G. ROTH.

JACQUARD MACHINE.

No. 12,072. Patented Dec. 12, 1854.

Fig. 4

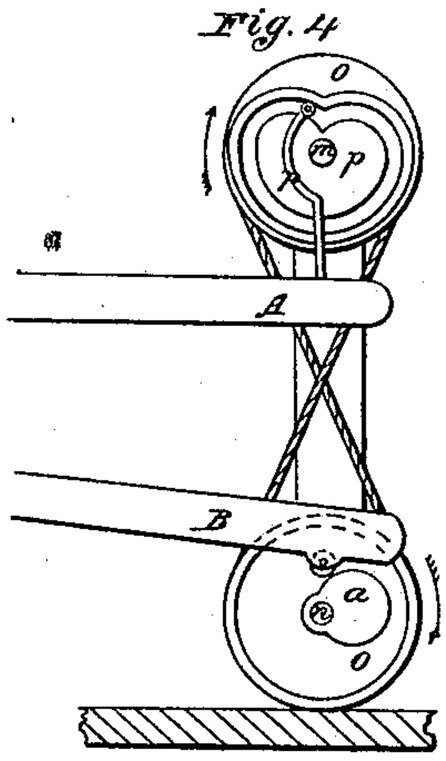


Fig. 1

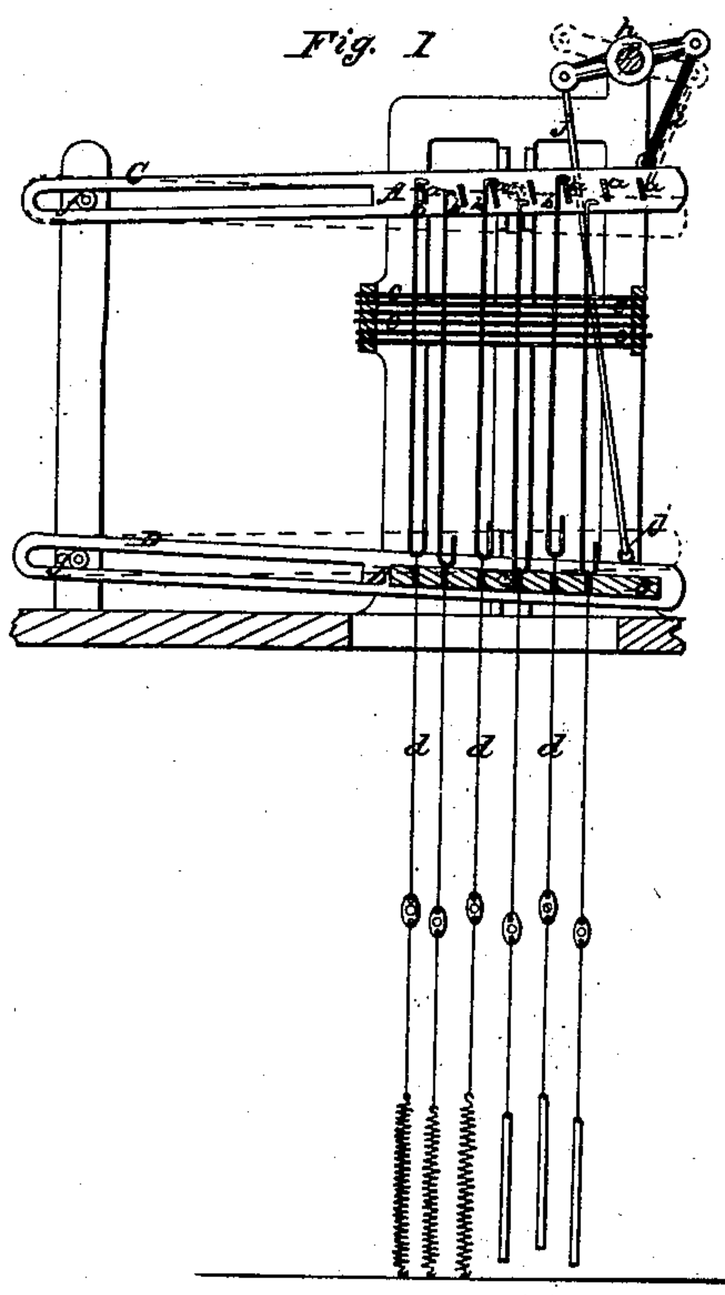


Fig. 3.

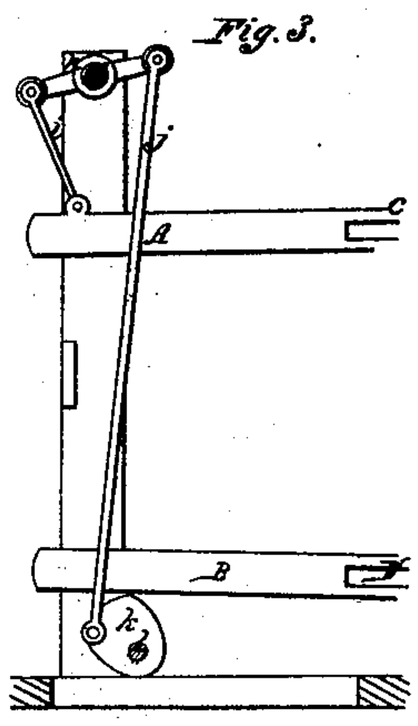
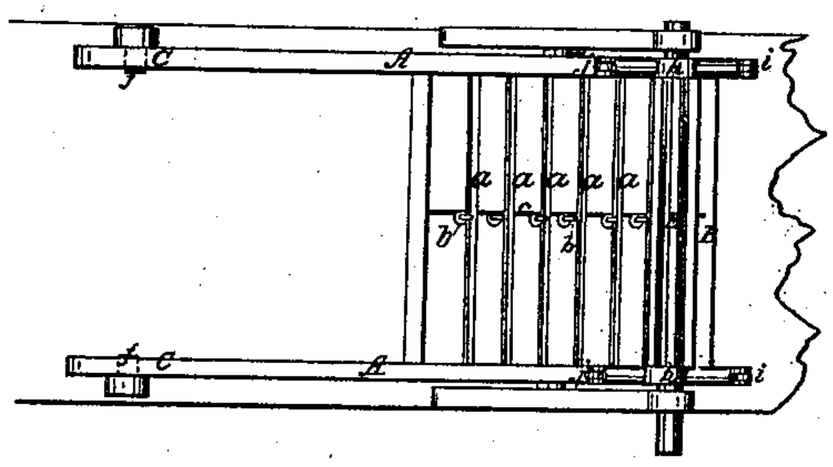


Fig. 2.



UNITED STATES PATENT OFFICE.

GEORGE ROTH, OF NEW YORK, N. Y.

LOOM.

Specification of Letters Patent No. 12,072, dated December 12, 1854.

To all whom it may concern:

Be it known that I, GEORGE ROTH, of the city, county, and State of New York, have invented a new and useful Improvement in the Jacquard Machine; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of the specifications, in which—

Figure 1, is a vertical section of a jacquard machine constructed according to my invention. Fig. 2, is a top view of the same. Figs. 3 and 4 are elevations of modifications of my invention.

Similar letters of reference indicate corresponding parts in the several figures.

The object of this invention is to balance the weights or their equivalent which are attached to the ascending cords of the harness by means of those which are attached to the other cords and thereby save the expenditure of power which is otherwise necessary to raise the weights. In the ordinary French jacquard machine there is no connection whatever between the ascending and the other portion of the harness, the griff frame and the neck board being entirely independent of each other, and the weights or springs attached to the cords which are caught by the griff frame create such an amount of resistance to the movement of the said frame, as is due to their gravity. This is the cause of a great amount of useless expenditure of power in power looms, but in hand looms it is the cause of much more serious drawbacks, as the weaver, raising the harness by the action of his feet upon treadles, is unable to raise more than a certain weight, and as a certain weight is necessary to be attached to each cord it is impossible to use more than a certain number of heddles and therefore it has been impossible in heavy weaving to produce as elaborate patterns by the hand as by power loom. The above disadvantage is entirely overcome by my invention which consists in suspending the griff frame and the neck board from, or attaching them in such a way as to be capable of a free movement, to opposite arms of levers on a rock shaft. The weights of the cords which are missed by the griff frame will always nearly balance those which are caught by it and thus the weight to be raised by the driving power of the loom can never be considerable, and a very steady motion of the harness is insured.

A, represents the griff frame, and *a*, *a*, the bars by which the perpendicular hooked rods *b*, *b*, from which the harness is suspended are caught as directed by the operation of the cylinder and cords (which are not shown) upon the needles *c*, *c*.

B, is the neck board, *d*, *d*, are the harness cords which are supposed to be attached to the perpendicular rods *b*, *b*, in the usual way, and are represented as having the proper degree of tension produced upon them by springs *e*, *e*, but instead of these springs, it is preferable to suspend weights from them in the usual manner.

All the above parts are similar to the corresponding parts of the French jacquard machine except that the griff frame A, is attached to arms *c*, *c*, which vibrate from fixed points or pivots *f*, *f*, in the framing of the machine, and the neck board B, is attached to similar arms D, D, which vibrate from fixed points *g*, *g*.

The griff frame, may be arranged to work in vertical guides as the French machine, and the griff frame similarly arranged, so that they will always maintain a parallel relation to each other, but I consider the arrangement represented to be the best as it gives all the cords of the harness such motions as will cause all the threads of the warp to shed parallel with each other.

The upper part of the framing contains suitable bearings for a rock-shaft E, upon which, close within the sides of the framing are secured two levers *h*, *h*, having arms of equal length. To one arm of each of the above levers, the griff frame A, is attached by a rod *i*; and to the other arm of each, the neck board *b*, is attached by a rod *j*. The number of rods which are missed by the griff frame and supported by the neck board will usually be nearly the same as those caught by the griff frame, and if the griff frame and neck board are of equal weight, as I propose to make them, they will be at all times nearly balanced.

The motion of the harness is intended to be communicated by the rock-shaft E, which will receive the necessary rocking motion from the treadles, of a hand loom, or from a crank or eccentric on the main shaft of a power loom, or by any other suitable means.

In order the better to insure the catching of the hooked rods *b*, *b*, by the bars *a*, *a*, of the griff frame, it is better that the upward movement of the neck board should terminate a little earlier, and its downward movement commence a little later than the corresponding downward and upward movements of the griff frame so that the neck board should be stationary for a short time in its highest position. To effect this, in a hand loom instead of connecting the neck board directly with the rods *j*, I allow it to rest as shown in Fig. 3 upon a cam *k*, at each side of the machine, the said cams being secured to a transverse rock shaft *l*, placed in suitable bearings. The cams are connected with the rods *j*, and are of such form that they will lift the neck board the required distance quicker than the griff frame is lowered and allow the neck board to remain stationary during the remaining portion of the movements of the levers *h*, *h*, and rods *i*, *j*; a part of the periphery of each being an arc described from the axis of their rockshaft. By this intermission or suspension of their motion, time is allowed for the needles to move the hooked rods, and the failure of their hooks to catch their respective bars of the griff frame is effectually prevented. By properly proportioning the cams, and the distance of the pins *m*, which attach the rods *j*, to them, from the axis of the rock shaft, the balance of the griff frame and neck board will as far as is practically necessary, be preserved.

In a power loom where there is a continuous rotary motion, I prefer to use for the purpose of obtaining the above result, the arrangement shown in Fig. 4, where *m*, and *n*, are two shafts carrying pulleys *o*, *o*, of equal size connected by a belt *s*, either of the two shafts receiving a continuous rotary moton by a belt or gearing from the crank shaft or the shaft of the loom. The lower shaft *n*, carries a cam *q*, which supports the neck board B, and the upper shaft *m*, a cam *p*, in a groove in which the griff frame A, is suspended by a rod *r*. The two cams *p*, *q*, are of such form as to produce movements the reverse of each other, each having one half of its periphery in the form of a semicircle to cause a suspension of motion, the other half of *p*, being of such form as first to lower and then to raise the griff frame, and the other half of *q*, being of such form as first to raise and then to lower the neck board. The circular parts of the two being so arranged relatively to each other as to act together, will cause the griff frame to rise as the neck board descends, and the griff frame to descend as the neck board rises. This causes the same effect to be produced in both the griff frame and neck board as the arrangement shown in Fig. 3, causes to be produced on the neck board only. The griff frame and neck board by this arrangement are caused by the belt and pulleys to balance each other perfectly.

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

Suspending the griff frame and the neck board, wholly or in part, from opposite arms of levers *h*, *h*, on a rock shaft E, or what is equivalent, on cams *p*, *q*, on rotary shafts *o*, *o*, in such a manner that the weight or tension of those cords of the harness which are caught by the griff frame shall be balanced or nearly so by the weight or tension of those which are missed by the said frame and rest on the neck board, substantially in the manner and for the purposes as herein set forth.

GEORGE ROTH.

Witnesses:
DAVID MAY,
WM. SINCLAIR.