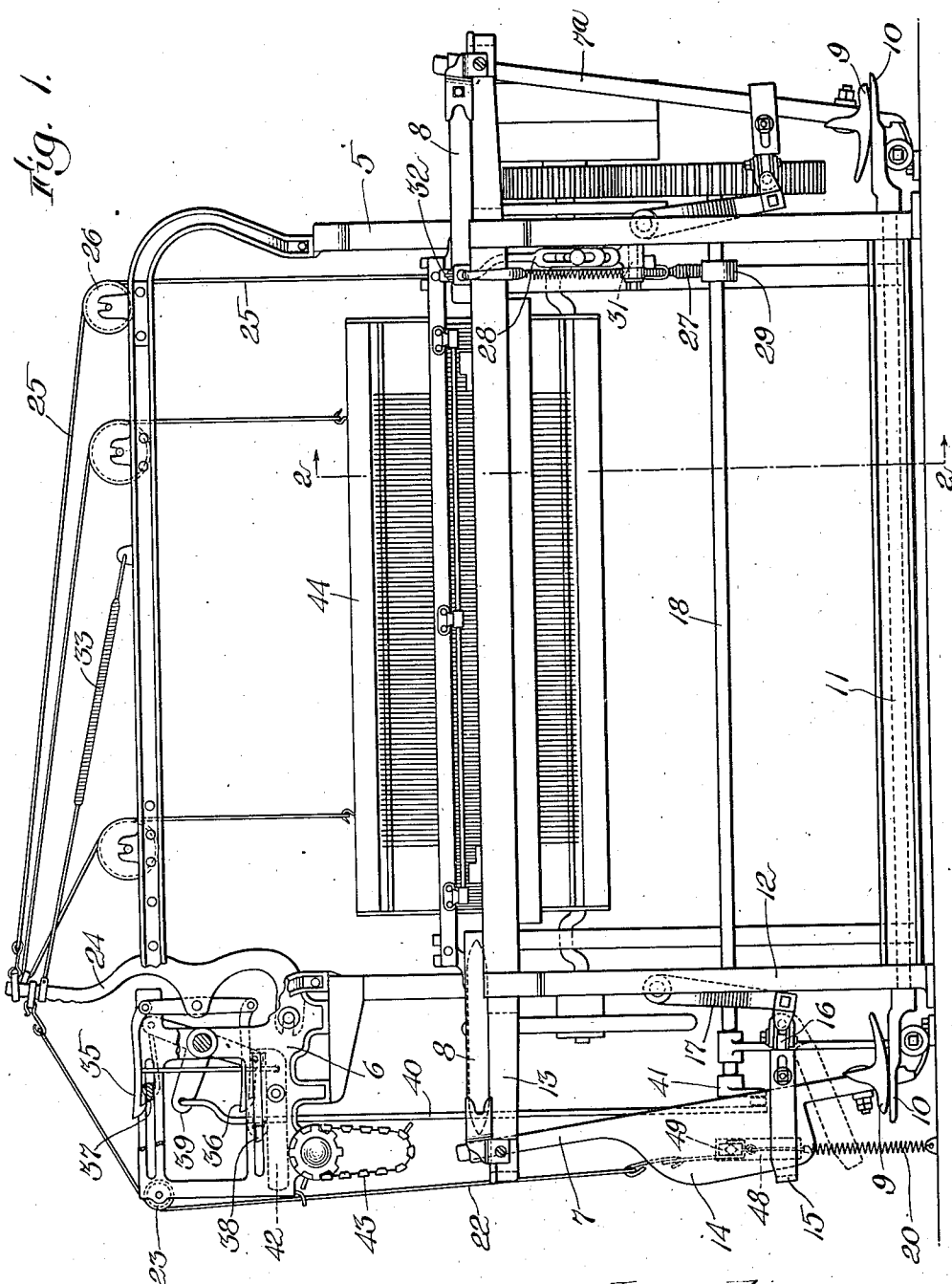


J. REYNOLDS.
 APPARATUS FOR PRODUCING OPENWORK FABRICS.
 APPLICATION FILED APR. 29, 1915.

Patented Feb. 8, 1916.

2 SHEETS—SHEET 1.

1,171,249.

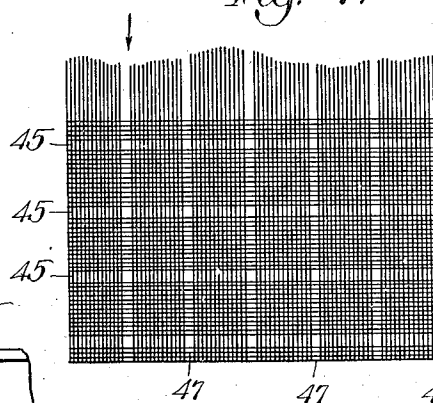
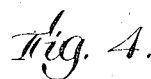
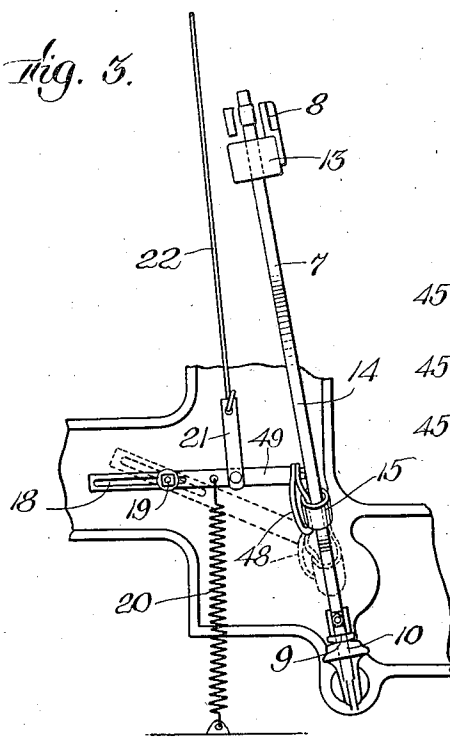
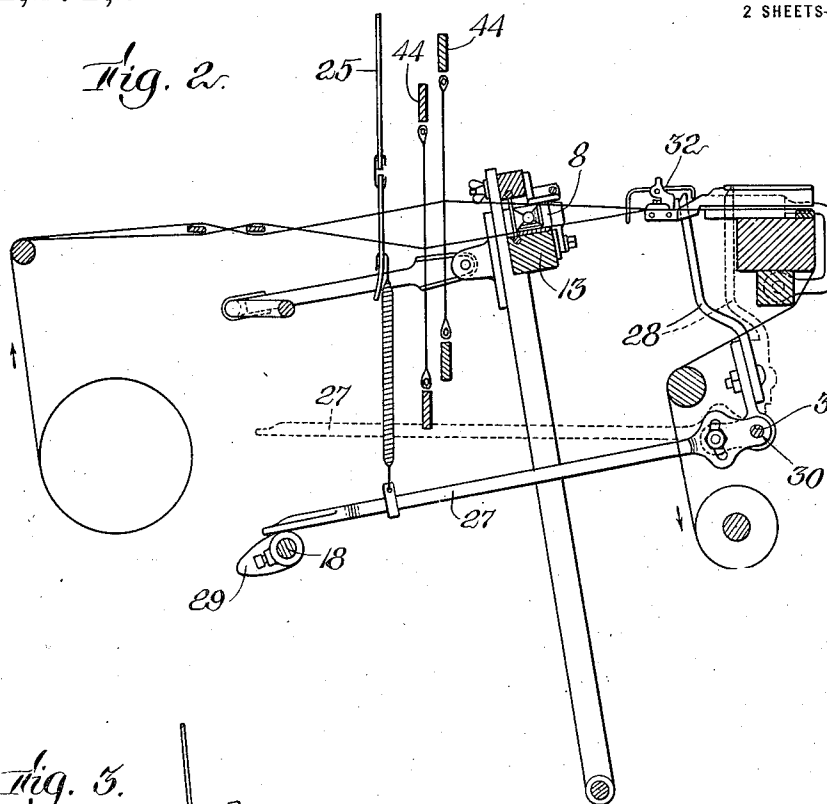


Inventor:
 John Reynolds,
 by *Carroll H. Curtis*
 Attorney.

Feb. 8, 1916
—SHEET 2.

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1,171,249.

Patented Feb 2 1904.
2 SHEETS-

Inventor:
John Reynold
by *Ernest H. Cunn*
Atto

UNITED STATES PATENT OFFICE.

JOHN REYNOLDS, OF NEW BEDFORD, MASSACHUSETTS, ASSIGNOR TO BUTLER MILL, OF NEW BEDFORD, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

APPARATUS FOR PRODUCING OPENWORK FABRICS.

1,171,249.

Specification of Letters Patent.

Patented Feb. 8, 1916.

Application filed April 29, 1915. Serial No. 24,641.

To all whom it may concern:

Be it known that I, JOHN REYNOLDS, a citizen of the United States, residing at New Bedford, in the county of Bristol and State of Massachusetts, have invented new and useful Improvements in Apparatus for Producing Openwork Fabrics, of which the following is a specification.

My invention relates to apparatus for producing open-work woven fabrics; and its objects are to produce open-work in a direction transverse of the fabric by leaving out at predetermined intervals certain of the filling threads, to make all kinds and combinations of longitudinal and transverse open-work for any distance for an even number of picks without affecting the speed of the loom; and to effect such rearrangement and modification of parts of the loom as could best bring about such result.

Primarily, my invention resides in a new arrangement of loom mechanism for causing one of the picker sticks to remain at rest during periods recurring at regular unit intervals, and to dispense with a number of picks while the woven cloth is being taken up, the result being to effect lines of open-work transverse of the cloth of a width and spacing corresponding to said periods and intervals.

My invention further consists in the novel arrangement of parts and modifications of loom mechanisms hereinafter more particularly set forth and claimed.

Prior to my invention, what is known as "open-work" in woven fabrics has been accomplished commercially in three principal ways which are essentially different in their nature; first, by the non-inclusion of warp threads brought about through skipping or leaving empty dents in the reed because of the drawing in of the warp pattern, and secondly, by the chemical change and destruction of certain of the filling threads after they have been incorporated within the woven cloth, and thirdly by laying upon the face of the cloth without the shed certain of the filling threads and afterward removing the same. Other methods different from my invention have also been employed in the endeavor to accomplish a similar result such as using an empty shuttle or as throwing out the pick cam, but such methods have

been merely experimental in character and of negligible commercial value. In the second case, above referred to, where the removable weft threads are interwoven, these threads are formed of a material which is capable of being disintegrated through the action of some acid which it is assumed does not affect the material of the remaining threads of the fabric; and in the third case where the removable weft threads are laid upon the fabric outside of the warp shed, the free portion of said threads, not being an integral part of the woven cloth, may be cut away close to the ends thereof and thrown away. While the first method above specified for leaving out the warp threads has been in use for many years for producing open-work lengthwise of the fabric, no practicable process or device has, so far as I am aware, been devised for yielding the same result in the direction of the filling threads except through the elimination and destruction of certain of such threads after they have been laid by the shuttle as above set forth. In other words, no one has been able heretofore practically to produce open-work by the non-inclusion in the first instance of filling threads of a character similar to that accomplished by the non-inclusion of warp threads by leaving open dents in the reed.

As is obvious, each of the methods above described for removing certain of the weft threads by destroying or cutting clear the same is wasteful of material and is cumbersome, laborious, and costly, the employment of acid being particularly unsatisfactory because of the length of time required for the process and of the uncertain action of the acid upon the permanent fabric; and the laying of filling threads outside of the shed occasioning mechanical difficulties and disarrangements, and requiring the constant attention of operators of great skill and experience.

By the use of my improved method, I am able to produce transverse open-work in the cloth without laying certain of the filling threads to bring about that result, and therefore I am not under the necessity of removing any of the filling threads by destroying the same or by any other means. Accordingly, I believe myself to be the first person who has ever been able to accomplish

such result through such actual non-utilization of weft threads by the omission of picks as herein set forth.

Attention is hereby directed to the drawing in which similar numerals of designation refer to similar parts throughout the several views.

Figure 1 is a front elevation of a loom with dobby head, a portion of the mechanism being removed for the purpose of better showing my improved device and connections incorporated therein; Fig. 2 is a vertical section of the lay and adjacent parts on line 2—2 of Fig. 1, looking in the direction of the arrows, showing my new mechanism for temporarily throwing out the stop motion during the production of the transverse open-work; Fig. 3 is an end elevation of the bladed picker stick and adjacent parts, and Fig. 4 is a view of one of the varieties of open-work cloth woven upon the machine.

Referring to the drawing,—I prefer to incorporate my new invention within a loom 5 and dobby head 6 of the same general construction as that in common use, and provided with the usual attachments. If desired, however, my device may be embodied and used to advantage in plain, fancy, or 30 box looms, or in fact in any form of loom in which pickers are employed for throwing the shuttle through the shed. As is usual in this form of construction, the upper end of each picker stick 7 and 7^a projects 35 through a vertical slot in the end of the lay 13 into a shuttle box 8 secured thereto, the lower end of each of said sticks being provided with a rocker 9 pivotally mounted upon a rocker foot 10 which is secured to 40 one end of the rocking shaft 11 journaled in suitable bearings upon the main frame 12. In constructing the picker stick 7, however, I depart radically from the usual form employed, in that I make the same with 45 the broad blade 14 which is preferably integral therewith. Normally engaging with said blade 14 is the elongated lug strap 15 secured to the sweep stick 16, which is attached to the picking arm 17 operatively 50 connected through the usual mechanisms to the lower shaft 18.

Principally through the construction of the picker stick 7 with the broad blade above described and mechanism for inducing the 55 lug strap 15 to drop out of engagement therewith at predetermined intervals. I am enabled to cause the said picker stick to remain at rest during an even number of picks without stopping the machine. As a part 60 of said mechanism, I employ the lever strap 48, the loop of which engages with the lug strap 15, and which is secured to the outer end of the lever 49, the inner end thereof being provided with the slot 18 by which it 65 is pivotally secured by the pin 19 to the

frame of the loom adjacent thereto. (See Fig. 3). A helical spring 20, one end of which is connected with the floor, and the other end with said lever 17, serves when unopposed to pull the lug strap 15 downwardly into the position shown in dotted lines (see Figs. 1 and 3), and thereby to throw the same out of engagement with the blade 14 of the picker stick 7. The said lever, however, is normally held in operative engagement with the blade 14 by means of the lug 21, secured to the lower end of the cord 22, the upper portion of which passes over the idler roll 23 upon the dobby head 6 and is fastened to the harness lever 24, which is normally in the position shown. As is obvious, the said harness lever serves to control the engagement of the lug strap 15 with the blade 14, the movement of said lever toward the left causing the said strap to drop out of said engagement when the picker stick 7 will be at rest, and its return movement restoring said strap to operative position when the regular movement of the said picker stick will again be effected.

In order to prevent the stoppage of the machine through the action of the filling fork 32, when the movement of the shuttle is temporarily arrested at such times as the picker stick 7 may be at rest as above described, I have also provided a means for throwing out the stop motion during said periods of rest. To the said harness lever 24 normally held in the position shown by the spring 33, I fasten one end of the cord 25 which passes over the pulley 26 upon the frame 5 and is affixed to the free end of rod 27, the other end of which is secured to the lower end of the oscillating bar 28. Normally, such free end rests upon and is operated by the cam 29 upon the lower shaft 18 in the well known manner, the rod 27 having an opening 30 through which projects the bolt 31 secured to the main frame 5 and oscillating thereon. Such arrangement permits the lever 27 to move upward as shown in dotted lines, the result of which is for the time being to throw the upper end of the oscillating bar out of possible engagement with the claw of the filling fork 32, and thereby to prevent the stoppage of the loom by the absence of the filling thread.

As will be observed, the arresting of the picker stick 7, and the throwing out of the stop motion are simultaneously controlled by the harness lever 24, the movement thereof to the left serving to effect both these results at the same time. As is usual with dobbies of the well known construction shown in the drawing, all the harness levers are connected by oscillating levers 34 to latches 35 and 36 which engage when in operative position with sliding knives 37 and 38 respectively, actuated by rocker arms 39 operatively connected with the lower shaft 130

in, a lug strap encircling said picker stick and operatively connecting the same with the picker stick means for temporarily engaging with said lug strap, and the stop motion of the loom with the disengagement of said enlargement.

picker stick mechanism, a picker stick formed intermediate the ends thereof, a broad blade intermediately connecting said picker stick and operatively connecting said blade with the picker stick mechanism, and means for engaging with said blade during a predetermined period of time for disconnecting the same from the picker stick, while the remainder of said loom continues in motion.

picker stick mechanism, a picker stick having a broad blade intermediate the ends thereof, a broad blade intermediately connecting said picker stick and operatively connecting the said blade with the picker stick mechanism, a dobby head, means for disengaging said blade during an even number of picks of the said loom, and means for throwing out the stop motion of said loom while said blade is out of engagement with said enlargement.

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picker stick mechanism, a picker stick having a broad blade intermediate the ends thereof, a broad blade intermediately connecting said picker stick and operatively connecting the said blade with the picker stick mechanism, a dobby head, means for disengaging said blade during an even number of picks of the said loom, and means for throwing out the stop motion of said loom while said blade is out of engagement with said enlargement.

18 by the rod 40 and crank 41. The usual fingers 42 and connecting mechanism are employed for controlling the engagement of said latches, the pegs of the dobby chain 43 operating in the selection of the same in the well known manner. For the purpose of clearness, I have illustrated in the drawing only those pegs which actuate the harness lever 24.

10 The preferred operation of my invention is as follows: The design of open work having been determined upon, and the pegs of the dobby chain 43 arranged accordingly, the loom is started. Through 15 the shed effected by lifting of certain of the harnesses 44 (of which only one is shown in Fig. 1) the shuttle is thrown by the picker sticks 7 and 7^a in the well known manner; and this operation is continued until the 20 harness lever 24 is actuated by the peg provided therefor upon the dobby chain, when the shuttle is caused to remain at rest in proximity to the picker stick 7 for an even number of picks. By the proper arrangement 25 of pegs, the rest periods of said shuttle as well as the intervals between can be varied at will. Since the ordinary movement of all of the mechanism of the machine, with the exception of the movement 30 of the shuttle and picker stick 7, and the oscillating bar 28, still continues during said rest periods, the action of the usual take up mechanism (not shown) is uninterrupted and the rolling up of the woven cloth continues at the same definite rate, the result of 35 which is to form the transverse open-work 45 as shown in the woven cloth 46 (see Fig. 4) while the shuttle is at rest. If desired, longitudinal open-work 47 may also be produced by the well known method of leaving vacant dents in the reed.

While I have described the use and adaptation of my invention to a loom with a dobby head, I by no means desire so to limit its application, it being obvious that my improved device could be used in connection with other looms in all cases where picker sticks are employed without departing from the scope or spirit of my invention.

50 What I claim and desire to secure by Letters Patent is,—

1. In a loom having picker stick mechanism and stop motion, a picker stick having an enlargement therein intermediate of 55 the ends thereof, picker actuating mechanism operatively in engagement with the outer side of said enlargement, means for temporarily throwing out said mechanism from its engagement with said enlargement without disconnecting the same from said 60 picker stick, and means for throwing out the stop motion of said loom simultaneously with said picker actuating mechanism.

2. In a loom having picker stick mechanism and stop motion, a picker stick hav-

ing an enlargement therein intermediate of the ends thereof, a broad blade intermediately connecting said enlargement with the picker stick mechanism, a dobby head, means for disengaging said blade during a predetermined period of time for disconnecting the same from the picker stick, while the remainder of the mechanism continues in motion.

3. In a loom having picker stick mechanism and stop motion, a picker stick having a broad blade intermediate the ends thereof, a broad blade intermediately connecting said picker stick and operatively connecting said blade with the picker stick mechanism, a dobby head, means for disengaging said blade during a predetermined period of time for disconnecting the same from the picker stick, while the remainder of the mechanism continues in motion.

4. In a loom having picker stick mechanism and stop motion, a picker stick having a broad blade intermediate the ends thereof, a broad blade intermediately connecting said picker stick and operatively connecting said blade with the picker stick mechanism, a dobby head, means for disengaging said blade during an even number of picks of the said loom, and means for throwing out the stop motion of said loom while said blade is out of engagement with said enlargement.

5. In a loom having picker stick mechanism and stop motion, a picker stick having a broad blade intermediate the ends thereof, a broad blade intermediately connecting said picker stick and operatively connecting said blade with the picker stick mechanism, a dobby head, means for disengaging said blade during an even number of picks of the said loom, and means for throwing out the stop motion of said loom while said blade is out of engagement with said enlargement.

6. In a loom having picker stick mechanism and stop motion, a picker stick having a broad blade intermediate the ends thereof, a broad blade intermediately connecting said picker stick and operatively connecting said blade with the picker stick mechanism, a dobby head, means for disengaging said blade during an even number of picks of the said loom, and means for throwing out the stop motion of said loom while said blade is out of engagement with said enlargement.

7. In a loom having picker stick mechanism and a dobby head, a picker stick having a broad blade intermediate the ends thereof, a broad blade intermediately connecting said picker stick and operatively connecting said blade with the picker stick mechanism, a dobby head, means for disengaging said blade during an even number of picks of the said loom, and means for throwing out the stop motion of said loom while said blade is out of engagement with said enlargement.

circling said picker stick and operatively connecting said blade with the picker mechanism, a spring connected with the picker mechanism, a spring connected with the lower end of said lug strap and operating when unopposed to depress the same out of engagement with said blade, a cord connecting said strap with one of the harness levers upon the dobby head and normally supporting said strap in operative position against the tension of said spring, and mechanism actuated by said dobby head for periodically depressing said harness lever thereby throwing said strap out of engagement with said blade at predetermined unit intervals.

8. In a loom having picker stick mechanism, stop motion and a dobby head, a picker stick formed with a broad blade, a lug strap encircling said picker stick and operatively connecting with the lower end of said lug strap and operating when unopposed to depress the same out of engagement with said blade, a cord connecting said strap with one of the harness levers upon the dobby head and normally supporting said strap in operative position against the tension of said spring, and mechanism actuated by said dobby head for periodically depressing said harness lever thereby throwing said strap out of engagement with said blade at pre-

determined unit intervals, combined with means for throwing out the stop motion of the loom during the said intervals.

9. In a loom having picker stick mechanism, stop motion and a dobby head, a picker stick formed with a broad blade integral therewith, a lug strap encircling said picker stick and engaging with said blade and operatively connected with said picker mechanism, a dobby head, means operatively connected with one of the harness levers of said head for throwing said strap out of engagement with said blade at predetermined intervals, combined with means for throwing out the stop motion of the loom during said intervals consisting of an oscillating lever for actuating the stop motion through the action of the filling fork, said oscillating lever being free to move out of possible engagement with said fork, and a cord connecting said oscillating lever with said harness lever and operated thereby, for effecting said movement.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses, this 27 day of April 1915.

JOHN REYNOLDS.

Witnesses:

HARRY J. RIELSETSNO,
MARY McINTOSH.