

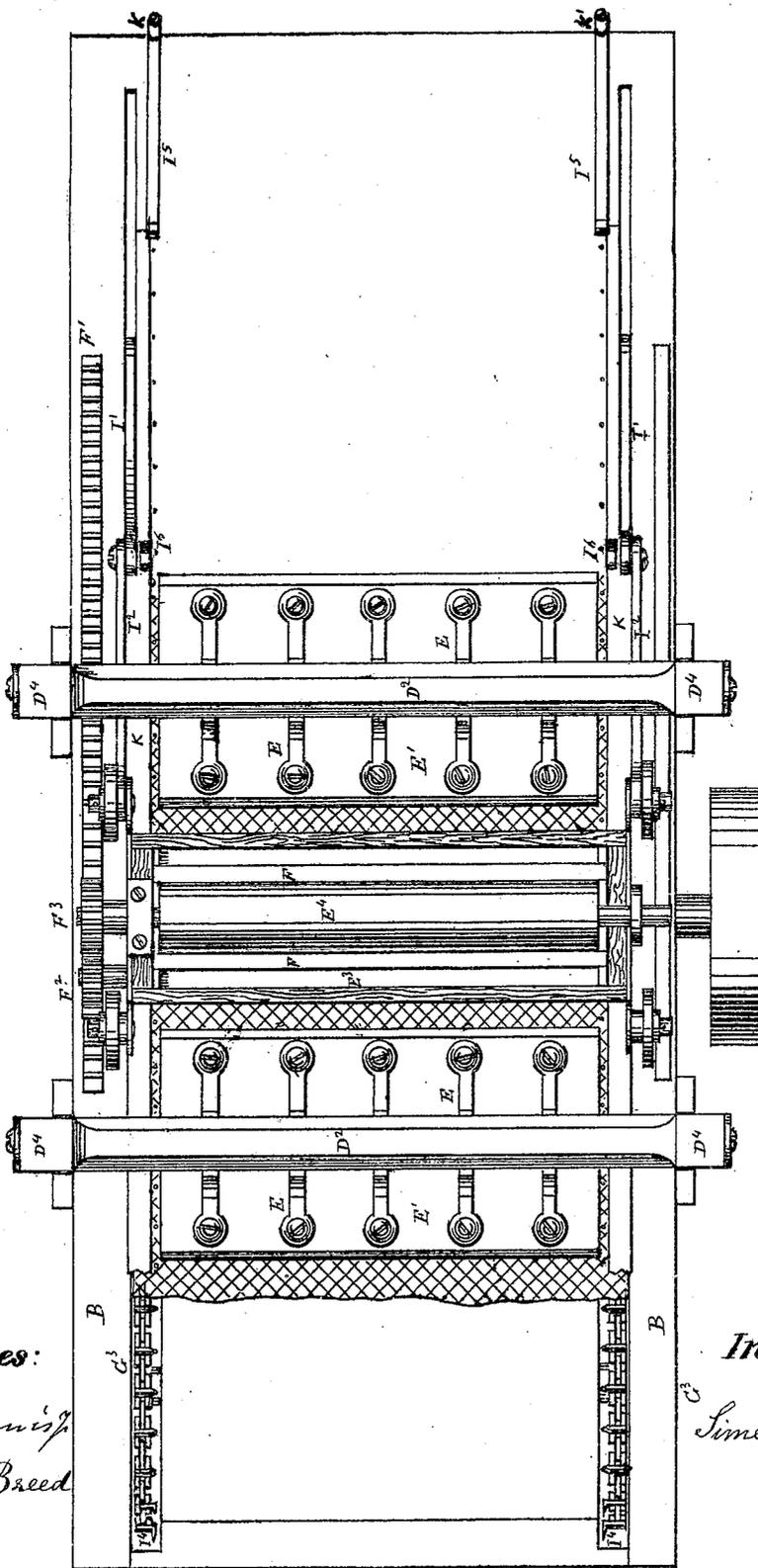
S. SAVAGE.

Improvement in Printing Machinery.

No. 129,176.

Patented July 16, 1872.

Fig. 1.



Witnesses:

Sam. Dennis
Daniel Breed

Inventor:

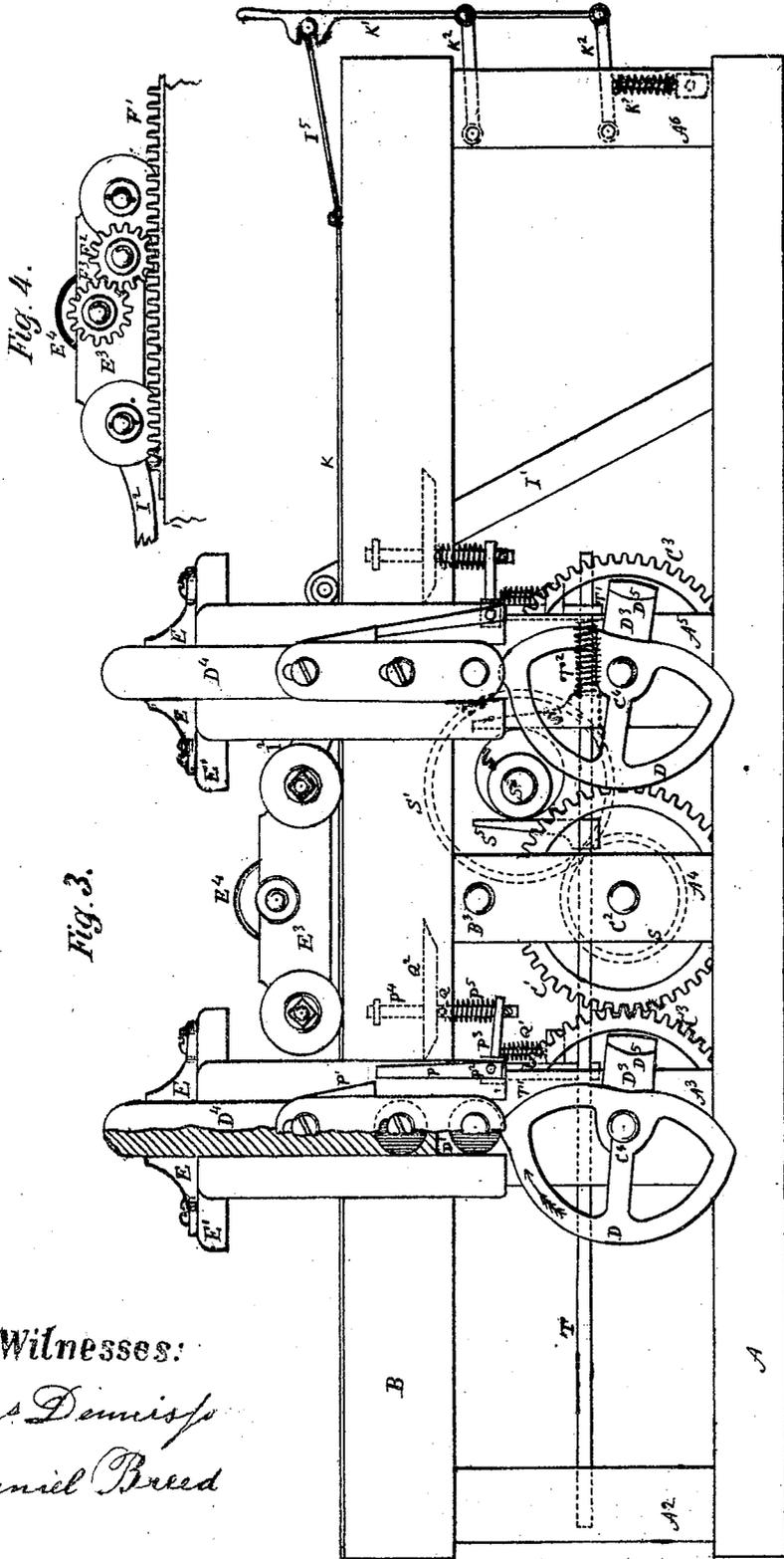
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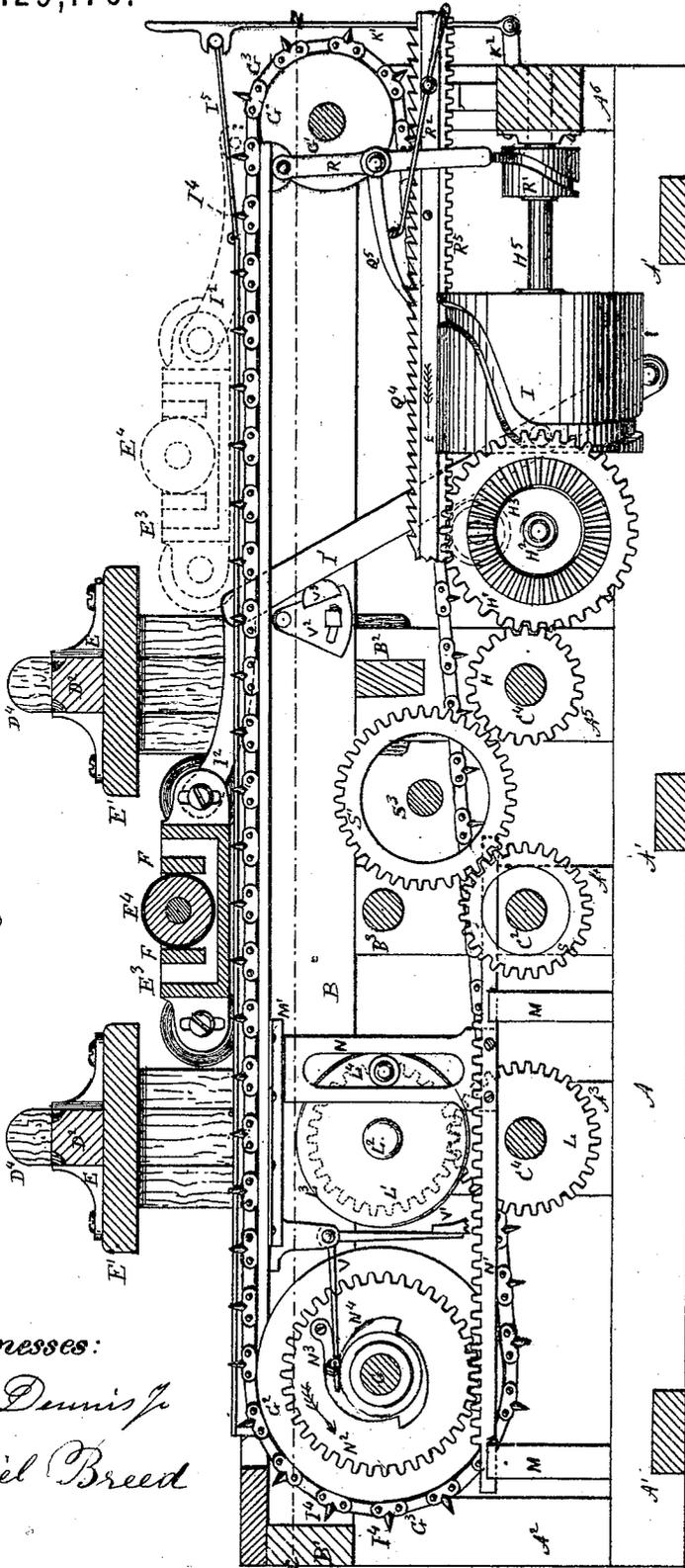


Fig. 5.

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UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN PRINTING-MACHINERY.

Specification forming part of Letters Patent No. 129,176, dated July 16, 1872.

SPECIFICATION.

To all whom it may concern:

Be it known that I, SIMEON SAVAGE, of Fredonia, Chautauqua county, in the State of New York, have invented certain new and useful Improvements in Machines for Printing Floor, Oil, and other Cloths, Wall, Floor, and other Papers; and I hereby declare the following to be a full and exact description thereof, reference being had to the accompanying drawing forming part of this specification.

The nature or essence of my invention consists in combining with a printing-machine, having traversing printing-blocks and traversing paint or inking troughs, endless chains provided with hooks or spurs to feed the cloth to be printed; and in the combination and arrangement of certain devices to communicate an automatic intermittent motion to the endless chains that feed the cloth, paper, or other material to be printed; and in the combination and arrangement of some levers and grooved cams to traverse the inking or paint troughs automatically; and in combining therewith an adjustable spring to ease the momentum of the paint-troughs at the ends of their traverse motion; and in the combination and arrangement of certain devices to automatically set the several printing-blocks carrying the several colors to be printed at work in succession as the first end of the cloth is fed under them; and also to stop the several blocks from printing in succession after the last end of the cloth passes from under the printing-blocks; and in the combination and arrangement of certain devices for locking up and stopping the printing-blocks automatically which carry the thick colors and are required to make only one impression on the cloth, while the other blocks, which carry thin colors, are making the second impression, and then release the blocks which carry the thick colors and set them to printing again; also, in the combination and arrangement of certain devices to automatically stop the feeding of the cloth until after the block or blocks carrying the thin colors have made a second impression on the cloth.

Figure 1 of the accompanying drawing represents a top view of a printing-machine with my improvements. Fig. 2 is a section on the line *x x*, Fig. 5. Fig. 3 is an elevation of one

side of the machine, some portions of which are broken away to show some other parts more clearly. Fig. 4 shows the rear end of the paint or inking apparatus. Fig. 5 is a vertical longitudinal section on the line *y y* of Fig. 2. Fig. 6 is a view of the left-hand or delivering end. Fig. 7 is a view of the right-hand or receiving end. Fig. 8 is an elevation of one of the rock-shafts with its latches and arm.

In the above-mentioned drawing, *A A* are the sills of the frame, connected by the cross-sills *A¹ A¹ A¹* to form the base of the frame. *A² A³ A⁴ A⁵ A⁶* are posts fastened into the sills *A* to support the rails *B B*, which are connected at the left-hand end by the girder *B¹*, and some of the posts by cross-girders *B²*, Fig. 5, the whole constituting a strong frame, to which the other parts of the machine are either fastened or connected. The shaft *B³* is fitted to turn in the posts *A⁴*, and is provided with a pulley, *B⁴*, for a belt from some driving-power to operate the machine. The pinion *C* is fastened to the shaft *B³* to turn the gear *C¹* on the shaft *C²*, which turns in the posts *A⁴* before mentioned. The gear *C¹* turns the gears *C³ C³* and shafts *C⁴ C⁴*, which turn in the posts *A³* and *A⁵* and carry the cams *D D* on the ends of the shafts outside of the frame, on both sides of the frame, as shown in Figs. 2, 6, and 7. The cams *D D* act against the roller *D¹* to lift the traversing frames, consisting of the bar *D²* and end pieces *D⁴*. There is an arm, *D³*, projecting radially from the back side of each cam, with a lug, *D⁵*, at the end, which passes over the roller *D¹* at the lowest part of the cam to draw the traversing-frame down and make a full impression on the cloth. The arms *E E* pass across under the bars *D²*, to which they are fastened, and screws are put through the ends of the arms into the stamping or printing type-blocks *E¹ E¹*. Strong bars are put across the machine between the rails *B B* to support the plank *E²*, which runs the whole length of the machine to support the cloth to be printed. The paint or inking trough *E³* is made in the form shown in the drawing, and mounted on wheels which roll on the rails *B B*, as the trough is traversed under the stamping-blocks *E¹*, to supply the paint to the blocks. The supplying-roller *E⁴* is fitted to turn in the paint in the trough *E³*,

which is provided with bars F F to gauge the supply of paint furnished by the roller E⁴. To turn this roller back, as the carriage or trough moves forward, so that its surface shall pass under the block E¹ and deliver the paint the same as though it derived its motion from rolling against the block, I fasten the rack F¹ to the rail B, and arrange the wheel F² to gear into the rack and turn on a stud in the trough and drive the wheel F³, fastened to the axis of the roller E⁴ to give it the motion desired, and not draw the paint across the grooves or interstices in the block and make imperfect impressions. The shafts G and G¹ are fitted to turn in proper bearings in the frame, and carry the grooved wheels G² G² G² G² to carry the endless chains G³ G³, which run in grooved iron ways fastened to the insides of the rails B for that purpose. The wheels G², which give motion to the chains, should have teeth on them to pass between the links of the chains. To communicate motion to the inking or paint troughs E³, I fasten the wheel H to the shaft C⁴ to turn the gear H¹ and shaft H², which is arranged to turn in proper supports and carry the bevel-gears H³ H³, which turn the gears H⁴ H⁴ and shafts H⁵ H⁵, which are arranged to turn in proper boxes and carry the grooved cams I, which are fastened to the shafts H⁵. The levers I are fastened to the sills A and extend up above the top of the frame, and are connected by the links I² to the paint-troughs E³, to traverse them as the levers are moved by the grooved cams I, acting on small rollers I³, which turn on studs fastened in the levers I¹. The grooves in the cams I are made alternately about one-fourth the circumference straight around, and one-fourth inclined, with gradual curves from one part into the other so as to work smoothly, as shown in Fig. 5.

To keep the cloth straight and feed it uniformly, I fasten tenter-hooks I⁴ to the links of the chain G³ at proper distances apart along the chain, while, as the cloth is fed in at the right-hand end of the machine its edges pass under the guides or levers I⁵ onto the points of the hooks I⁴, when the roller I⁶, on the side of the lever I¹, comes back and depresses the lever I⁵ and forces the edges of the cloth down onto the hooks, which pass through the cloth into a groove in the under side of the lever, made to receive them. One end of the lever I⁵ is hinged to the grooved plate K, which is fastened to the top of the rail B so that the edge of the cloth passes under the edge of the plate, and the points of the hooks travel forward in the groove, so that the plate holds the cloth on the hooks while it is passing through the machine and being stamped or printed. The outer ends of the levers I⁵ work in the spring shackle-bar K¹, which may be sprung off so as to release the lever when desired. The shackle-bar K¹ is hung to the frame by the links K² K², which allow it to traverse freely, and after the bar has been depressed by the lever I⁵, as the roller passes off of the lever and releases it, the spring K³, under the

link K², raises the bar K¹ and lever I⁵. To give the chains G³ an intermittent motion to move the cloth and stop it at a proper time, I fasten the gear L to the shaft C⁴ near the back side of the machine to turn the gear L¹ and short shaft L², arranged to turn in proper boxes right over the shaft C⁴, and carry the disk L³ on its end, which disk has a stud in it carrying the roller L⁴, which works in a slot in the bar N to traverse the bar N and rack N¹ horizontally, alternately, in each direction on the stands M M, while the top of the bar N traverses in the guide M¹. The gear N² is fitted to turn loose on the shaft G, which carries the chain-wheels G², and is turned by the rack N¹. The gear N² has the pawl N³ fastened to its side to catch into the ratchet N⁴ fastened to the shaft G when the gear is turned in the direction of the arrow, so as to turn the wheels G² and move the chains and cloth a proper distance, and let them stop for the cloth to receive an impression, while the rack carries the wheel back and the pawl slips over the teeth of the ratchet to take a new hold and move the chains and cloth again.

The above-described machine is represented in the drawing with two printing-blocks, E¹, to print two colors at one operation; but these machines may be made with ten or more blocks to print ten or more colors at once, each block having an inking or paint trough to supply the coloring matter to the block. And when the machine is arranged and prepared for printing and the machine put in motion, and the paint-troughs all traverse under their respective blocks, it is necessary to lock and hold the blocks up so high that the paint-supplying rollers E⁴ will not touch the blocks until the cloth comes under, when the blocks are released in succession and drop down to receive a supply of paint from the roller and press it onto the cloth; and it is also necessary, as the last end of the cloth being printed passes from under each block, that they should be raised and held up in succession out of the reach of the paint-supplying rollers which pass under them. This raising and holding up and releasing of the printing-blocks is effected by the devices which will now be described.

The cam D turns in the direction of the arrow and has a projecting point at its upper corner, as shown in Fig. 3, which, acting on the roller D¹, lifts the block E¹ beyond the reach of the paint-roller E⁴ at that point of the cam, when the latch P catches under the catch P¹ and holds the block up until the latch is released. The rock-shaft P² extends entirely across the machine, and has a latch, P, on each end, worked by the arm P³, fastened to the rock-shaft, and extending horizontally to receive the traverse-rod P⁴, which has its upper end supported by a stand fastened to the rail B. The spring P⁵ on the rod P⁴ acts against the pin Q and the arm P³ to throw the latch P out at the proper time when the weight of the block is taken off. The spring Q¹ acts against the under side of the arm P³ and holds the

latch under the catch until the traversing-plate Q^2 passes onto the pin Q and depresses it so that the spring P^5 overcomes the spring Q^1 and throws out the latch, when the weight of the block is taken off, so that the block comes down and receives the paint from the roller and presses it onto the cloth. The rack-bar Q^4 , in Figs. 2 and 5, is arranged to traverse horizontally and carry the plates Q^2 , which are fastened to it and carried by it. This ratchet rack-bar Q^4 is moved forward by the pawl Q^5 attached to the lever R , which is hung to a stand on the under side of the plank E^2 , Fig. 7, and is vibrated by the cam R^1 on the shaft H^5 , so as to work the pawl and move the rack in the direction of the arrow and carry the plates Q^2 onto the pins Q , until all the blocks in the machine are set to printing in proper succession, when the handle of the lever R^2 is depressed to raise the pawl Q^5 and hold it up and let the rack stop until the last end of the last piece of cloth to be printed, for the time being, passes in, when the handle of the lever R^2 is raised and the pawl set at work again to traverse the rack and carry the plates Q^2 off of the pins Q in succession, (as the last end of the cloth passes along,) and release the springs P^5 , so that the springs Q^1 raise the arm P^3 and throw the latch P under catches P^1 and hold the blocks up clear of the paint-roller, and retain them there while there is no cloth under them to be printed. After the last block is raised and latched up the handle of the lever R^2 is depressed to throw the pawl Q^5 up out of the rack. The crank-shaft R^3 is fitted to turn in a stand fastened to the rail B , and carries the pinion R^4 , Fig. 7, which acts on the toothed-rack R^5 on the under side of the rack Q^4 , shown in Fig. 7; so that when the pawl Q^5 is raised out of the rack and the machine stopped the crank and shaft R^3 may be turned to run the rack back and carry the plates Q^2 over the pins Q without releasing the latches P , as the weight of the frame and blocks is upon the latches, which prevents their being thrown out from under the catches by the springs.

It is found in printing floor-cloths that some kinds of paint, embracing some particular colors, cannot be mixed thick or stiff enough, so that the printing-blocks will hold and carry paint enough to the cloth with one impression to make good work. Hence it is desirable to have the blocks carrying these particular colors make two or more impressions, while the blocks carrying other colors make one, which double impression should be made before the cloth is moved on the machine; and in order to do this it becomes necessary to raise the blocks carrying the thick colors out of reach of the paint-rolls, and hold them there while the blocks carrying the thin colors make a second impression on the same surface. To effect this desired result automatically without stopping the machine, I have combined and arranged certain devices which will now be described. The gear S , Fig. 5, is fast-

ened to the shaft C^2 , and made just half as large as gear S^1 , which it turns, to carry the shaft S^3 , which turns in the sides of the frame and carries the eccentric S^4 , Fig. 2, which works between the arms S^5 of the traversing-bar T , which is arranged to traverse on proper supports fastened to the frame. The bar T is made to traverse freely, through slots in the arms T^1 , on the rock-shaft P^2 , which arms (see Figs. 3 and 8) are fastened to the rock-shafts by set-screws, so that when the screws are turned back the arms T^1 work loose on the shafts P^2 without rocking the shaft. The spring T^2 on the bar T , Fig. 3, acts against the arm T^1 , when it is compressed by the eccentric S^4 with sufficient force to overcome the spring P^5 , and throw the latch P under the catch P^1 and hold up the printing-block E^1 at each alternate revolution of the cam D , as the eccentric S^4 only turns once to the cams turning twice; and as the eccentric continues to move it releases the spring T^2 and allows the spring P^5 to throw out the latch P and let the block E^1 down to make an impression; hence, the operator can make any of his printing-blocks work alternately by locking the arm T^1 the rock-shaft P^2 , while the blocks, when the arm T^1 is not so locked, will make an impression at each revolution of the cam D . When one or more of the printing-blocks is to make two impressions on the same space in the cloth being printed, the devices which traverse the cloth must cease working until the second impression is made, and then work again to traverse the cloth. To effect this the bell-crank V , Figs. 5 and 6, is hung in a stand fastened to the plank E^2 , so that the vertical arm of the crank extends down and is acted on by the arm V^1 on the bar T to lift the horizontal arm of the crank, which acts under a pin in the pawl N^3 and raises the pawl so that it does not move the devices which traverse the cloth, until the eccentric S^4 carries the arm V^1 back and lets the pawl N^3 down again. To ease the momentum of the color-boxes at each end of the distance which they traverse, I fasten the adjustable stand V^2 , Fig. 5, to the inside of the rail B , with a notch in it to receive the rubber spring V^3 , which acts on the lever I^1 as it approaches the extremity of its sweep, and gradually resists the momentum as the spring is compressed; and a similar spring is applied at the opposite end of the sweep of the lever.

Having described my improvements in printing-machines carrying several blocks to print several different colors at the same time, so as to enable any person skilled in the art to make and use them, I will now state what I claim and desire to secure by Letters Patent:

1. In combination with the traversing printing-blocks E^1 , I claim the combination and arrangement of the grooved cam R^1 , lever R , pawl Q^5 , rack Q^4 , plate Q^2 , traverse-rod P^4 , spring P^5 , arm P^3 , rock-shaft P^2 , latch P , catch P^1 , and spring Q^1 , to automatically set the several printing-blocks carrying the several

colors at work in succession as the first end of the cloth is fed under them, and also to stop the blocks from printing in succession after the last end of the cloth being printed passes from under each printing-block.

2. I claim the combination and arrangement of the gears S and S¹, eccentric S⁴, arms S⁵, traverse-rod T, spring T², arm T¹, rock-shaft P², latches P, catch P¹, arm P³, and spring P⁵, for locking up or stopping the printing-blocks automatically which carry the thick colors and are required to make only one impression on the cloth, while the blocks which carry thin colors are making the second impression, and then releasing the blocks which carry the thick colors and set them at work again.

3. I claim the combination and arrangement of the cams S⁴, arms S⁵, traverse-rod T, arm V¹, and bell-crank V, to lift the pawl N³ and stop the feeding of the cloth until after the block or blocks carrying the thin colors have made a second impression on the cloth, substantially as described.

4. I claim the combination and arrangement of the grooved lever I⁵ and traversing-roller I⁶, to force the cloth onto the spurs I⁴ of the chain G³, substantially as described.

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