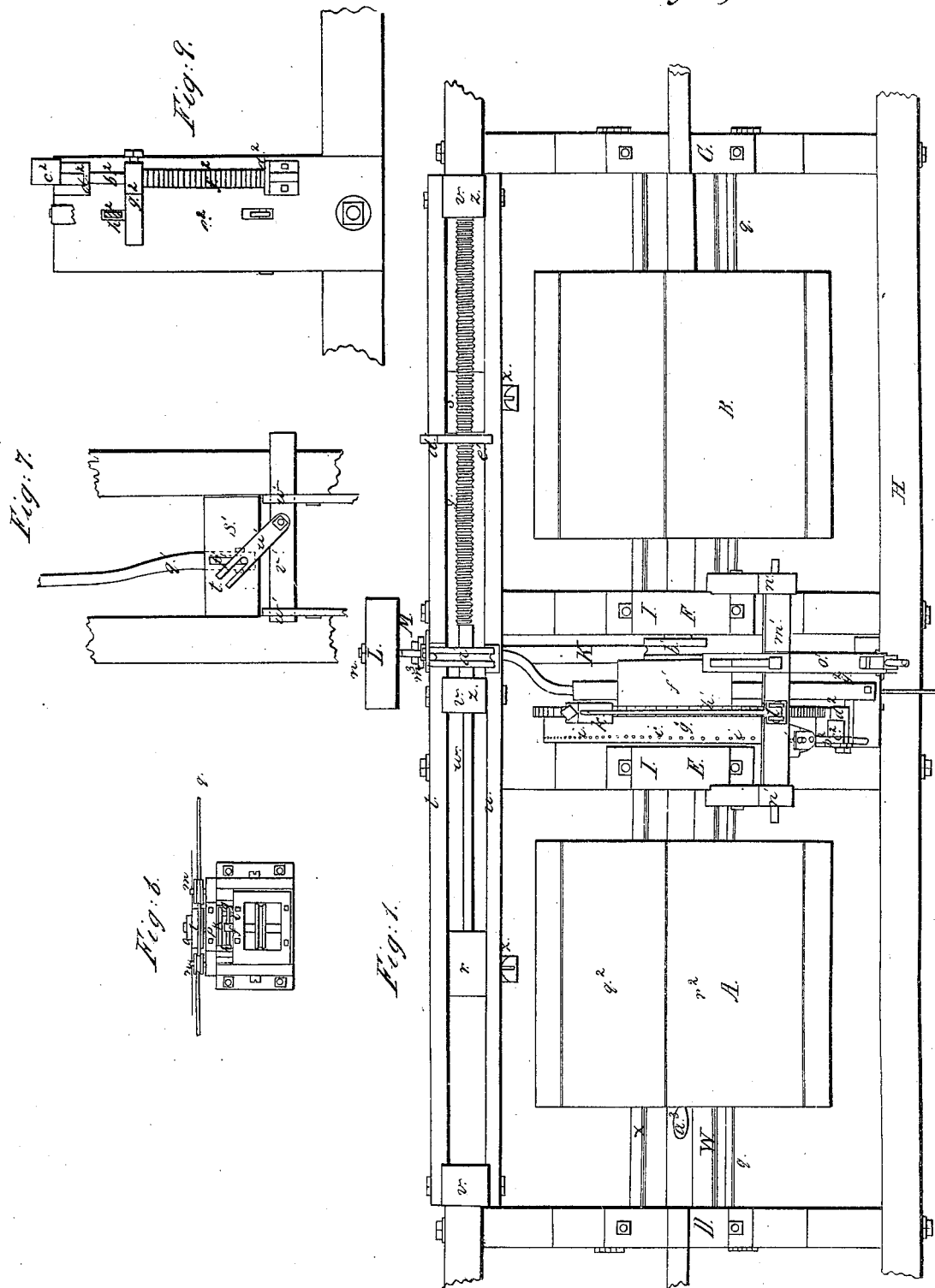


A. Hartman. Sheet 1, 4 Sheets.
Warp & Yarn.

N^o 5,686.

Patented Aug. 1, 1848.



A. Hartman. Sheets, 4 Sheets.
Warp & Yarn.

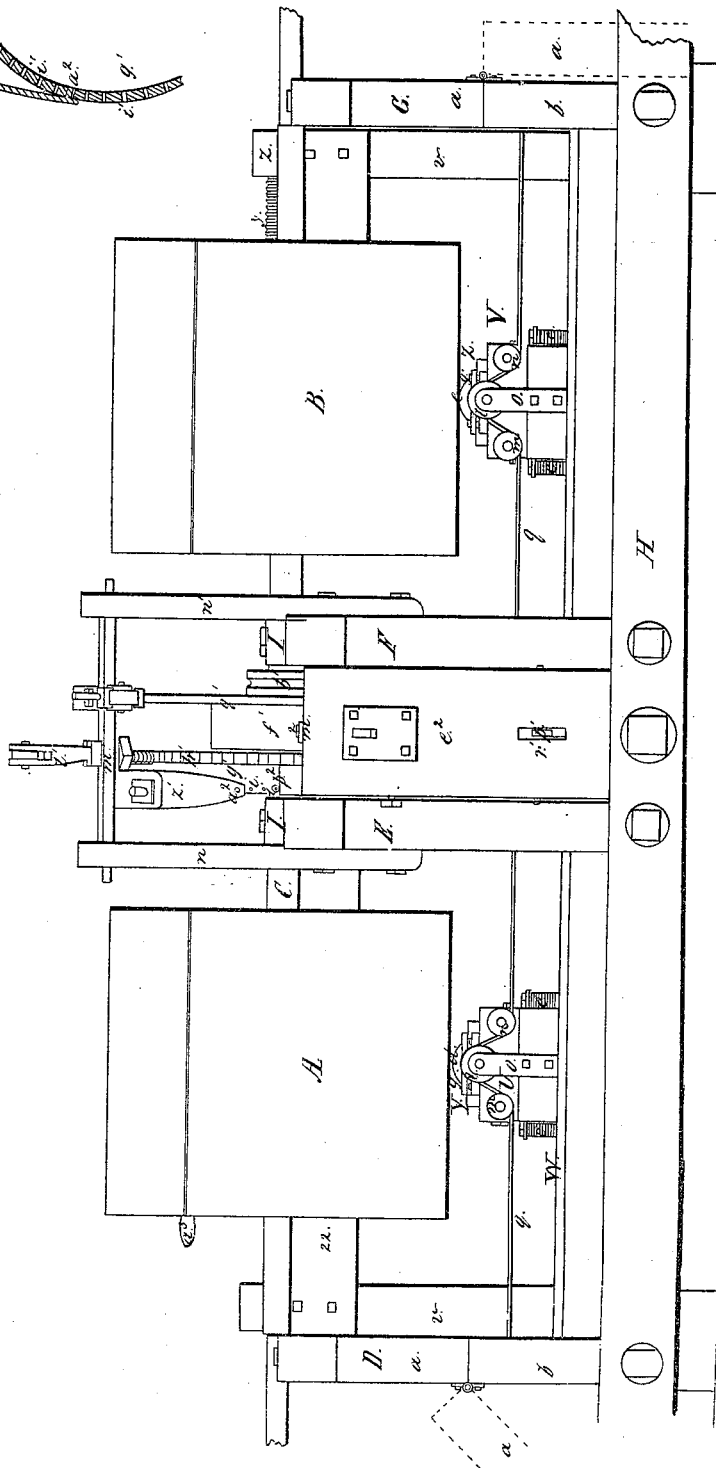
N^o 5,688.

Patented Aug. 1, 1848.

Fig. 8.



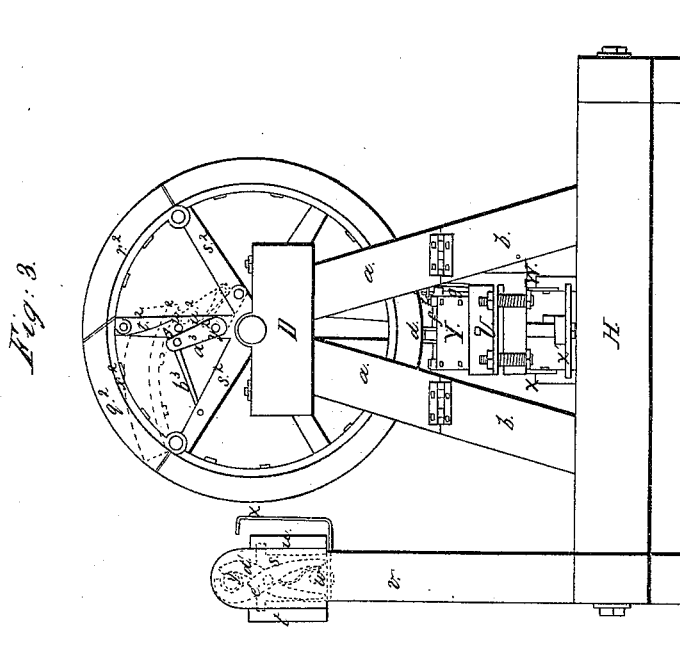
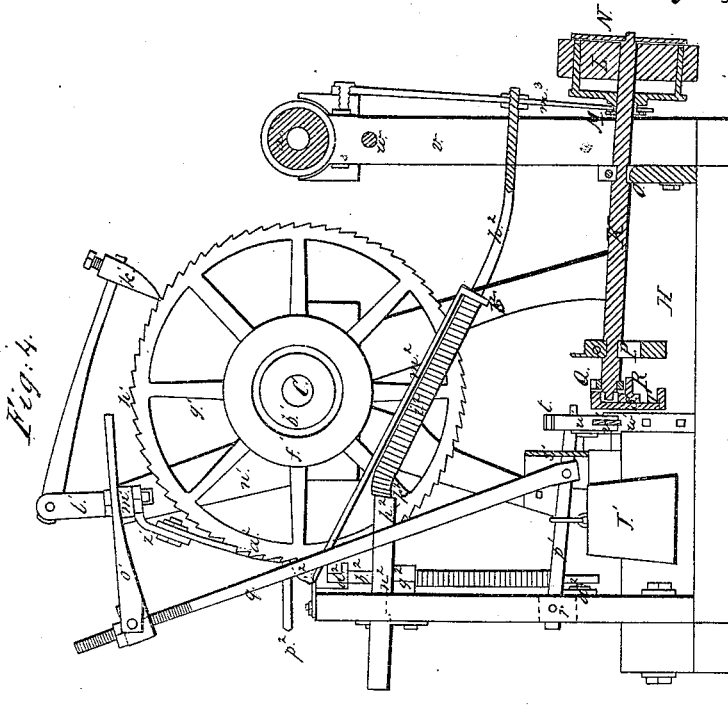
Fig. 2.



A. Hartman. Sheet 3, 4 Sheets.
Warp & Yarn.

Nº 5,688.

Patented Aug. 1, 1848.

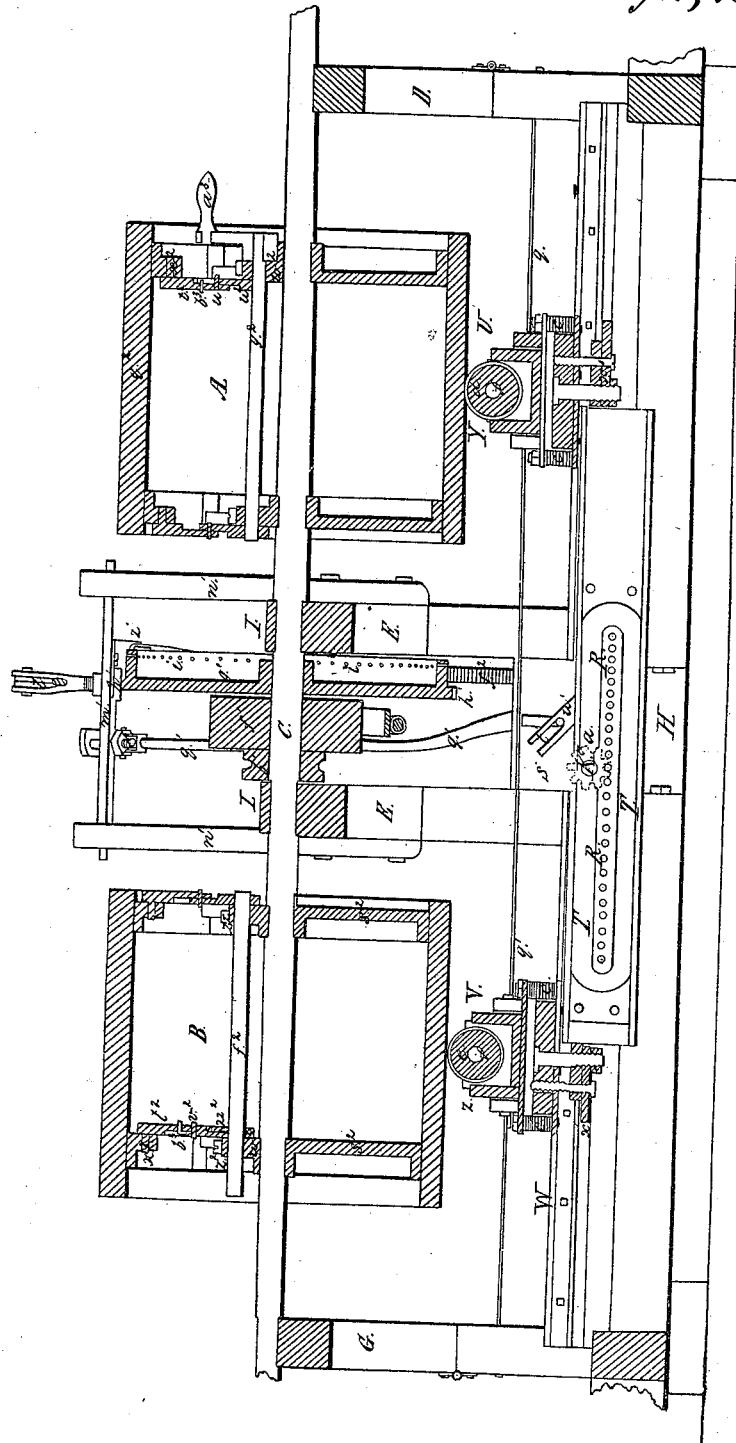


A. Hartman. Sheet 4, 4 Sheets.
Warp & Yarn.

No 5,688.

Patented Aug. 1, 1848.

Fig. 5.



UNITED STATES PATENT OFFICE.

ANDREW HARTMAN, OF CLAPPVILLE, MASSACHUSETTS.

PRINTING YARNS FOR THE MANUFACTURE OF TAPESTRY.

Specification of Letters Patent No. 5,688, dated August 1, 1848.

To all whom it may concern:

Be it known that I, ANDREW HARTMAN, of Clappville, and formerly of Saxonville, in the State of Massachusetts, have invented
5 certain new and useful Machinery for Printing Yarns for the Manufacture of what is usually termed "Tapestry" or "Velvet Pile Carpeting"; and I do hereby declare that the same is fully described and
10 represented in the following specification and accompanying drawings, letters, figures, and references thereof.

Of said drawings, Figure 1, denotes a top view of my improved machinery. Fig. 2
15 is a front elevation. Fig. 3 an end view. Fig. 4 a transverse and vertical section taken through the driving shaft. Fig. 5 is a central longitudinal and vertical section, taken so as to exhibit the front portions of the
20 machine.

Such other figures as may be necessary to fully exhibit the operative parts to be described, will be hereinafter duly specified and explained.

25 The peculiar process for which my improved mechanism is intended is described in a printed work published in 1844, and termed the "Art of weaving by Hand and by Power," by Clinton G. Gilroy, the said
30 process being known as the invention of Richard Whytock of Edinburgh, Scotland, the description of which is to be found between pages 215 and 240, of said work.

In the drawings of my improved mechanism A and B represent two cylinders or
35 drums, arranged at some distance apart, and with their axes in one straight line. They are fixed to, and supported by one long shaft C, which is sustained by four standards D, E, F, G, which are disposed with
40 respect to one another and project vertically from a bed frame H as seen in the drawings. The shaft is more properly sustained by, and revolved in boxes I, I, applied to the tops of the two middle standards E, F. At each of its ends, it is made
45 to simply rest on one of the outer standards D, or G, each of which is divided into two parts *a*, *b*, which are hinged together in such manner as to render the upper one
50 capable of being turned downward, into the position denoted by the dotted lines in Fig. 2. By means of the aforescribed mode of arranging, and sustaining two cylinders the
55 one is made to balance the other, and thus I am enabled to do away with the tackle

pulley and rope such as are applied in an oblique direction, between the arms of the cylinder and hung from a support at the ceiling of the room, and used in Whytock's
60 machine. On turning down either of the parts *a* of the standards D, G, the yarn may be readily doffed from the adjacent cylinder.

The machinery which operates or revolves
65 the cylinders or drums is situated between them, while that which applies paint, dyeing or printing matter to the warps is placed and operates directly underneath them.

K, Figs. 1 and 4 is the main shaft. It
70 has a driving pulley L placed on one end of it, and made to revolve freely on it. The said pulley is connected with a clutch M, whose arms extend through it, and when the
75 clutch is moved up to the pulley, engage with a cross bar N, fixed upon the end of the shaft, and lock the pulley to the shaft, so that the motion of the pulley, when revolving may be communicated to the shaft.
80 The said main shaft has a toothed pinion Q fixed to its inner end, the said pinion being made to operate, in conjunction with a series or rack of pins R projecting at equal
85 distances apart from a horizontal bar S. Around said pins a continuous and endless groove T is made in the bar S, as seen in Fig. 5, the end of the main shaft being inserted and made to travel in said groove. The shaft is made to rock near its opposite
90 end on a pin or bearing O, and is sustained and guided (so that its inner end may rise and fall), by a suitable standard P. The shaft being made to revolve always in one
95 direction will so operate on the rack of teeth or pins R, as to impart a reciprocating rectilinear motion to the bar S, to which the carriages U, V, which support the printing reservoirs and rollers, are attached. The said carriages are supported and move
100 on two parallel rails W, X, which extend underneath the cylinders or drums A, B, as seen in the drawings.

Y, Z, are the color boxes or reservoirs, each of which rests on four or any suitable
105 number of springs *c*, *c*, by which it is pressed toward the cylinder over it so as to keep the printing roller *d* or *e* of the box, in contact with the warps wound on the cylinder. A top view of one of the printing rollers—and
110 its reservoir—and sustaining carriage is represented by Fig. 6. Each printing roller

rests partly within or so as to dip into its reservoir, and is arranged in a vertical position, as seen in the drawings. Its gudgeon or shaft *f* extends a short distance beyond one side of the reservoir and has a wire *g* passed through it, at right angles to it. The said wire extends an equal distance on each side of the shaft, and between two studs or pins, *h*, *i*, which project from a plate, or cross piece *k*, fixed in the inner end of the shaft of a vertical pulley *l*, which is supported by suitable standards *o*, *p*, projecting up from the carriage of the color box. The said pulley has two guide pulleys *m*, *n*, arranged on opposite sides of it, or with respect to it, as seen in Figs. 2 and 6. A cord or band *q* whose ends are fastened respectively to the standards D, G passes over the two pulleys *l*, *l*, and under the guide pulleys *m*, *n*, *m*, *n*, as seen in Fig. 2.

The two printing rollers and their carriages are moved simultaneously with and by the bar S, and the rack of pins R, should be of such length as to cause the printing rollers after each passage across the surfaces of the two cylinders or warp thread thereon to pass a short distance beyond or by the adjacent ends of their respective cylinders, in order that the two printing rollers may be made to continue their revolving motion to an extent sufficient to cover their entire edges with the printing material before they are again brought into action upon the warp thread of the cylinders. Each of the pulleys *l*, *l*, should have a diameter equal to that of the printing roller with which it is connected. The object of the pulleys *l*, *l*, and cord or band *q* is to revolve the printing rollers after they pass by or beyond the ends of their respective cylinders, and by so doing cause their entire peripheries to be covered with the dying matter. While the rollers are passing in contact with the cylinders or warp thereof, they simply roll against them and impart the coloring matter to them. The threads are wound upon the cylinders in the following manner.

T, S are two carriages supported by and made to slide between two horizontal and parallel rails *t*, *u*, which are sustained in position by posts *v*, *v*, *v*. The two carriages are connected together by a rod *w*, which extends from one to the other of them. Each carriage has a yarn guide *x* affixed to it, and projecting upward from it, and toward the external surface of the adjacent cylinder A or B. A long screw *y* is disposed over one of the carriages, and so as to revolve in bearings *z*, *z*. Said screw has a grooved pulley *a'* fixed on it, near one of its bearings. Around said pulley and another pulley *b'* fixed on the shaft C, an endless band passes, and by means of the pulleys communicates a rotary motion to the screw.

A pair of opening screw jaws *d'*, *e'*, are

attached to one of the carriages *r*, *s*, and work upon the screw, in such manner that the revolutions of the screw shall cause a regular progressive motion of the two carriages, between their supporting rails, and in a mode proper to cause a regular laying of each thread of the warp or yarn, in a helix on the external curved surface of the cylinder to which its end may be attached, when the two cylinders are put in revolution: which is accomplished by a belt, from a suitable driving drum, being made to pass around and act upon a pulley *f'* fixed on the shaft C.

The next portion of the machinery to be described is that which imparts to the two cylinders A, B, a regular rotary movement after each passage of the printing rollers across them, and permits them to remain at rest while the said printing rollers, are in action on the warps on the cylinders.

g' Figs. 1, 2, 4, is a large wheel fixed on the shaft C, and having ratchet teeth *h'* projecting around and from one part of its periphery, and a series of holes *i'* bored at equal distances apart through its rim, as seen in the drawings. The arc extending from center to center of any two adjacent holes, should contain the same measure or same number of degrees as the arc of any stripe or color, laid on the surface of the warp yarn, at any one motion of one of the printing rollers, across one of the cylinders. Each of the ratchet teeth *h'* should be of a length to correspond with the length of said arc measured on the periphery of the wheel, there being the same number of ratchet teeth as holes through the rim. Each hole has a designating number engraved against it, and on the surface or circumference of the wheel. A heavy or weighted pulling pawl *k'* shaped as seen in the drawings, has one end resting in contact with the row of ratchet teeth, and the other jointed to an arm *l'* which extends upward from a horizontal shaft *m'* whose journals or ends, rest and turn in bearings in the upper ends of two struts *n'*, *n'*, fastened respectively to the standards E, F. Another arm *o'* extends from the shaft *m'*, and is connected with a lever *p'* by an inclined rod *q'* jointed to both. The lever *p'*, turns vertically on a fulcrum at *r'* at one end of it, and at its opposite end, it passes through a vertical slot, made through a guide plate *s'*, and rests in the opening *t'*, of a forked piece of metal *u'*, see Fig. 7, which denotes a rear elevation of the said forked piece *u'*, the parts below it, with which it is connected, and also the plate *s'*. The lower end of the forked piece *u'* is jointed to the middle part of a horizontal slide bar *v'*, which is supported by, and so as to slide back and forth in bearings *w'*, *w'*. Each of the carriages U, V, has a horizontal plate of metal *x'*, con-

nected with it, and extending between the
 rails or timbers on which the carriage rests.
 Now during the movement of the bar S,
 either in one direction or the opposite, it
 5 will carry the inner edge of one of the plates
 x' , x' , against that end of the slide bar v'
 which is next to it, and will by pressure on
 the bar cause it to slide longitudinally
 through its bearings, and so as to elevate
 10 the forked piece u' (which previous to the
 movement of the bar, was in an inclined po-
 sition) into a vertical position, during a
 part of its movement, and allow it to fall
 over into an opposite inclined position. The
 15 elevation of the forked piece u' , will create
 a lifting upward of the lever p' , and of
 course the rod q' , and arm o' , of the shaft
 m' , and so as to partially rotate said shaft
 sufficient to move the pawl k' , on the ratchet
 20 teeth h' , and throw it into gear with an-
 other or the next succeeding tooth. A
 weight y' is hung on the lever p' , and
 should be sufficient to depress the lever,
 while the forked piece u' , is falling back
 25 and cause the pawl to drag on the ratchet
 tooth against which it rests, and partially
 rotate the wheel g' and the two cylinders,
 and to the extent required to bring the color
 wheels to act entirely on a fresh surface of
 30 warps. The shaft m' has another arm z' ,
 extended from it, directly over the line of
 holes of the wheel g' , and in other respects
 as seen in the drawings. Said arm has a
 small stud or pin a' extending from it, as
 35 seen in Fig. 8, which denotes a vertical sec-
 tion of the arm, and its pin, as well as a por-
 tion of the wheel g' , beneath it.

The pin or stud is made to enter any one
 of the holes of the periphery of the wheel.
 40 When the pawl k' is moved over a tooth of
 the wheel g' the movement of the shaft m'
 will elevate the arm z' so as to draw its stud
 out of one of the holes i' . The reverse mo-
 tion of the pawl, brings the succeeding hole
 45 under the stud, which as soon as the wheel
 has moved far enough, enters the said hole,
 and confines the wheel and cylinders in a
 stationary position, during the time a suc-
 ceeding stripe of color is laid on each of the
 50 warps, on said cylinders.

We will now suppose that it is desirable to
 cause the printing rollers to pass back and
 forth and roll against the warps on the
 cylinders any given number of times and
 55 directly on completion of the same to have
 the machine stop its motions. This is ef-
 fected by the following mechanism acting
 as hereinafter described.

Directly in front of the wheel g' and
 60 range of the holes i' a vertical rod b^2 having
 a broad head e^2 , is arranged, and supported
 by bearings or projections d^2 , d^2 from a
 standard e^2 . The said rod is made to slide
 freely up or down through said bearings,
 65 and has a helical spring f^2 coiled around it.

and made to rest on the lower bearing d^2
 and to act against an arm g^2 , projecting
 from the rod b^2 , as seen in Fig. 9, which de-
 notes a view of the inner side of the rod
 and the standard e^2 . The said arm g^2 acts
 70 in conjunction with a long bent rod h^2 ,
 which slides freely through the standard e^2
 and is pressed forward or toward the stand-
 ard by a spring i^2 , one end of which rests
 against a shoulder h^2 formed on the rod,
 75 while the other end acts against the bent
 part l^2 of a bar m^2 , which projects from the
 top of the standard e^2 and has the rod h^2
 passing and moving freely through its bent
 end l^2 . The rear end of the rod h^2 , is joint-
 80 ed or connected to a shifting fork m^3 of the
 clutch M, before mentioned. A notch or
 shoulder n^2 , is made in the underside of the
 rod h^2 , and in such position thereon, that
 when said rod is forced back, so as to clutch
 85 the driving pulley to the main shaft it (the
 shoulder n^2) will bear against the arm g^2 .
 This being the case if pressure is put on the
 rod b^2 so as to depress it and the arm g^2 the
 said arm may be made to pass below the
 90 shoulder and so liberate the rod h^2 as to per-
 mit the spring i^2 to press it forward, and by
 so doing draw the clutch forward, in a man-
 ner sufficient to unclutch the driving pulley
 and main shaft, which being effected the
 95 machinery will cease to operate.

By inserting a pin p^2 in any one of the
 holes of the range i' as seen in the draw-
 ing, said pin when moved into contact with
 the top of the rod b^2 , will depress said rod
 100 and by so doing, will arrest the motions of
 the machinery.

The neat portion of my machine to be de-
 scribed, is that by which certain portions of
 each cylinder are made to fall inward or
 105 toward the cylinder shaft, in order to en-
 able a person to readily remove the coils of
 yarn, from the cylinder, after the printing
 process has been completed. My improve-
 ment is not confined to the making of said
 110 cylinders with such falling or movable por-
 tions, or parts of its external case, as such
 are used in the machine of Whytock herein-
 before alluded to, but that which consti-
 tutes my improvement is the peculiar man-
 115 ner in which the mechanism I use, for de-
 pressing said portions, is constructed, and
 arranged, so as to fold up in a direction
 transversely of the axis of the cylinder, in-
 stead of folding down in a line parallel,
 120 with the said axis, or slightly inclined there-
 to as does the folding machinery of said
 Whytock's machine, my improvement en-
 abling me to derive some important advan-
 tages in the use of my machine.

In Fig. 3, q^2 and r^2 exhibit the two parts
 of the circumference of the cylinder which
 are hinged to the rest, and made to turn
 down into the positions denoted by the dot-
 ted lines. For this purpose one of the arms
 125

s^2 , of each set of arms, s^2 , s^2 , s^2 , &c which radiate from the shaft C (there being two or any greater number of sets of arms to each cylinder) and serve to support the rim of the cylinder, is made in two parts t^2 , u^2 , which are jointed together at v^2 . The part u^2 is jointed at its lower end to the hub w^2 of the set of arms, while the upper end of the other part t^2 , is jointed to one of the folding parts of the rim, or to the leaf x^2 of the hinge thereof. The several joints should be made so as to admit of the parts t^2 , u^2 , folding together in a direction or plane, perpendicular to the axis of the shaft C. In my machine the folding arms of each cylinder are attached at their lower ends to a shaft y^2 which is sustained in boxes z^2 , z^2 , and has a crank a^3 affixed on its outer end. By turning said crank down, the two boards or folding parts of the cylinder will be made to fall in toward the shaft C. The manner in which the folding arms operate enables me to use more than two sets of arms to each cylinder, and thus I am enabled to use much larger cylinders than can be conveniently used, when the folding apparatus used in Whytock's machine is employed. Besides I gain other very important advantages not necessary to be mentioned, but which will be apparent to any person, who is acquainted with the use of such machinery. When the folding parts t^2 , u^2 , are brought into straight line with each other, they are kept so by a rod b^3 , which is jointed to one of the arms s^2 , and made to hook into a hole made through either of the parts t^2 , u^2 .

Having thus specified my improved machine, that which I claim is as follows:

1. I claim the combination of two working cylinders or drums, and one set of rotating and supporting machinery as arranged between them, and operating substantially as above described.
2. I also claim the manner in which I arrange the printing wheels, and machinery, with respect to the working cylinders, viz, the placing them directly underneath the cylinders, and so that the wheels shall stand in, or nearly in a vertical plane or so that

the printing matter may not gather more on or toward one edge of the printing wheel, than it does on the other, as it is liable to by the force of gravity, when the wheel is inclined to the horizon, or made to run in a horizontal plane as heretofore.

3. I also claim the pulley l , and band q , applied to each printing wheel as set forth, in combination with the mechanism by which said paint wheel is made to pass some distance beyond the end of the cylinder every time it is rolled in contact with it, the same being for the purpose of covering the entire surface of the printing wheel with the coloring matter of its reservoir, before it is again brought into action on the warp yarns of the cylinder.

4. I also claim the index wheel or series of holes i' and pin p^2 in combination with the stop motion, the same being used in manner and for the purpose substantially as specified.

5. I also claim the arm z' and stud a^2 in their combination with the range of holes i' , and machinery for rotating the cylinders, and allowing them to rest at certain intervals of time the said arm and stud being for the purpose of holding the cylinders perfectly stationary, and still while the printing wheels are passing across them.

6. I do not claim making each of the cylinders, with falling or folding portions q^2 , r^2 , but that which I do claim is the construction and arrangement of the arms, which support the folding parts, in such manner, that they shall fold together in directions at right angles to the axis of the cylinder, instead of folding down, parallel or inclined to the said axis, as in the machine of Whytock to which I have heretofore alluded the said improvement enabling me to obtain several decided advantages in the use of the mechanism.

In testimony whereof I have hereto set my signature this tenth day of May A. D. 1847.

ANDREW HARTMAN.

Witnesses:

H. G. HENSHAW,
A. WOODARD.