C. Bergen.

Weaving Silk.

No. 1,432. Patented Dec. 18, 1839.

Fig: 4.

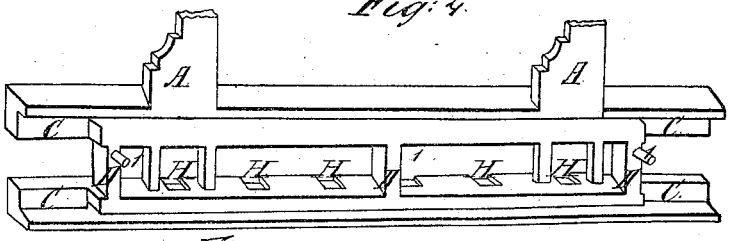

Fig: 1.

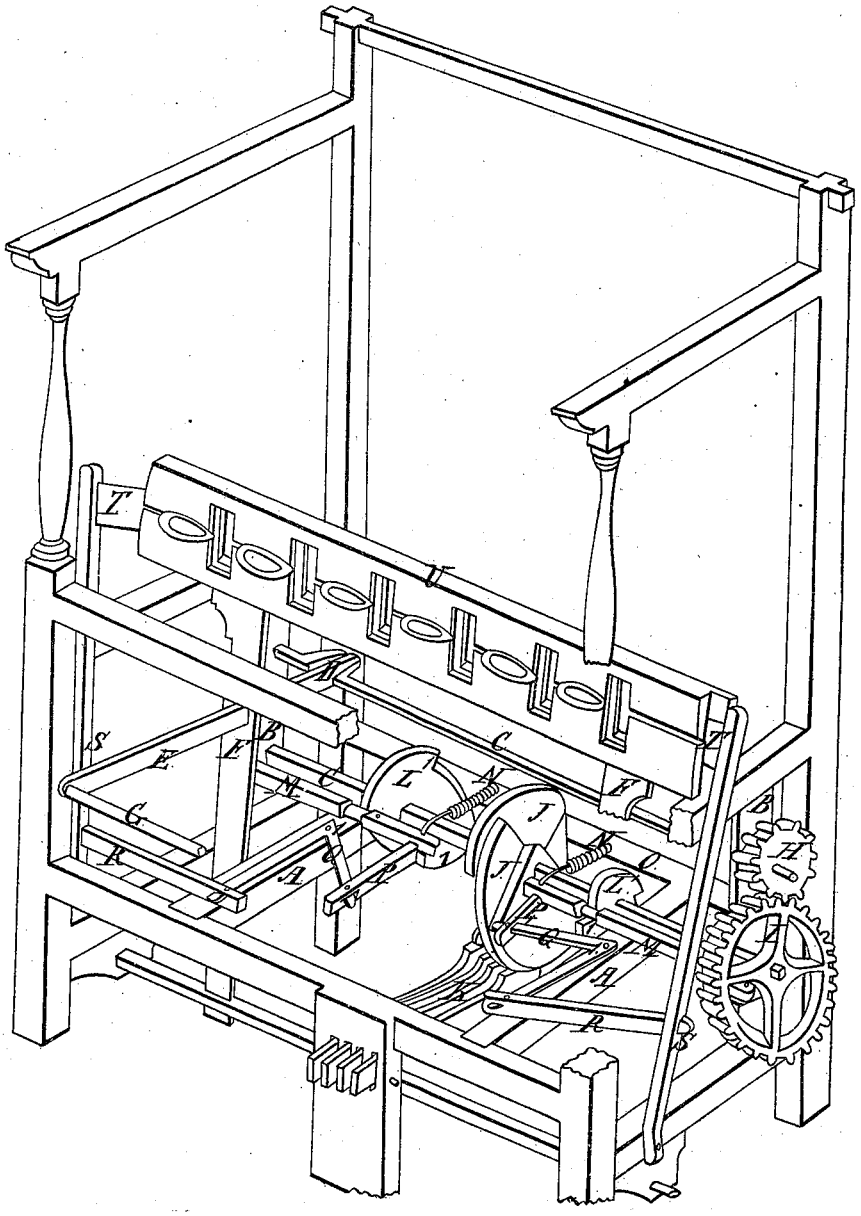

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Fig: 2.

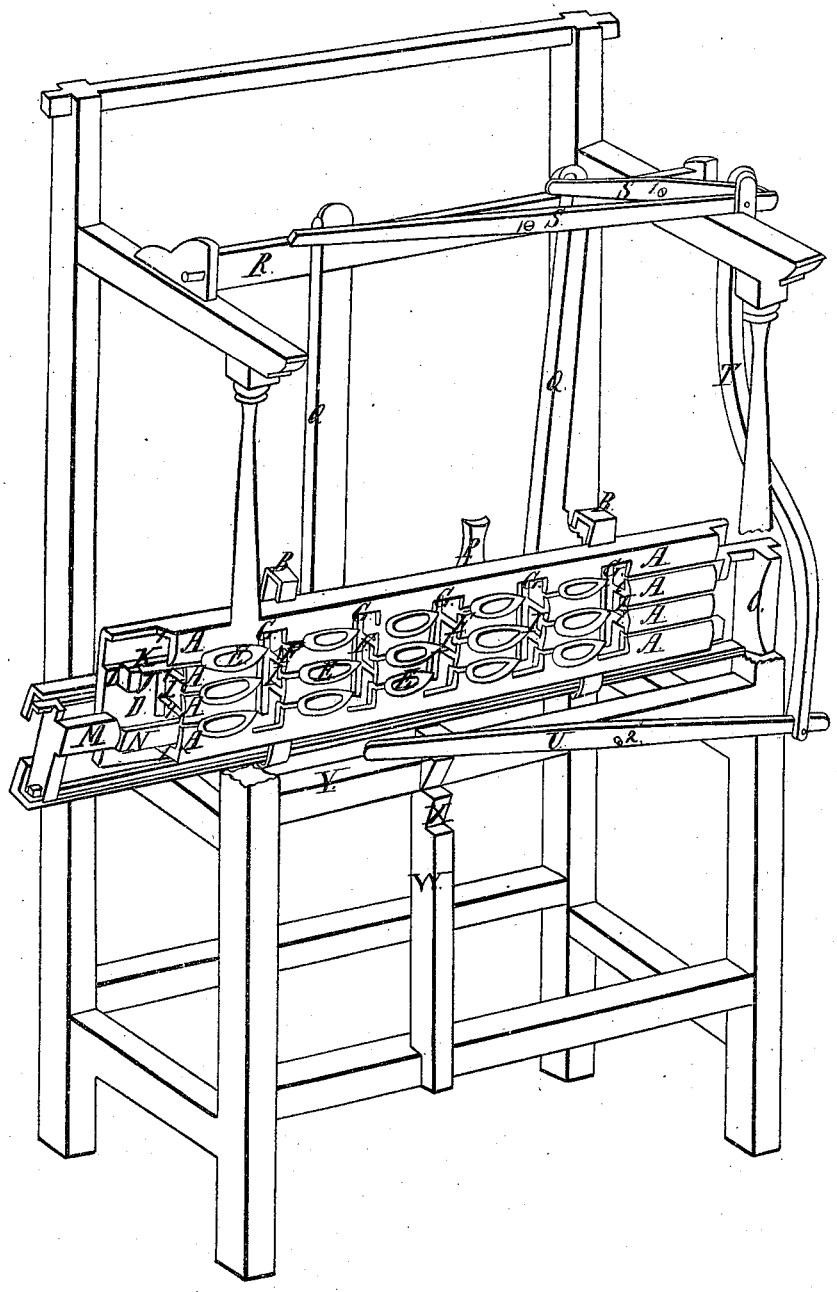

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Fig: 1.

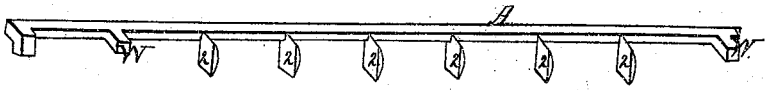


Fig: 6.

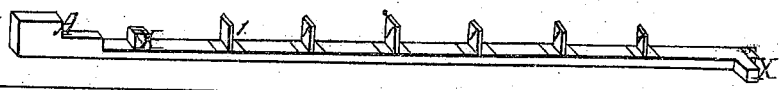


Fig: 5.

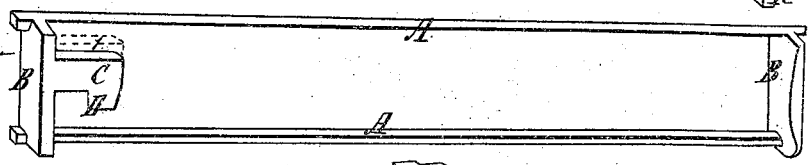
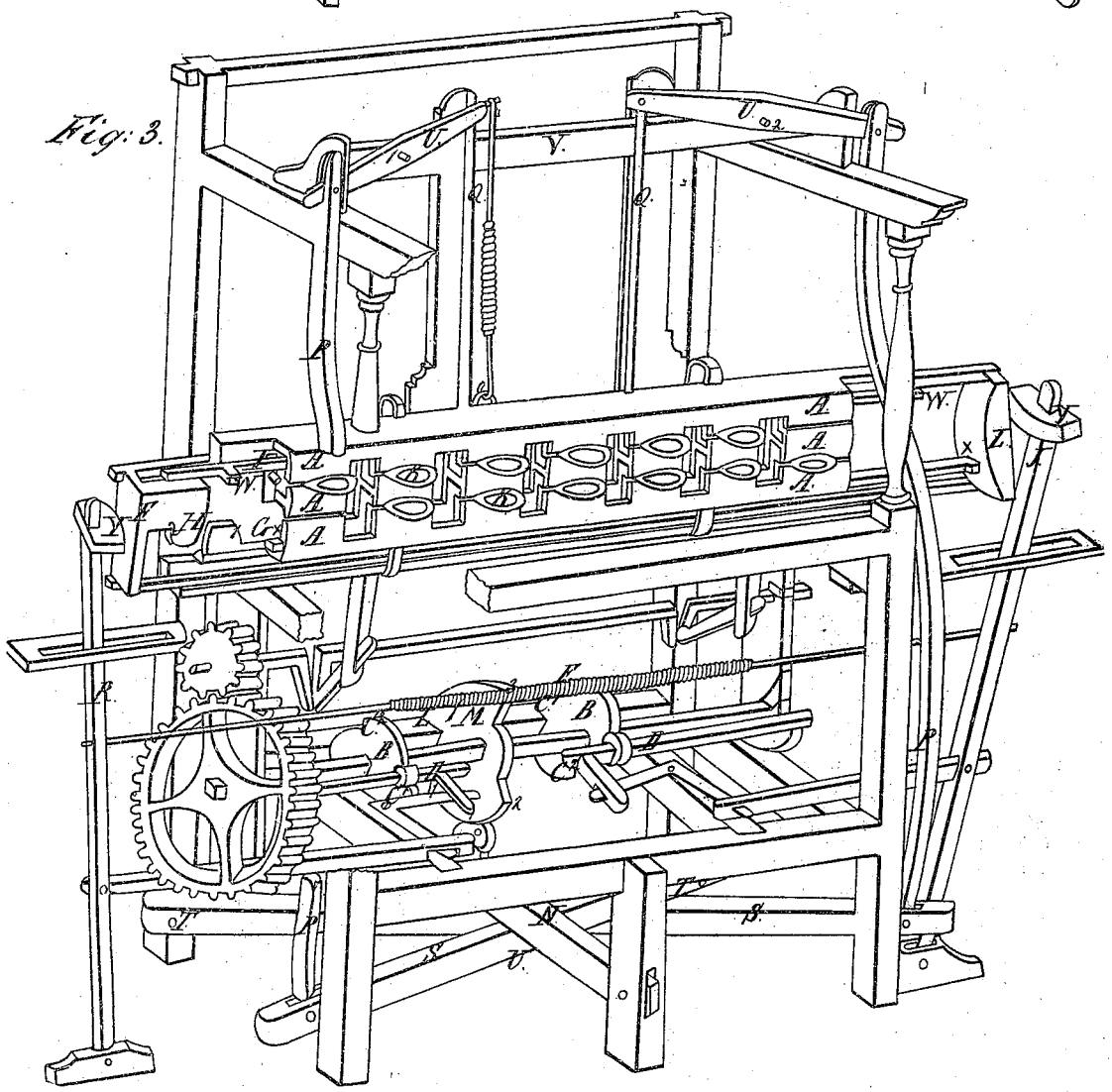


Fig: 3.



UNITED STATES PATENT OFFICE.

CORNELIUS BERGEN, OF BROOKLYN, NEW YORK.

SILK-LOOM FOR WEAVING NARROW GOODS.

Specification of Letters Patent No. 1,432, dated December 18, 1839.

To all whom it may concern:

Be it known that I, CORNELIUS BERGEN, of the city of Brooklyn, in the county of Kings, in the State of New York, have invented a new and useful Improvement in the Common Silk-Loom; and I do hereby declare that the description following is a full and exact description.

The following is a description of improvements attached to the common silk loom. The only alteration which is made is the addition of four pieces to the common frame. Two, A A, Figure 1, extend from the footstep to the back rail of the loom about the distance of eighteen inches from each end and the others B B one at each end of the loom, in a vertical position secured to the lower and middle rails of the frame. To these pieces two square bars or shafts C C are secured on journals, extending from one to the other the whole length of the loom. The upper bar or shaft is provided with two cranks D D to which the batten is secured by two flat bars E E passing through and secured to the swords or arms F F of the batten by a pivot. These are sometimes extended to the front of the loom, where a round piece G is secured to them on pivots to work or operate the loom. To one end of this shaft and outside of the frame a small cog wheel H is firmly secured. This locks or gears into another cog wheel I, firmly secured to the lower shaft or axle of precisely four times the dimensions of the first. To the shaft or axle of this wheel cams J are secured to open and cross the warps by moving treadles K which are tied to the harness. Two other cams L L are also secured to the same shaft at a suitable or convenient distance from the ends thereof these cams are each formed with two projections 1, 1, precisely alike on the same diameter and the same distance from the center, but they are placed on different squares of the shaft. Each of the end pieces B B before described has an iron rod or shaft M M secured to a projection on it by a pivot. These rods are precisely of the same length and extend toward the center on a parallel line with the shaft or axle C C, and are supported in their horizontal position by the two additional pieces A A aforesaid. These rods have each a wire secured to them near the end, and extend from them nearly at right angles above and below the axle to the rear of the loom and is there fastened to a spiral spring N in such a manner that when the projection 1, 1, on the cams L L in their orbit arrives at the aforesaid rods M M the spring N N beforenamed immediately pulls the rods M M to the lowest part of the cam, the opposite end of the springs being secured to the back rail O of the loom. To the end of the aforesaid rods M M another rod P is attached by a joint or pivot, which extends from it at right angles toward the front of the loom, where it is joined by a pivot to one arm of a triangle, Q. The angular point 1 of the triangle is secured by a pivot to the additional piece A, extending from the footstep to the back rail O. To the other arm of the triangle another rod R is secured by a joint or pivot and extends to the end of the loom on nearly a parallel line with the first named rod M to an upright piece S secured by a pivot to the lower end rail of the frame or sometimes to the floor, see R J Fig. 3. This piece or driver S extends up as high as the end of the batten, where it has a thin flat piece T secured to it, and which enters the grooves of the shuttle driver in the batten U. Thus it becomes manifest that when the wheels are put in motion the cams L L revolve and force out the springs N by their projection 1 which arriving in their orbit at the aforesaid rods M they are immediately pulled up by said springs to the lowest part of said cams at 1 and communicate the same motion by means of the triangles Q to the upright piece or drivers S and by that to the shuttle driver and shuttle. When this operation is performed at one end of the loom the driver at the other end is moved back so as not to interfere, and to be ready to perform the same operation in its turn. The shuttles are probably more effectually moved by the use of one spring instead of two N attached by its extremities to the upright drivers S S as E Fig. 3. It is sometimes preferred to operate the looms by attaching the arms or swords F by pivots to the top of the loom, by merely securing a cross piece to the drivers S S, so as to operate against the end of the shuttle driver as at Y Y Fig. 3 which is extended beyond the frame of the batten at both extremities for that purpose. When this mode is used it is necessary to extend two pieces Z down from the batten to the arms or bars A^{12} that secures the batten to the cranks D^{12}, see Fig. 3.

The apparatus for throwing the shuttles

performs the same or has the same effect on them as when they are thrown by muscular power, but with more precision and regularity, as the power of the springs are always the same, whether the machine is put under fast or slow motion, which is quite a desideratum in this business.

The second improvement is for the purpose of manufacturing plaid-ribbons of three colors with nearly the same facility and despatch that other kinds can be made. The only known method previously has been to make but one of these ribbons at a time, whereas with this improvement as many can be made at one operation as of any other kind, this is accomplished by forming what may be termed a double batten first by connecting two rails by means of the swords or arms A A, Fig. 4, similar to the common batten, and instead of planks (as the common batten) firmly secured to them they are each provided with a groove B B to admit the upper and lower rails of a driver, Fig. 5, which may be termed the main driver. This driver has not any connecting teeth as the common driver, but the rails A A are connected at the ends by pieces B B extending out from the rails about two inches. The one to the left has a projection C to it of about three inches wide extending to the right, about an equal distance between the two rails being the same length that the driver is required to move in order to throw the shuttles, the rails of the batten being cut down at their extremities C, Fig. 4, to permit these connecting pieces B, Fig. 5, to move the required distance. These rails of the batten are also connected in three different places D, one near each end and the other in the middle. In each of these a small pin or bolt 1 is placed extending out to the front about one inch, these rails are also provided with cavities H in which the slays or reeds are placed for the warps to pass through. To these rails or batten the planks A, Fig. 2, are secured by means of two oblong irons or clasps B Fig. 2 firmly secured to the rear of the planks, extending above and below the rails C C, to permit an up and down motion. The planks A are constructed as follows. To a thin board D Fig. 2 of suitable dimensions four ribs 1 are firmly secured, projecting out far enough to permit flanges or planks A to be secured to them to receive the shuttles E and to permit the driver rail Fig. 7 of the upper row of shuttles to move up and down behind them, the upper middle rib F is connected at the ends of the divisions G only, thereby permitting the driver teeth I to pass through them down to the middle row of shuttles, the two outside or upper and lower ribs 1 have each one flange the one extending up and the other down. Between these and their board D in the rear to which they are attached two drivers are placed and may be termed the shuttle drivers, the lower one, Fig. 6, being provided with teeth I, which extend up nearly to the rib next above it. The upper shuttle driver Fig. 7 is likewise provided with teeth 2, but they are long enough to pass through the upper middle rib F down to the middle row of shuttles. These teeth are so constructed as to project out from the front of the driver rail A, Fig. 7, so as to come in contact with the rear of the shuttles and allow the rail to pass behind them. The two middle rows of flanges or planks A, Fig. 2, and part of the upper and lower one, together with the two middle ribs 1, 1, and the board D, to which they are attached, are all cut through, so as to form openings or spaces G for the warps to pass through of the width that the ribs are required. These openings are precisely opposite to the cavities H, Fig. 4, of the batten. The pins or small bolts 1, Fig. 4, in the batten before described, pass through grooves or openings J, Fig. 2, cut in the board D the distance that it moves up and down on these pins the upper driver K, Fig. 2, rests so that when the upper row of shuttles E are required to move through the warps, the driver K is carried up by these pins or bolts behind the upper row of shutters, in which situation when put in motion the teeth I come in contact with them only, the end L of said driver being when in that situation placed opposite to the projection M, on the main driver to the left. When the middle row of shuttles are moved the planks are raised up so as to place them opposite to the center of the warps, when the pins or bolts aforesaid allow the upper shuttle driver K to drop down to the upper middle rib 1, the driver rail K passing behind the upper row of shuttles and the teeth I extending past the ends of the middle row of shuttles ready to move them, the end L of said driver being still opposite to the aforesaid projection M of the main driver. To move the lower row of shuttles the planks or pulleys A are raised up still higher so as to place them opposite to the warps. The upper shuttle driver K is then placed above the aforesaid projection M of the main driver, and the end N of the lower shuttle driver, Fig. 6, opposite to it. Thus when the main driver M is moved by hand or any other means it moves the shuttle driver that may be opposite to it, to the right, the other end being thereby placed against the right hand connection O of the main driver, Fig. 5, before described, and is moved back by it, whereas the driver which is not opposite to said projection remains stationary, and consequently the shuttles with which it communicates also remains stationary. Thus any row of shuttles are moved for any length of time that the operator may require, and for the greater

convenience to effect this, the main driver has a handle P secured to it near the center of the batten by which the impulse is communicated.

The movement up and down is effected as follows: To the rear of the planks or the board D, Figs. 2 and 3, opposite to the swords or arms of the batten two thin bars of iron Q Q are firmly secured and extend up as high as the axle R above, where they are secured by pivots to two levers S. These levers are secured at their centers by pivots 1 to the axle R, and to their opposite ends a crooked piece T is also secured by pivots, which extend downward at the end of the loom, where it is also secured by a pivot to another lever U, which is also secured by a pivot 2 at its center to the breast piece V. At the other end of this lever near the center of the loom an upright piece W is secured to the breast piece and foot step or bottom rail of the loom. This piece is provided with three notches or rests X corresponding to the distance that the shuttles require to be raised or lowered. Thus it becomes manifest that when the lever U is placed on the upper notch its opposite end is moved down which draws down by the crooked piece T aforesaid the levers S above. They operating on their centers 1 consequently moves up the planks and shuttles together with the shuttle drivers K N. The reverse operation takes place when the lever U is placed on either of the lower notches X. The movement up and down must never be effected only at such times when the shuttles have been thrown to the left. The power before described for making plain goods can be applied to this machine.

The third improvement is for making galoons and curtain trimmings, or plaid ribbons of two colors as may be required by the manufacturer. To accomplish this the whole batten is formed almost precisely the same as the one for three tier of shuttles. It is also provided with two shuttle drivers nearly the same as the lower shuttle driver, Fig. 6, before described. The main driver, Fig. 5, is also the same as the other with the exception of being somewhat longer and having a hook or notch D on the under part of the projection C. The lower shuttle driver, Fig. 6, has also a corresponding hook or notch A. To make curtain trimmings it is necessary to use two different kinds of shoots. This process is termed shoot and shoot about, that is one kind of shoot is thrown through the warps at one opening and the other follows it at the next opening and so on alternately, consequently the movable planks A, Fig. 3, has to be raised and lowered at every vibration of the batten. This is accomplished by hand or by power. When it is worked by power, nearly the same apparatus is made use of to throw the shuttles, as has been described for the first improvement, Fig. 1. A description thereof is consequently unnecessary, further than will be required to explain the difference. The cams B, Fig. 3, are also formed with two projections C these projections are on the quarters of the circle instead of being on the diameter, the one being as much nearer to the center than the other as the drop is required to produce the throw, thus when the notch C^1 on the cam in its orbit arrives at the rod D which throws the shuttles it is drawn in by the spring E and suddenly moves the main driver F which shoves up the lower shuttle driver G to its destination. Then directly after the warps are crossed the shuttles are quickly lowered, when the second projection C^2 of the same cam B arrives at the rod D (the lower driver G being then below the projection H on the main driver) which then allows the apparatus to drive home the upper shuttle driver I and thus the upper row of shuttles to their destination, the cam at the other end having in the meantime forced back the upright driver J, to allow room for the other arm of the main driver, and to be ready to drive back the shuttles by the same process. It then is evident that when the upper row of shuttles is thrown the projection H on the main driver is shoved entirely up to the planks A which contain the shuttles K. Then by raising up the movable planks the notch or hook 1 at the left end of the lower shuttle driver G is placed or caught behind the hook or notch 2 of the main driver F which being forced back by the apparatus at the other end draws the lower shuttle driver G with it and moves the lower shuttles back. When the planks A are again dropped, the lower shuttle driver G is unhooked from the main driver F which is then permitted by the apparatus as before described to shove over the upper shuttle driver 1 by the connecting piece L at the right hand end of the main driver, the upright driver R at the left end having been moved back by its cam for that purpose and to be ready to perform its duty over again, at the next evolution.

The raising and lowering of the planks and shuttles is performed by a cam M on the lower shaft operating on a treadle N below it. This cam is formed with two circles, the one as much nearer to the center than the other as it is required to raise and lower the shuttles. It consequently has four notches 1 2 3 4 which are placed at each quarter of the circle. Then as the cam revolves and the notch 2 strikes the treadle pully O it is forced down to the outside or largest circle, which pulls down the crooked pieces P at the end of the loom. Then as the cam revolves until the notch 3 arrives at the treadle pulley O it immediately rises

up to the smallest circle on the cam, and the planks by their own weight with the assistance of a spring Q is quickly dropped down. Then again as the notch 3 in its orbit arrives at the treadle pulley O it is again forced to the other highest part of the cam and so on, the treadle N being secured to two other treadles S which, form a triangle under the loom, the one extremity of each being secured to the back post of the frame at T and the other extremities to a crooked piece P at each end of the loom, which are secured by pivots to two levers U above which are secured at their centers by pivots 1 2 to the axle V of the batten, the raising and lowering motion being communicated similar to what was described in the 2d improvement, Fig. 2.

When the machine is used for making two colored plaid ribbons it will be necessary to substitute the cams L, Fig. 1, for throwing the shuttles as described in the first improvement for these and to add a small strip (dotted lines, 1 Fig. 5,) to the upper side of the projection H of the main driver F so as to allow the end of the upper shuttle driver I to be shoved by the end thereof when working.

The rails of both the shuttle drivers have knobs or stops W X attached to them so as to prevent them from moving any farther than the required distance by striking against the ends of the planks A.

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

1. The employment of the cams with double sections in connection with the arrangements of levers and springs for the purpose of driving the shuttles as herein described.

2. The making the batten in two parts for two or more rows or tiers of shuttles and in combination therewith the manner of throwing the shuttles by means of three drivers, one acting as the main driver by the action of which the other two are driven as herein described.

3. The arrangement of levers, springs and cams for raising and lowering the shuttles in combination with the batten, the cams to be dispensed with when working by hand, all as herein described.

CORN. BERGEN.

Witnesses:

ALDEN SPOONER,

ALEX. BIRKBACK.