OF SAME PLACE.

PATTERN MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 509,712, dated November 28, 1893.

Application filed August 8, 1893. Serial No. 482,648. (No model.)

To all whom it may concern:

Be it known that I, HORACE WYMAN, of Worcester, county of Worcester, State of Massachusetts, have invented an Improvement in Pattern Mechanism for Looms, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

In the employment of pattern chains in looms, each bar or rod commonly has one row of indicators, there being as many bars or rods in the chain as there are picks in the pattern to be woven. Under such construction the length of the patterns which may be woven profitably is limited, for the longer the chain the greater its cost and weight, and the power required to move it.

The employment of a long chain is especially objectionable in high speed looms, and in that class of loom known as "dobby," and I have herein chosen to illustrate my invention as applied to a loom of the latter class, a loom substantially such as shown in United States Patent No. 336,683, granted to me February 23, 1886, but I desire it to be understood that my invention in pattern mechanism is not limited in its use to only such a loom for it may be used to great advantage wherever it is desired to save chain and weave long patterns.

In accordance with my invention a chain for the production of a pattern having hundreds of picks need be but a few inches long.

One peculiar and valuable feature of my invention consists in the combination with each indicator finger such as heretofore employed to lift jacks, of two or more multiplying fingers each with its own row of indicators, the bars or rods of the chain having two or more longitudinal rows of indicators.

This invention is not, however, limited to the use of a chain with bars, as its equivalent, a pattern cylinder, might be used with some patterns.

Another peculiar and novel feature of this invention consists in the employment of a series of movable transmitters interposed between the indicator fingers and the multiplier fingers. Said series of transmitters would be under the control of an auxiliary pattern surface to move them laterally, which, by such lateral shifting determines which of the multiplier fingers shall be made the actuators of the indicator fingers, that depending upon the fact of which row of indicators on the pattern surface is to control in the formation of the pattern then being woven.

As here shown and as the method which I prefer, the transmitter consists of a series of pins or needles carried in the frame under the control of an auxiliary pattern surface. As for instance, suppose a herring-bone pattern was being woven. One row of indicators on the pattern surface with one of the multiplying fingers would actuate the indicator fingers and hooks controlled by them to weave one half the figure, when the multiplying frame would be moved and the other row of indicators through the other multiplying finger would move the indicator fingers and hooks to form the other half of the pattern.

By the auxiliary pattern the pattern may be changed at the end of each round of the chain, or round after round may be used as the pattern requires.

Figure 1, in side elevation, represents a sufficient portion of a loom with my improvements added to enable my invention to be understood; Fig. 2, a view of the parts shown in Fig. 1 from the right; Fig. 3, a detail showing part of the main pattern surface, together with some of the multiplying fingers and indicator fingers and co-operating parts. Fig. 4 is a sectional detail showing part of the main pattern surface, the fingers referred to, their guides, part of a jack, part of a rocker, and a hook. Fig. 5 shows some of the parts of Fig. 3 in a different position, and Fig. 6 shows one of the fingers e' detached.

The loom frame A, the notched jacks x^4, the rocker f^6, but partially shown, it in practice having at its opposite ends a hook, each set of hooks having co-operating with it a griff s^2, the evener seat 23, the hook guide c^2, the indicator fingers a, a, pivoted at a^2 and having a horn 32, and the rod b, in practice extended from one to the other series of indicator fingers, the frame having slots a^{10}, a^{10},

for the movements of the griffs, are and may be all as in United States Patent No. 336,683, dated February 23, 1886.

In the drawings c^5 represents the pattern surface shaft, and in practice this shaft may be rotated from the crank shaft of the loom, and the griffs to engage the hooks at the upper and lower ends of the rockers f^6 may be actuated all as provided for in United States Patent No. 217,589, granted to George Crompton and myself.

The parts so far referred to by letters and figures being old and common, need not be herein further described.

In this present invention, instead of using a pattern surface such as provided for in said patents, it being a chain each bar of which has but a single row of indicators, I employ a chain, each bar d of which has, it may be, two or more rows of indicators 2, 3, the rows 2 representing a definite part of the pattern to be woven, and the rows 3, another definite part of the pattern, the rows 2 commonly acting in succession for one round of the chain, and the rows 3 at the next round of the chain, yet these rows may be made to act for more than one round or for less than one round, according to the requirements of the auxiliary pattern to be hereinafter described.

The pattern cylinder shaft has its bearings at c^6 in suitable stands c^7, at each side of the frame or head A, said stand also carrying the rod c^8 which constitutes the fulcra for the multiplying fingers e, e', having respectively acting surfaces at 5, 6, the said fingers differing somewhat in shape, the shape of fingers e' being as in dotted lines Fig. 3, and full lines Fig. 5. The fingers e will be acted upon, it will be supposed, by the indicators 2 and the fingers e' by the indicators 3. There are two or more of these multiplying fingers e, e' for each indicator finger a. The fingers e, e' extended through guides e^2 are thinner than the fingers a, extended through guides a^4. The fingers a and hooks e^6 correspond in number, and there are as many rockers and jacks as there are fingers a.

Between the fingers a and e, e', I have placed a multiplying bar, lever or frame g having a series of sliding pins or needles 7, so made,—preferably provided at their upper ends with heads, as shown in Fig. 3—, as to prevent the said pins dropping out of the said bar, lever or frame. The number of pins or needles 7 correspond with the number of fingers a, and the frame, as herein shown, consists of a yoke-shaped piece marked g, it being joined in suitable manner as by bolts g' to elbow levers g^2 pivoted at g^3 on a stand g^4 suitably fixed to the frame. The inner ends of the elbow levers are connected by links g^5 in an adjustable manner, as by a bolt g^6, to the auxiliary pattern finger g^7 pivoted at g^8 on a stand g^9, said stand having a stud h on which is mounted loosely the auxiliary pattern cylinder h' having an attached ratchet h^2 and a hand wheel h^3, the cylinder carrying in this instance of my invention a chain h^4 to constitute the auxiliary pattern surface, the said surface, of usual construction, having in practice suitable protuberances and spaces to raise or lower the finger g^7 and thus rock the frame carrying the pins or needles 7. The auxiliary pattern surface, as herein shown, is actuated intermittingly by a pawl m pivoted on a lever n pivoted on a stud n' carried by the stand g^9, said stand having a stop 14 to arrest the movement of said lever in one direction by the spring 15. To prevent the auxiliary pattern surface overrunning its movement by the pawl, I have provided a suitable brake n^2 pivoted also at g^8 and acted upon by a spring n^3. To actuate the lever and pawl m, I have utilized one of the notched jacks, it being drawn to the right, viewing Fig. 1, at the proper time, just as in shedding, the jack so used having co-operating with it a rocker, and a set of hooks, and fingers a and a set of fingers $e^\times$, $e'^\times$, the latter fingers being acted upon by the row of pins 20 carried by the pattern surface. The auxiliary pattern surface will be actuated only on the occurrence of the pins 20 in holes 21.

In operation let it be supposed that the row of indicators 2 is being used in the pattern, said pins acting on the fingers e, the pin carrying frame being then as shown in Fig. 3, said fingers e being worked in the order of the pins 2, the pins of the row 2 varying more or less in number as required for, say, one-half the length of the pattern. The main pattern surface having worked once over the series of rows 2 of pins, and one-half the woven pattern having been completed, the auxiliary pattern in its movement indicated by a pin 20, will shift the frame g into the position shown in Fig. 5, so as to put the pins or needles 7 over the acting parts 6 of the fingers e', and after this the indicators 3 of the rows of indicators will in lifting the fingers e', effect the raising of the fingers a. When the frame and pins 7 are as in Fig. 3, should an indicator 3 lift a finger e' it would not effect a change of shed, for it will be seen that the said fingers e' have depressions at 22 so that they cannot strike the pins 7 when the frame g is as in Fig. 3, and when the frame g is as in Fig. 5, the fingers e cannot strike pins 7 if lifted by the indicators 2.

Prior to this invention I am not aware that one set of indicator fingers controlling hooks has ever been under the control of two or more multiplying fingers, and consequently this invention is not limited to the exact construction shown for the said devices; nor to the exact construction shown of the devices for carrying and moving the pins 7 into their working positions from the auxiliary pattern surface.

The multiplying frame g and its needles

constitute what I may denominate transmitting mechanism, said devices transmitting the motion given to fingers *e* or *e'* to the fingers *a*.

This invention is not limited to the exact construction shown of the said transmitting mechanism, as the same might be variously modified within the skill of a mechanic and yet embody my invention.

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

1. In a loom, an indicating finger, and two co-operating multiplying fingers, combined with a pattern surface having two series of indicators one series for each multiplying finger, substantially as described.

2. An indicator finger, two co-operating multiplying fingers, and a pattern surface to move the multiplying fingers, combined with a transmitting mechanism located and made movable between said fingers, substantially as described.

3. The indicator fingers, the multiplying fingers made in pairs and having acting surfaces and depressions located in different planes transversely with relation to the fingers, combined with transmitting mechanism located and made movable between said fingers, a pattern surface to move the multiplying fingers, and devices to move the said transmitting mechanism, substantially as and for the purpose described.

4. The indicator fingers, the hooks actuated thereby, a multiplying frame having pins or needles, and an auxiliary pattern surface, and means between it and said frame to shift it, combined with a series of multiplying fingers two for each indicator finger, and a pattern surface to move the multiplying fingers, substantially as described.

5. The indicator fingers, the hooks actuated thereby, a multiplying frame having pins or needles, and an auxiliary pattern surface, means between said pattern surface and said frame to shift said frame, and means to operate said auxiliary pattern surface intermittingly, combined with a series of multiplying fingers two for each indicator surface, and a pattern surface to move the multiplying fingers, substantially as described.

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

HORACE WYMAN.

Witnesses:
JUSTIN A. WARE,
SAMUEL B. SCHOFIELD.