

G. REUTER.
JACQUARD MECHANISM FOR LOOMS.

No. 561,130.

Patented June 2, 1896.

Fig.1

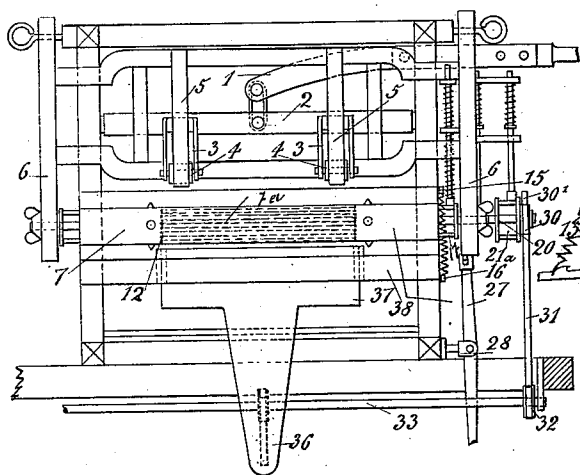


Fig.3

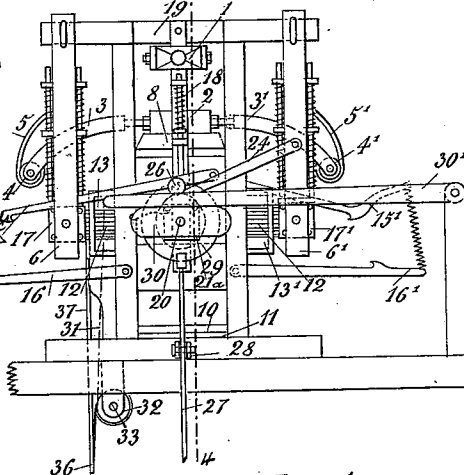


Fig.2

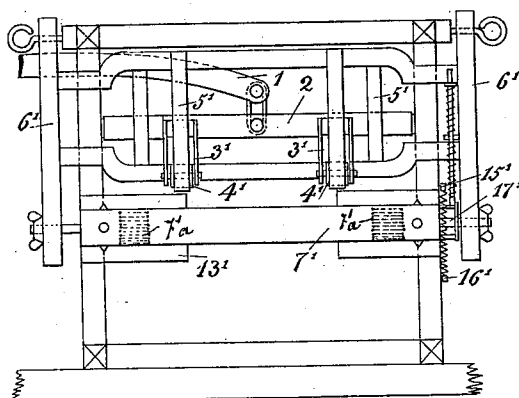


Fig.4

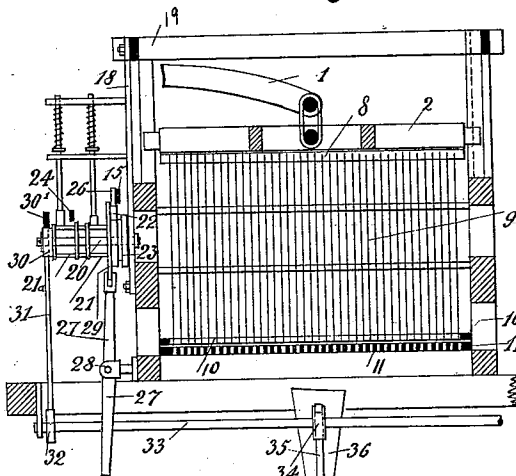
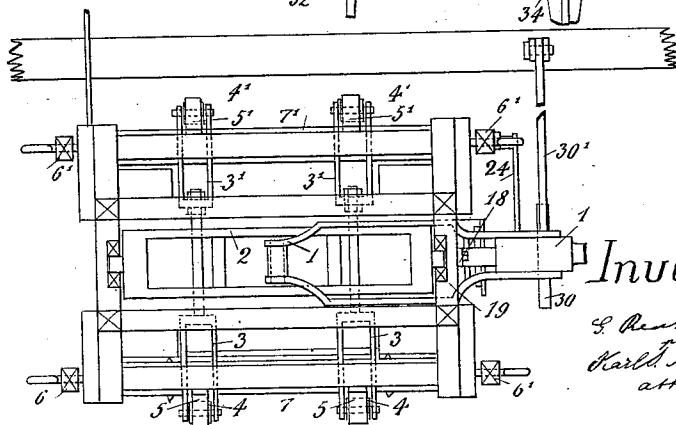


Fig.5



Witnesses

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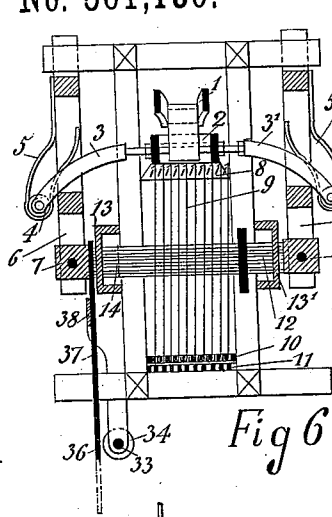


Fig. 6

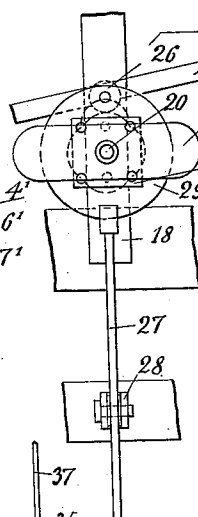


Fig. 7

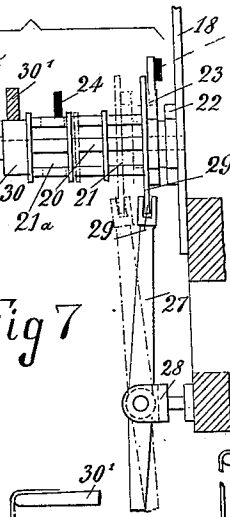


Fig. 8

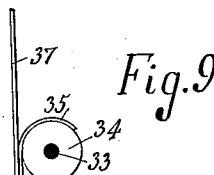


Fig. 9

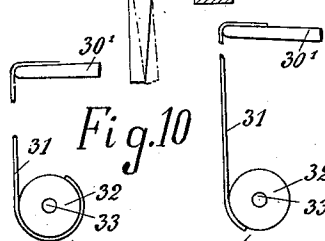
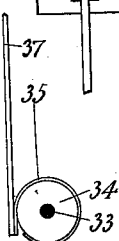


Fig. 10

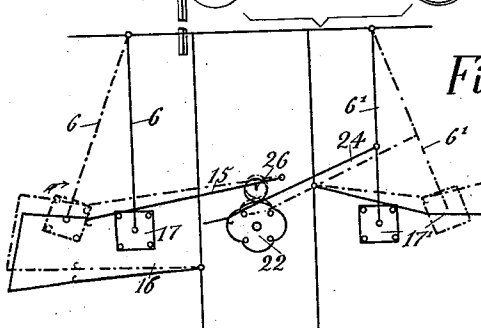


Fig. 11

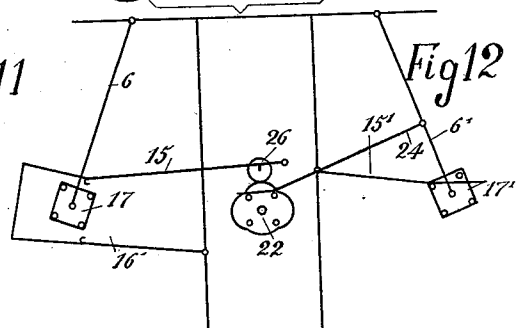


Fig. 12

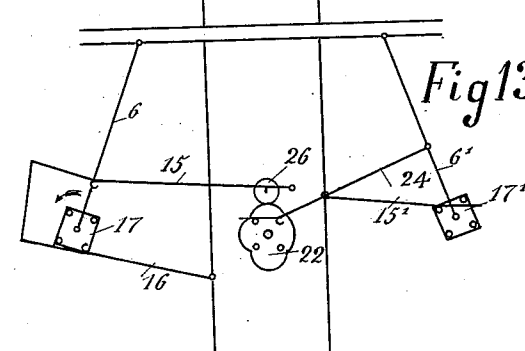


Fig. 13

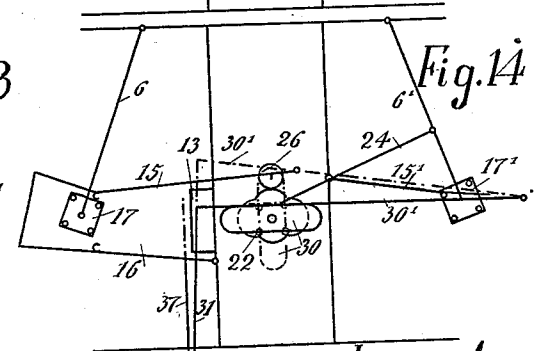


Fig. 14

Witnesses

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UNITED STATES PATENT OFFICE.

GUSTAV REUTER, OF ELBERFELD, GERMANY.

JACQUARD MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 561,130, dated June 2, 1896.

Application filed August 19, 1891. Serial No. 403,141. (No model.) Patented in Germany April 10, 1890, No. 61,729, October 7, 1891, No. 64,567, and November 4, 1892, No. 68,742; in France January 27, 1891, No. 211,047; in Switzerland July 17, 1891, No. 3,994, and September 15, 1892, No. 4,955; in Belgium July 31, 1891, No. 95,557; in England February 9, 1892, No. 2,483, and September 11, 1892, No. 15,437; in Austria-Hungary February 18, 1892, No. 42,609 and No. 73,723, and July 6, 1892, No. 71,470 and No. 21,754, and in Italy April 5, 1892, No. 70,394.

To all whom it may concern:

Be it known that I, GUSTAV REUTER, a subject of His Majesty the Emperor of Germany, residing at Elberfeld, in the Province of Rhenish Prussia, Germany, have invented new and useful Improvements in Jacquard Mechanism for Looms, (for which I have obtained patents in Germany, No. 61,729, dated April 10, 1890; in France, No. 211,047, dated January 27, 1891; in Belgium, No. 95,557, dated July 31, 1891; in Germany, No. 68,143, addition, dated July 23, 1891; in England, No. 15,437, dated September 11, 1892; in Switzerland, No. 3,994, dated July 17, 1891; in France, No. 201,154, addition, dated June 22, 1891; in Austria-Hungary, No. 42,609 and No. 73,723, dated February 18, 1892; in Italy, No. 70,394, dated April 5, 1892; in Germany, No. 66,671, addition, dated January 19, 1892; in England, No. 2,483, dated February 9, 1892; in Austria-Hungary, No. 71,470 and No. 21,754, dated July 6, 1892; in France, No. 205,727, addition, dated January 23, 1892; in Switzerland, No. 4,955, dated September 15, 1892; in Belgium, No. 98,261, addition, dated February 8, 1892; in Italy, No. 31,486, addition, dated March 16, 1892, and in Germany, No. 64,567, dated October 7, 1891, No. 68,742, dated November 4, 1892, and III addition, dated June 6, 1894,) of which the following is a specification.

My invention relates to improvements in looms, particularly in Jacquard looms or in the mechanisms of the Jacquard machine; and the objects of my improvements are, first, to be able to save a great number of the Jacquard cards; second, to enable the weaver to make cloths of varied designs in the middle and having a figured border without changing the cards of the Jacquard cylinders. I attain these objects by means of the improvements illustrated in the accompanying drawings, in which—

Figure 1 is a front view of the Jacquard machine with my improvements seen from the figure-cylinder. Fig. 2 is a similar view seen from the ground-cylinder. Fig. 3 is a side view from the right side of Fig. 1. Fig.

4 is a central section through line 4 4 of Fig. 3. Fig. 5 is a top view. Fig. 6 is a central vertical cross-section of Fig. 1. Fig. 7 shows a front and side view of the arrangement for shifting the cams. Fig. 8 shows a cam-chain used sometimes in place of a cam-disk. Fig. 9 shows a modified mechanism for raising and lowering the permanent blind card in its upper and lower positions. Fig. 10 shows the mechanism for turning the spindle carrying the pulleys for lowering and raising the blind card. Figs. 11 to 14 are schematic figures showing the working of the cylinders and the blind card.

For raising and lowering the frame 2 of the lifting-blades I use, as usual, the lever 1, and by means of the stays 3 and 3', carrying the antifriction-rollers 4 and 4', which work in the guides 5 and 5', the cylinders 7 and 7' at the foot of the oscillating levers 6 and 6'. The cylinder 7 serves for taking up the cards for making the figure or design in the cloth, and the cylinder 7' carries the cards for producing the groundwork. 8 are the lifting-blades, and 9 are the lifting-wires. In state of rest they stand on a grate 10 of the board 11 and they are guided in needles 12, as usual.

I use two sets of needles belonging together. The middle set 7^a (indicated on the cylinder 7, Fig. 1) is for making the figure, and the two parts 7^a (indicated on the cylinder 7' in Fig. 2) are for making the ground-binding only. In accordance with this I also wind up the warp upon two separate beams, one warp being for the design and the other for the ground. The needle-boards are marked 13 and 13' in Figs. 1, 2, 3, and 6, and united with them are the spring-boxes 14, all as in an ordinary double Jacquard machine. 15 and 15' are the upper dogs or hooks for turning the cylinders in the positive direction. 16 and 16' are similar hooks for turning the cylinders backward. They take hold of the pillars of the tourniquets or lanterns 17 and 17', as usual.

So far as described the machine does not differ from an ordinary Jacquard machine with two cylinders, the one working for the figure and the other for the ground-binding. It

was, however, thought desirable to give its general description for the sake of a better understanding of the following improvements and the manner of their working in the loom.

- 5 On a bar 18, screwed against the main frame 19 of the machine, I fix a bolt 20, Figs. 3, 4, and 7. This bolt carries a lantern 21, similar to the lanterns of the cylinders and rotating on the said bolt. At the back or inner side
10 two cams 22 and 23 are fixed to the said lantern, having thumbs or projections of different lengths. The lantern 21 is governed by a hook 24, joined to the oscillating lever 6' of the ground-cylinder 7' and going backward
15 or forward with the same, and thus it is able to turn the lantern 21 and also the cams 22 and 23. When there are more than four thumbs required, (this depends upon the design to be woven and on the manner of binding,) it is recommended to use instead of the
20 cams the cam-chain 25, as shown in Fig. 8, which is then placed around disks fixed to the lantern in place of the cams themselves. The hook 15, governing the figure-cylinder 7, is provided with a roller 26, resting upon one or
25 the other of the cams 22 or 23, respectively, according to their position.

- As will be seen from Figs. 4 and 7, the lantern 21, together with the cams 22 and 23 or
30 cam-chains, respectively, can be shifted lengthwise upon the bolt 20 by means of a forked lever 27, having its fulcrum upon a bracket 28, fixed against the frame of the machine. The forked end of the lever takes
35 hold of the inner disk 29 of the lantern, and it will thus be seen how the latter can be shifted forward and backward so as to bring either of the cams 22 or 23 below and in connection with the roller 26 of the hook 15. I
40 shall explain farther on when this will be required. It will, however, be remarked that according to the radius of eccentricity of the cam standing below the roller 26 at a certain moment the hook 15 may be brought within
45 or without reach of the pillars of the lantern 17, in which latter case no turning of the cylinder will take place, or it may be raised so much that the lower hook 16 will engage with these pillars, and then the lantern will be
50 turned backward and the cylinder also, Figs. 11, 12, and 13. The hooks 15 and 16 are connected by a spring put between their ends, and the same is done with the hooks 15' and 16'. By this means it is possible to bring a new
55 card before the needle-board at every stroke of the cylinder, or the same card may be brought into action repeatedly, or a preceding card may be turned on a second time by the cylinder being turned backward.

- 60 Now the cams 22 and 23 or cam-chains, respectively, are so proportioned that when one is governing the turning of the cylinder 17 the figure produced will be the reciprocal of that woven when the other cam is in action—
65 that is to say, that in using the same cards the same figures will be produced, but in op-

posite direction, without requiring changing of the cards to produce this change in the position of the figures, as in the case, for instance, in making pieces of cloth changing
70 alternately the figure, or when a figured symmetrical border has to be made to the second or opposite side of the woven part of the shawl.

The cylinder 7' makes a quarter-turn at every stroke or for every ground-binding, and therefore I connect with it for ordinary goods
75 the arrangement which I have invented for saving the ordinary blind cards, although this device must not necessarily be driven from this cylinder. Figs. 1, 3, 4, and 7 show this
80 arrangement, which is as follows: In front of the lantern 21 I mount upon the bolt 20 another lantern 21^a, governed by the hook 24 of the oscillating lever of the ground-cylinder, and to this lantern is fixed a double cam
85 30, upon which bears a rocking lever 30', which is raised and lowered by the action of the cam every alternate stroke. At one end of this lever I fix one end of a strap 31, (see detail, Fig. 10,) the other end of which is se-
90 cured to the periphery of a pulley 32 in such a manner that the strap is wound off when the lever is raised, and that by unwinding it turns the pulley and its spindle 33. On the
95 same spindle 33 is keyed another roller 34, and to the circumference of this is also fixed the end of a strap 35, the other end of which hangs downward and is fastened to the foot
100 36 of a plate of sheet-iron 37, reaching below the center of the spindle 33 even in its highest position. This plate 37 is the base of my whole invention. By its means I can save a
105 large number of cards, (the usual blind cards completely,) and it enables me to attain the other objects named above as making the essential features of my invention. The belts
31 and 35 of the rollers 32 and 34 are wound
round the latter in opposite directions, so that
when the lever 30' is raised and 32 is turned
by the unwinding of 31 the belt 35 is wound
110 on round 34, and thus pulls the foot 36 and its plate upward. This plate 37, which I name the "permanent blind card," is guided in front by a bar 38 and in suitable slots side-
wise, so that it will come to stand directly
115 before the needle-board of the figure-cylinder when it is raised by the mechanisms described above.

The action of the permanent blind card and of the gearing described is such that it will
120 be raised and brought before the needle-board of the figure-cylinder 7 every alternate stroke, and it does the same work as if blind cards, as usual, were bound in alternate rows between the figure-cards. The ordinary blind
125 cards in the chain of cards can therefore be dispensed with, only half the number of cards is required, and the action of the figure-card facing the needle-board at the time when the permanent blind card is raised is neutral-
130 ized—that is to say, because it strikes against the permanent blind card the action will be

as if an ordinary blind card had been bound in the chain of cards alternately after a figure-card.

Now by means of the cams 22 and 23 or cam-chains 25 described above the turning of the figure-cylinder can be regulated at will, so that no turning takes place during the stroke when the permanent blind card is raised, and the same figure-card will of course come in action a second time, when the blind card 37 is lowered and the figure-card will now act upon the needles and lifting-wires, as usual. The permanent blind card may be divided into two parts crosswise, both parts acting together or singly, and it is not absolutely necessary that it be raised mechanically; but the raising and lowering may be done by hand in the simplest manner.

So far as described the use of my permanent blind card gives a saving of half the number of cards in a chain. Its use, however, permits weaving with a further reduction of half the number of figure-cards without materially influencing the beauty of a design or the quality of the fabric. To that end I proceed as follows: I draw the pattern on the point paper instead of ten to sixteen—for instance, in the ratio of ten to eight—and of course I so need only half the number of cards; but I shoot two wefts for every figure-card, which is kept inactive on account of the permanent blind card being brought before the

needle-board. The ground is bound, as usual, by means of the few cards placed round the ground-cylinder. The unarmed eye does not observe the least difference in the contour of the figure, while it must be admitted that in reality and looked at through an eyeglass the continuity of the contour-lines is more broken; but considering the fineness of the threads, weft and warp, especially in silk, this is of little consequence, the less so because in most cases the changes of two threads following are very small.

What I claim as my invention, and desire to secure by Letters Patent, is—

In a Jacquard machine, a bolt 20 at one side of the frame, a lantern 21 to rotate thereon, cams 22, and 23 on said lantern, oscillating lever 6', a hook 24 carried thereby ground-cylinder 7' and the forked lever 27 for shifting the said cams lengthwise on bolt 20, in combination with the lantern 21^a, double cam 30, the lever 30^a provided at its end with a bolt 31^a, spindle 33, provided with pulleys 32^a, and 34^a, plate 37 and the belt 35^a connecting pulley 34^a and plate 37 as described, the figuring-cylinder and needles, substantially as set forth.

GUSTAV REUTER.

Witnesses:

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