

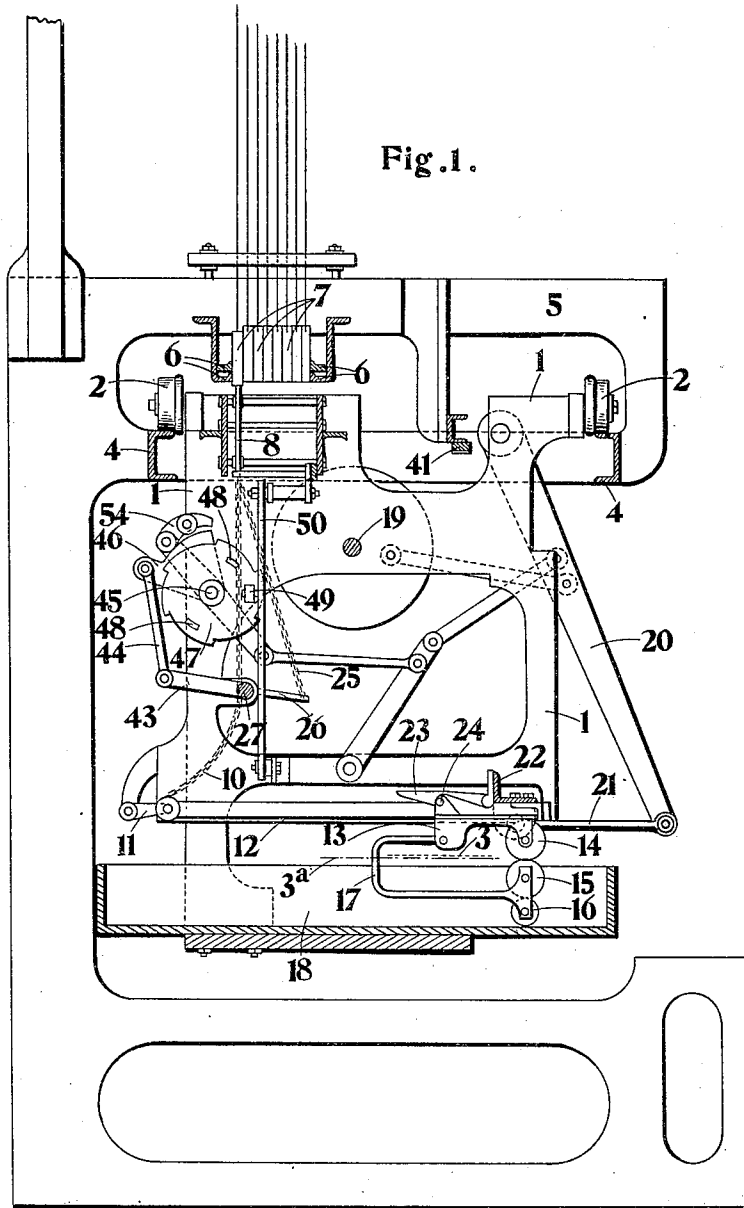
O. HALLENSLEBEN.
MACHINE FOR PRINTING UPON WARPS.
APPLICATION FILED MAY 8, 1912.

1,042,786.

Patented Oct. 29, 1912.

4 SHEETS—SHEET 1.

Fig. 1.



Witnesses—

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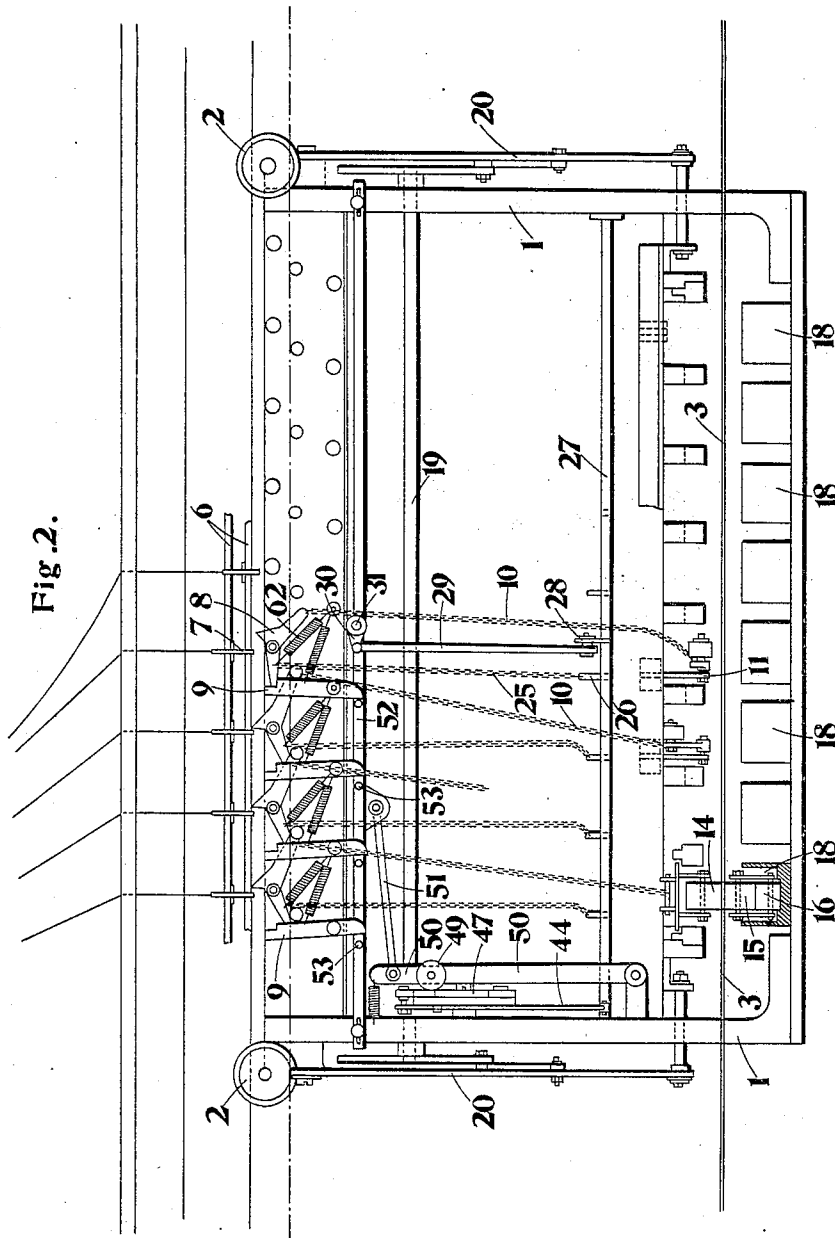


Fig. 2.

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4 SHEETS—SHEET 3.

Fig. 3.

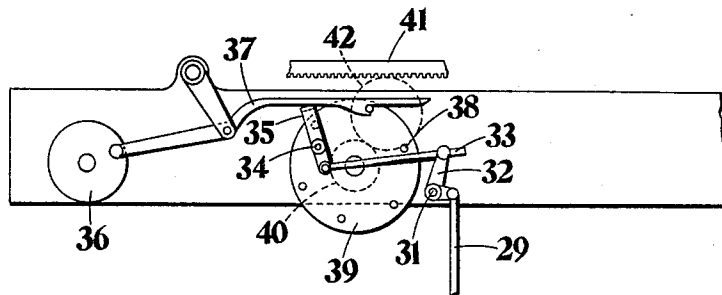
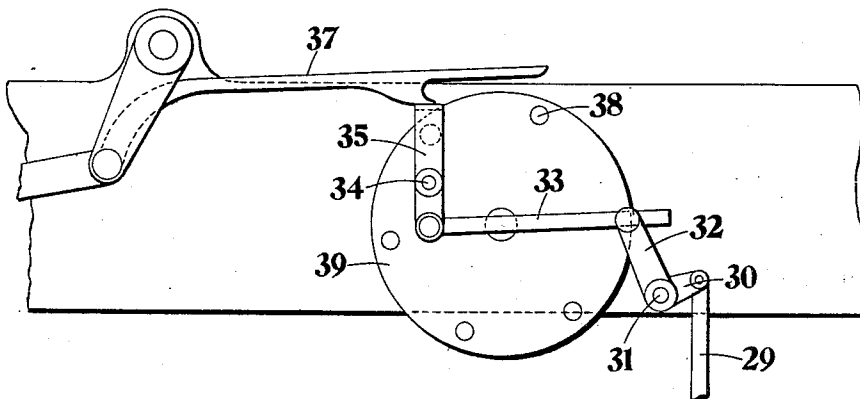


Fig. 4.



Witnesses—

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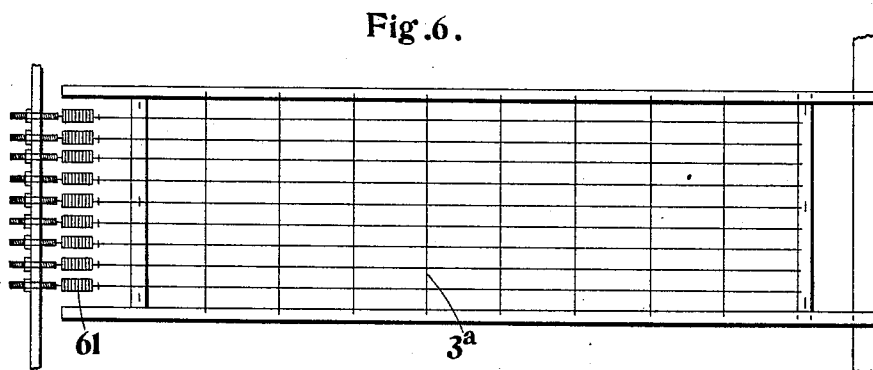
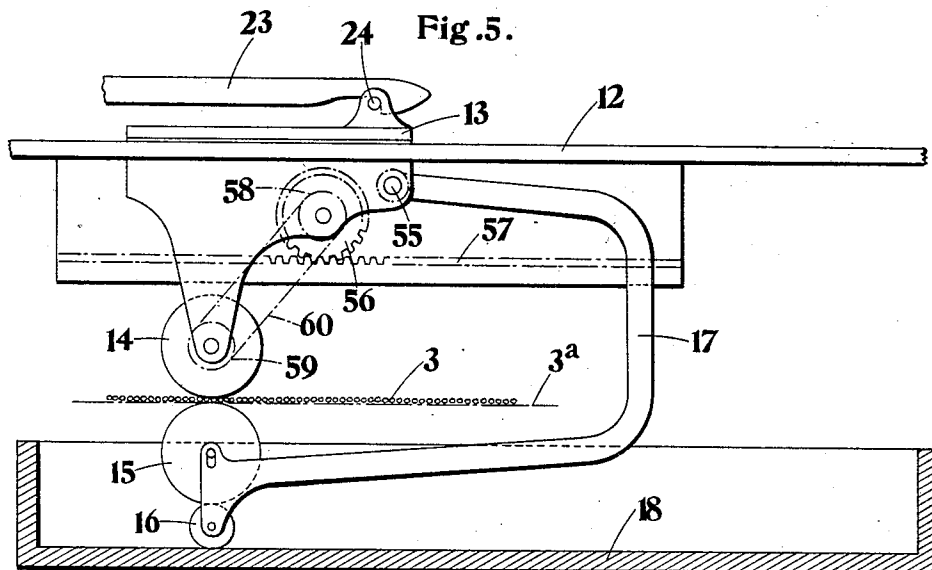
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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

OTTO HALLENSLEBEN, OF HANAU, GERMANY, ASSIGNOR TO NEW CARPET AND TEXTILES SYNDICATE LIMITED, OF LONDON, ENGLAND.

MACHINE FOR PRINTING UPON WARPS.

1,042,786.

Specification of Letters Patent.

Patented Oct. 29, 1912.

Application filed May 8, 1912. Serial No. 695,967.

To all whom it may concern:

Be it known that I, OTTO HALLENSLEBEN, a subject of the German Emperor, residing at 50 Akademiestrasse, Hanau, Germany, engineer, have invented certain new and useful Improvements in Machines for Printing Upon Warps, of which the following is a specification.

This invention relates to a machine for printing upon warps in which a frame moving in the longitudinal direction of the warps and remaining stationary during the printing operation is provided in the known manner with a number of printing apparatus for printing various colors. The printing apparatus are brought into operation according to the pattern, by jacquard mechanism and put out of operation automatically by controlling mechanism after every printing operation.

This invention has for its object in such printing machines to save time and to avoid unnecessary movements. For this purpose, the frame, which carries the printing apparatus and which moves in the longitudinal direction of the warps is arrested while printing takes place.

In the known machines of this type the frame carrying the printing apparatus is moved periodically through a determined distance and remains stationary during the printing operation and this, whether any printing takes place at this point or not. It therefore frequently happens that when the ground color has been previously applied, the other colors are only applied at a few points. If in this case, the frame after each advance through a distance corresponding to the width of the weft, is arrested during the printing operation, there is an unnecessary loss of time and in addition there is also the disadvantage that the printing operations carried out during this period are unnecessary. Further, in the known printing machines of this type, the controlling mechanism, which after every printing operation disengages all the printing apparatus is continually in operation so that unnecessary wear takes place and the driving power is used unnecessarily.

According to the present invention, the

controlling mechanism is only operated when one of the printing apparatus is being used that is only when the control thereof becomes necessary. As soon as all the printing apparatus in use have been stopped by the controlling mechanism, the gear for the latter is also put out of operation. Such a method of working is possible, if both the gear for the frame carrying the printing apparatus, and the gear for the mechanism controlling the printing apparatus are dependent upon the jacquard mechanism in such a manner that on the operation of one of the printing apparatus, effected by means of the jacquard mechanism, the gear for the frame carrying the printing apparatus is disengaged and the gear for the controlling mechanism is put into operation by the jacquard mechanism. On disengaging all the printing apparatus, after printing, by the controlling mechanism, the gear for the frame, carrying the printing apparatus is again brought into operation, and the gear for the controlling mechanism is disengaged.

The disengagement of the gear for the frame when bringing one of the printing apparatus into operation, and bringing the said gear into operation when all the printing apparatus are disengaged is advantageously effected by the combining all the mechanisms for bringing into operation the separate printing apparatus, with the disengaging mechanism for the gear for the frame, so that each separate printing apparatus effects the disengagement of the gear for the frame and the reengagement thereof when put out of operation. Such a combination can be produced in a simple manner by means of a common lever shaft upon which all the mechanisms for bringing the various printing apparatus into operation, operate, and which on bringing one of the printing apparatus into operation press, by means of lever mechanism or the like the pawl of ratchet mechanism of the gear of the frame out of engagement. Consequently the pawl cannot come into engagement with its corresponding ratchet member, and therefore the frame cannot be operated. Also the controlling mechanism can advantageously be controlled by the

jacquard mechanism by combining all the mechanisms for bringing the separate printing apparatus into operation with the coupling mechanism for the controlling mechanism in such manner that on bringing one of the printing apparatus into operation the gear for the controlling mechanism is also in engagement. The combination in this instance can also be effected by means of a common lever shaft, on which all the mechanisms for bringing the printing apparatus into operation, operate, and for this purpose, the crank shaft which acts upon the gear for the frame carrying the printing apparatus, is advantageously employed.

The controlling mechanism for the printing apparatus is advantageously driven by a continually oscillating pawl and a ratchet wheel in such manner that the lever shaft, which is rotated on bringing the printing apparatus into and out of operation, presses the pawl out of its engaging position, by means of suitable lever mechanism, when the printing apparatus are out of operation, and releases it, for the purpose of engagement with its ratchet wheel, when one of the printing apparatus is brought into operation.

The printing carriages carried by the frame, which is moved in the longitudinal direction of the warps are advantageously freely movable on guides provided on this frame, and receive their periodic movement from a common, reciprocating rail or the like. This rail is provided with pawls one for each of the printing carriages, which according to their operation are caused to engage with or freely pass over the printing carriages by means of levers which are mounted in the frame and controlled by the jacquard mechanism.

The printing carriages are each provided with three superimposed coloring rollers, which contact with one another, of which the two uppermost rollers receive between them the warps to be colored and the lower roller runs on the bottom of the color duct and feeds to the two other rollers the color. In order that the warps to be colored do not hang loosely, which would cause the warps to tend to pass laterally of the coloring rollers instead of between them, and so that the warps during printing are not pressed laterally on passing between the rollers, they are supported by a coarse net-work which is composed of tensioned longitudinal and transverse wires. The transverse wires prevent the warps from hanging loosely, whereas the longitudinal wires prevent the warps from being forced laterally during the printing operation.

In the accompanying drawings is shown a constructional form of the invention.

Figure 1 shows the parts of the machine

which come into question in end elevation, partly in section. Fig. 2 is a side elevation corresponding to Fig. 1. Figs. 3-6 show details which will be described more fully hereinafter.

The frame 1 (Figs. 1 and 2) which carries the printing carriages and which is movable in the longitudinal direction of the warps 3, which are to be colored is mounted on rollers 2 running on rails 4 provided in a stationary frame 5 in which latter rods 7, which are controlled by the jacquard mechanism are guided, in rails 6.

According to the operation of the rods 7 by means of the jacquard mechanism bell crank levers 8, provided on the frame 1 and abutting against the rods 7, have one arm lowered on the movement of the said frame 1, and are then retained in this position as shown at right hand side of Fig. 2 by a lever 9. In Fig. 1, for the sake of clearness only one of the levers 8 is shown whereas in Fig. 4 four of these levers are shown. In practice, however, as many levers 8 and corresponding levers 9 are provided as there are printing apparatus in the frame 1 and the levers 8 lie side by side corresponding to the arrangement of the rods 7 (Fig. 1). The levers 8 are each connected by chains 10 to levers 11 which are mounted in the frame 1 adjacent the end of the guide rails 12 for the various printing carriages.

The printing carriages each consist of a frame 13, movable on the rails 12, which carries the upper coloring roller 14 and to which is hinged an arm 17 which carries the two rollers 15 and 16. On the reciprocation of the printing carriage on the guide rails 12 the lowermost roller 16 runs on the bottom of the color duct 18 and thus feeds the color to the rollers 15 and 14. The rollers 14 and 15 serve as coloring rollers and print upon the warps 3 which are passing between them simultaneously from above and below.

In order to prevent the warps 3 during printing, from hanging loosely and thus being caused to run laterally of the rollers 14 and 15 instead of between them, and to prevent them from being pressed laterally by the rollers, the warps 3 are supported by a wire net 3^a, which is shown to a larger scale in Fig. 6 (see also Figs. 1 and 5). This wire net consists as shown in Fig. 6, of longitudinal wires, which are tensioned by springs 61 and transverse wires. The transverse wires prevent the threads, which are made heavy by the color, from hanging loosely, whereas the longitudinal wires prevent the threads which are disposed between them from lateral movement due to the action of the rollers 14 and 15.

The printing carriages are operated from a shaft 19, mounted in the frame 1, by means

of oscillatory levers 20 which latter by means of rods 21 are connected to a rail 22 which is common to all the printing carriages. The rail 22 is provided with a pawl 23 for each printing carriage which pawls are adapted to engage shafts 24 provided on the printing carriages. The printing carriages, when not in operation are at the left hand end of Fig. 1 *i. e.*, they are immediately in front of the levers 11 each of which is provided with a roller. These levers 11 are normally retained in the raised position by means of the levers 8, which are under the action of springs 62 and the chains 10 in such manner that on the movement of one of the printing carriages by means of a pawl 23, connected to the rail 22, from right to left the pawl 23 at the end of this movement strikes upon the roller of the raised lever 11 and is thus disengaged from the carriage so that on the return movement of the rail 22, the printing carriage will remain at the left hand end of its travel. On the next movement of the rail 22, from the right to the left, the pawl 23 again strikes against the roller of the lever 11 and will therefore not engage with the printing carriage until the lever 11, suspended from the chain 10 is lowered by the displacement of the corresponding lever 8 by means of the corresponding rod 7 operated by the jacquard mechanism. On the lever 11 being brought into the lowered position the corresponding pawl 23 will pass over the roller of the lever 11 on the next stroke of the rail 22, and drops, as it cannot be retained in the raised position by the roller, over the shaft 24 of the printing carriage and thus takes this with it on the return stroke. As long as the corresponding lever 11 remains in the lowered position, the printing carriage will be reciprocated by the mechanism 19, 20, 21, 22, 23, so that the warps 3 are printed upon at the corresponding points by means of the rollers 14 and 15.

The levers 8 have their other arms connected to arms 26 of a shaft 27 by means of chains 25. These chains 25 are loose when the levers 8 are not operated by the rods 20 of the jacquard mechanism *i. e.*, when they are in that position which is imparted to them, by their springs. As soon as one end of one of the levers 8 is depressed by the action of the corresponding rod 7 and thus lowers the corresponding lever 11, which is suspended from the chain 10, the chain 25, is raised together with the corresponding arm 26 of the shaft 27 thus rotating the shaft 27 through a certain angle in an anti-clockwise direction (see Fig. 1.) On the shaft 27 is also mounted a lever arm 28 which by means of a connecting rod 29 and a crank 30 is connected to a shaft 31 (Figs. 2, 3 and 4). The shaft 31 is provided with an arm 32 (Figs. 3 and 4) which

by means of a connecting rod 33 is connected to a bell crank lever 35 which rotates about a stationary pivot 34.

The frame 1 is advanced after every printing operation, in the longitudinal direction of the warps 3 which are to be printed upon. This advance is effected by means of a pawl 37 which is operated by a rotary disk 36. The pawl coöperates with pins 38 of a ratchet disk 39, which is connected to a toothed wheel 40 which engages with a toothed wheel 42 gearing with a rack 41 (see Figs. 1 to 3).

The ratchet mechanism for the sake of clearness is not shown in Figs. 1 and 2, but only the rack 41 is shown in Fig. 1 and the ratchet mechanism is shown to a larger scale in Figs. 3 and 4. The relative position of the ratchet mechanism to Fig. 2 can be ascertained from the position of the shaft 31 in Fig. 2 which shaft forms part of the disconnecting mechanism for the ratchet mechanism driving the frame 1 hereinafter described.

As soon as the shaft 27 is rotated in the hereinbefore described manner by tensioning one of the chains 25, and thus rotating the shaft 31 by means of the connecting rod 29 which is raised, the levers 32 and the rod 33 will move the lever 35 into the position shown in Fig. 4. In this position the lever 35 retains the pawl 37 in the raised position by means of a lateral projection so that it cannot engage with the pins 38 of the ratchet disk 29 on its reciprocation. The pawl 37, which moves over the pin 38, therefore, does not operate the disk 39 so that this remains stationary and the frame 1 cannot be advanced by means of the toothed wheels 40, 42, and the rack 41.

As soon as one of the levers 8 is depressed by the corresponding rod 7 and thus brings into operation the corresponding printing apparatus, the lever 35 puts the mechanism for advancing the frame 1 out of operation, so that the frame remains stationary and the printing can be effected by means of the carriage connected to its driving mechanism.

On the shaft 27 is also mounted a lever arm 43 (Fig. 1) which, by means of the connecting rod 44 (see also Fig. 2) is connected to a segment 46 which rotates on a shaft 45. The shaft 45 also forms the axis of rotation for the device for simultaneously putting out of operation all the printing apparatus which are in operation. This shaft 45 carries a ratchet disk 47 provided with projections 48 which operate upon the roller 49 of a lever 50 (see Fig. 2). The lever 50 is, by means of a rod 51, connected to a movable rod 52 which is provided with a pin 53 for each lever 9. As soon as the lever 50 is caused to oscillate in consequence of the projections 48 contacting with the roller 49, the

rod 52 is displaced and the pins 53 of this rod operate upon the levers 9 so that any one of the levers which retains the corresponding lever 8 in the depressed position is withdrawn from the lever 8 and this latter is, by means of its spring 62 moved back into its normal position. By the displacement of the rod 52 all the levers 8 are simultaneously moved into their normal position so that, as the chains 25 are slackened, (see Figs. 1 and 2) the shaft 27 is rotated in a right-hand direction. This rotation of the shaft 27 produces, by means of the arm 43 and the rod 44, an oscillation of the segment 46, around the shaft 45 toward the right, whereby the segment is guided under the pawl 54, corresponding to the ratchet wheel 47 and provided with a roller and thus raises this pawl. The pawl, which receives its movement from the gear 20 for driving the printing carriage, by means of the lever mechanism shown in Fig. 1, can then no longer engage with the teeth of the ratchet wheel 47, so that the ratchet wheel 47 remains stationary. As soon as all the printing apparatus have been put out of operation by means of the controlling mechanism (rod 52), the drive of the controlling mechanism is also put out of operation by raising the pawl 54 by means of the segment 46. As soon as the shaft 27 is again rotated on bringing into operation one of the printing apparatus by depressing one of the levers 8, by the corresponding chain 25 the segment 46 is drawn back by the pawl 54 so that the latter again engages with the ratchet wheel 47 and drives the controlling mechanism. The controlling mechanism will then, after a time corresponding to the printing period, again put the printing apparatus out of operation on the succeeding projection 48 contacting with the roller 49 by means of the lever 50 and the rod 52, and simultaneously put its own driving gear out of operation. The drive for the frame 1 is now again brought into operation by the lever mechanism 29, 30, 32, 33 and 35 connected to the shaft 27 so that the frame 1 is advanced in the longitudinal direction of the warps to be printed upon.

The coloring rollers 14 and 15 are driven and fed with color in the following manner: To the frame 13 is hinged at 55 an arm 17 which at its lower end carries two rollers 15 and 16; the roller 16 rests on the bottom of the coloring duct 18, and the roller 15 contacts with the roller 16. The roller 15 lies directly under the wire net 3^a so that it acts upon the warp 3 through this net. In the frame 13 is mounted the second coloring roller 14 which rests upon the warps 3 which are disposed side by side. In the sliding member 13 is also mounted a toothed wheel 56 which engages with a stationary rack 57.

On the shaft of the toothed wheel 56 is keyed a chain wheel 58 and on the shaft of the coloring roller 14 is mounted a chain wheel 59, the said chain wheels being connected together by a chain 60.

On the reciprocation of the sliding member 13 in the direction of the color duct 18 that is, transversely to the warps 3, disposed side by side, the feeding roller 16 runs on the bottom of the color duct 18 and thus drives the coloring roller 15 and simultaneously feeds the color to this. On the rotation of the toothed wheel 56 in the rack 57 the chain wheel 58 is rotated and by means of the chain 60 drives the chain wheel 59 and thus the upper coloring roller 14 so that this latter is rotated at a speed corresponding to the speed of the warps 3 which are disposed side by side. By this means on rotation of the two coloring rollers 14 and 15 the displacement of the warps by the coloring rollers is prevented.

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

1. Mechanism for printing upon the warps comprising a frame, means for moving said frame in the longitudinal direction of the warps, printing mechanisms mounted in said frame, each of said printing mechanisms consisting of a color duct, printing rollers, means for transferring the color from the duct to the printing rollers, and means for rotating the printing rollers, means for bringing the separate printing mechanisms into and out of operation and means for putting all the printing mechanisms out of operation simultaneously.

2. Mechanism for printing upon warps comprising a slidable frame, a coloring roller carried by the frame, means for moving the frame, means on the frame for operating the coloring roller, an arm secured to the frame, coloring rollers carried by the arm, a coloring duct for supplying coloring matter to the rollers, and means for bringing the printing mechanism into and out of operation.

3. Mechanism for printing upon warps comprising supporting rails, a frame slidable on the rails, means for moving the frame, a coloring roller carried by the frame, an operating wheel associated with the coloring roller, a rack for operating said wheel, means for forming a connection between the operating wheel and coloring roller, a coloring duct associated with the frame, an arm carried by the frame, said arm extending into the duct, coloring rollers carried by the arm, and means for bringing the printing mechanism into and out of operation.

4. Mechanism for printing upon warps comprising a main frame, a printing carriage movable on said frame, an oscillatory lever carried by the frame, a coloring duct

under the frame, an auxiliary frame, coloring rolls carried by the auxiliary frame, a pawl adapted to engage the auxiliary frame, means connected to the lever for operating
5 the pawl and auxiliary frame, and a roller for disengaging the pawl and auxiliary frame.

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

OTTO HALLENSLEBEN.

Witnesses:

JEAN GRUND,
CARL GRUND.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."
