

No. 656,234.

Patented Aug. 21, 1900.

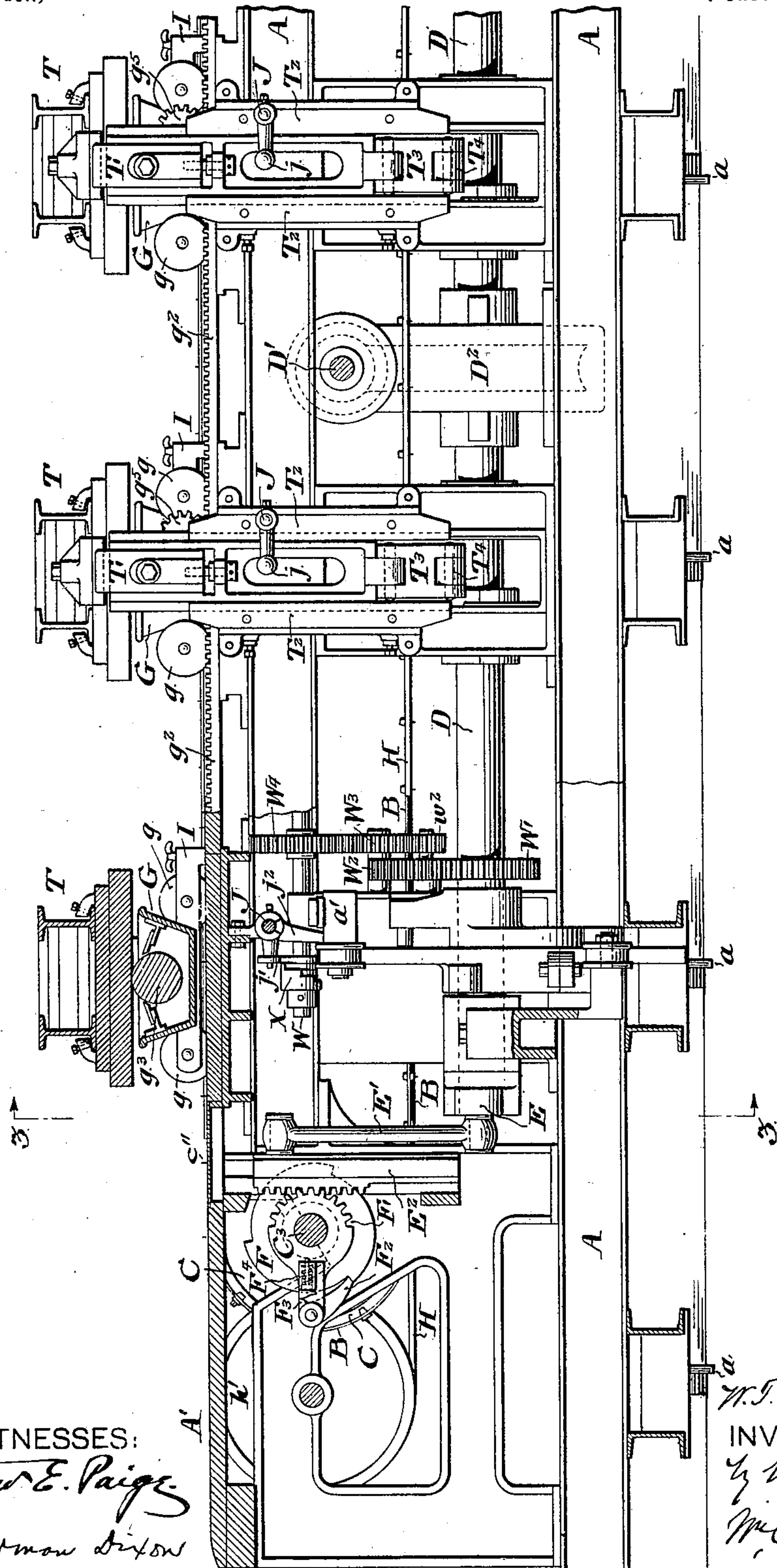
W. T. WIEGAND.
MACHINE FOR PRINTING OIL CLOTH.

(Application filed Dec. 7, 1899.)

(No Model.)

4 Sheets—Sheet 1.

FIG. 1.



WITNESSES:

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W. T. WIEGAND.
MACHINE FOR PRINTING OIL CLOTH.

(Application filed Dec. 17, 1899.)

(No Model.)

4 Sheets—Sheet 2.

FIG. 7.

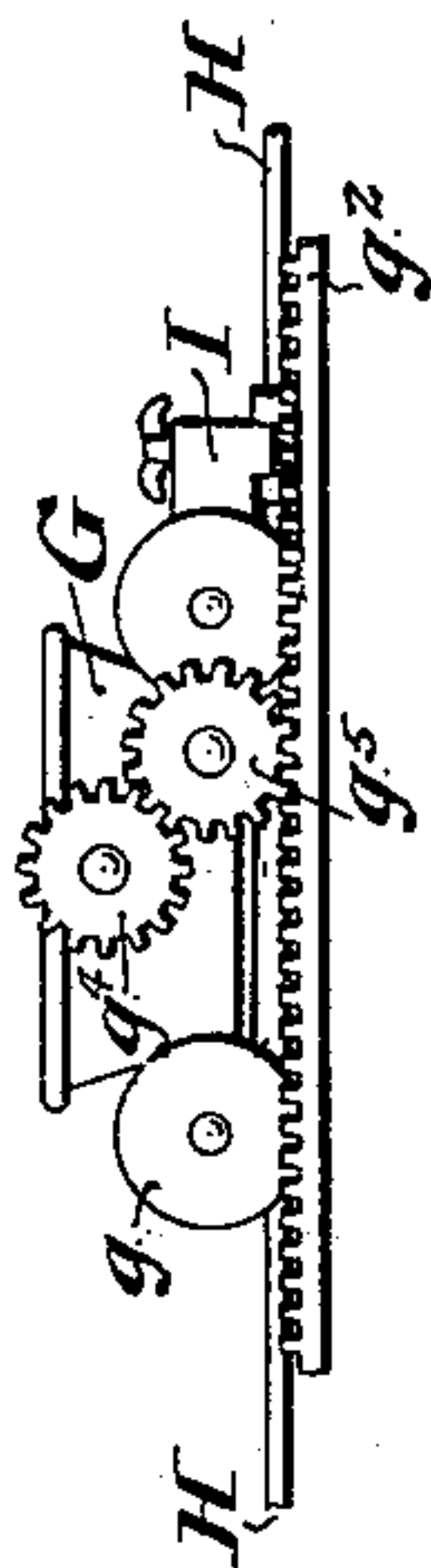
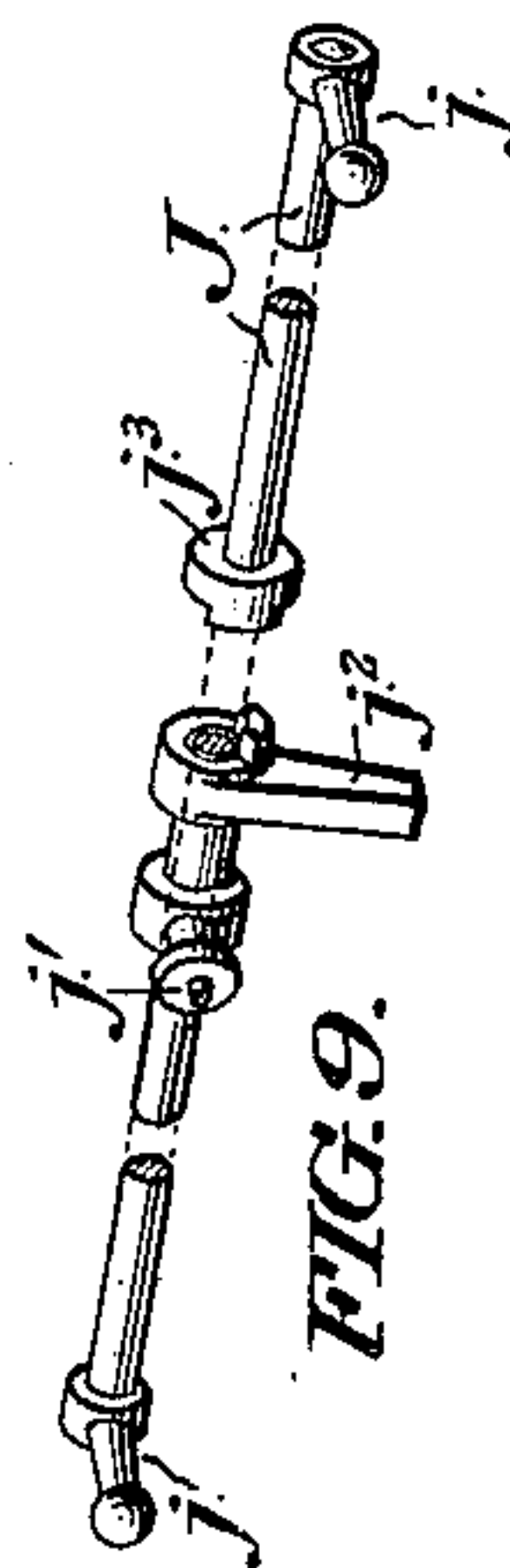
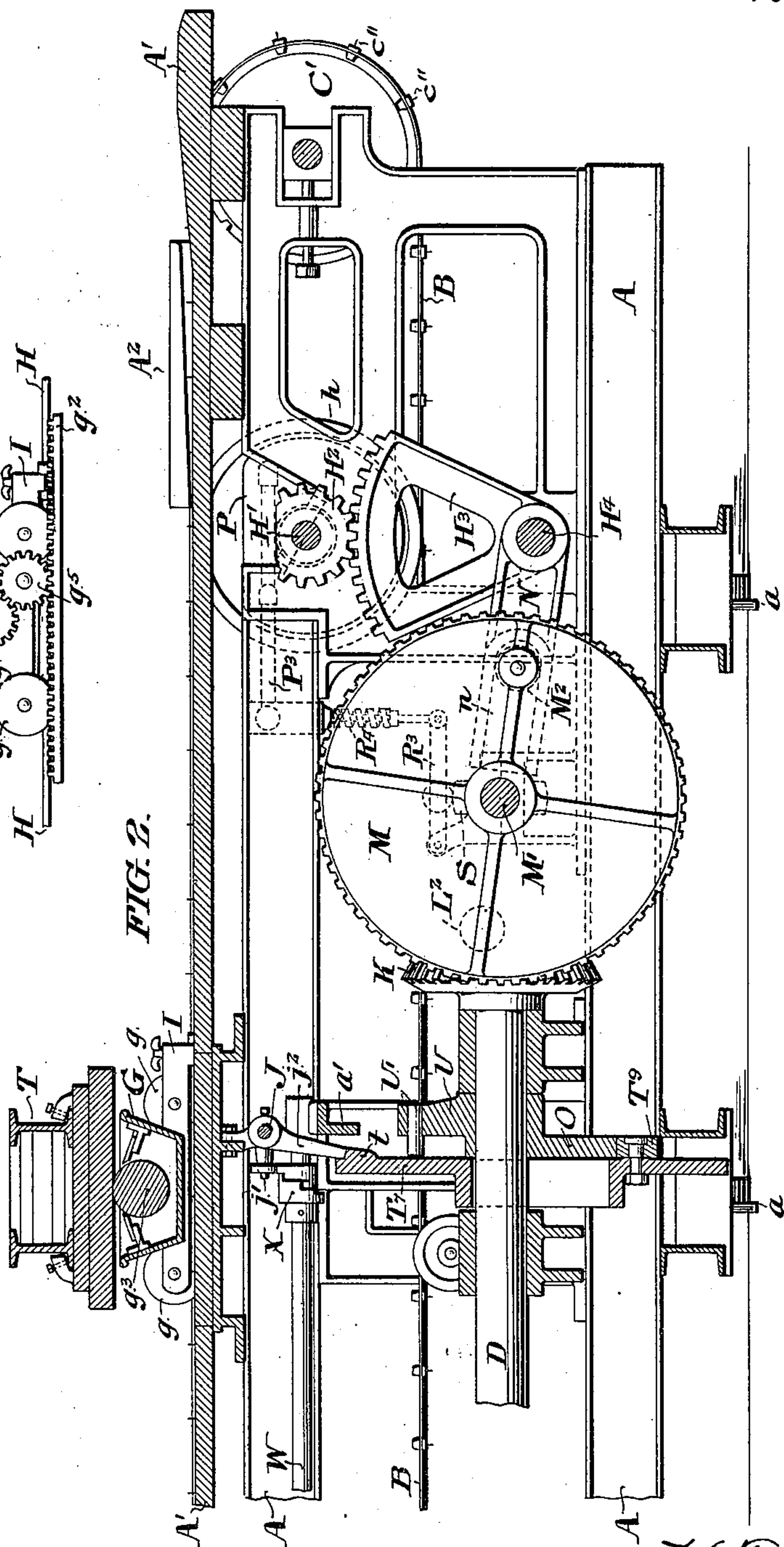


FIG. 2.



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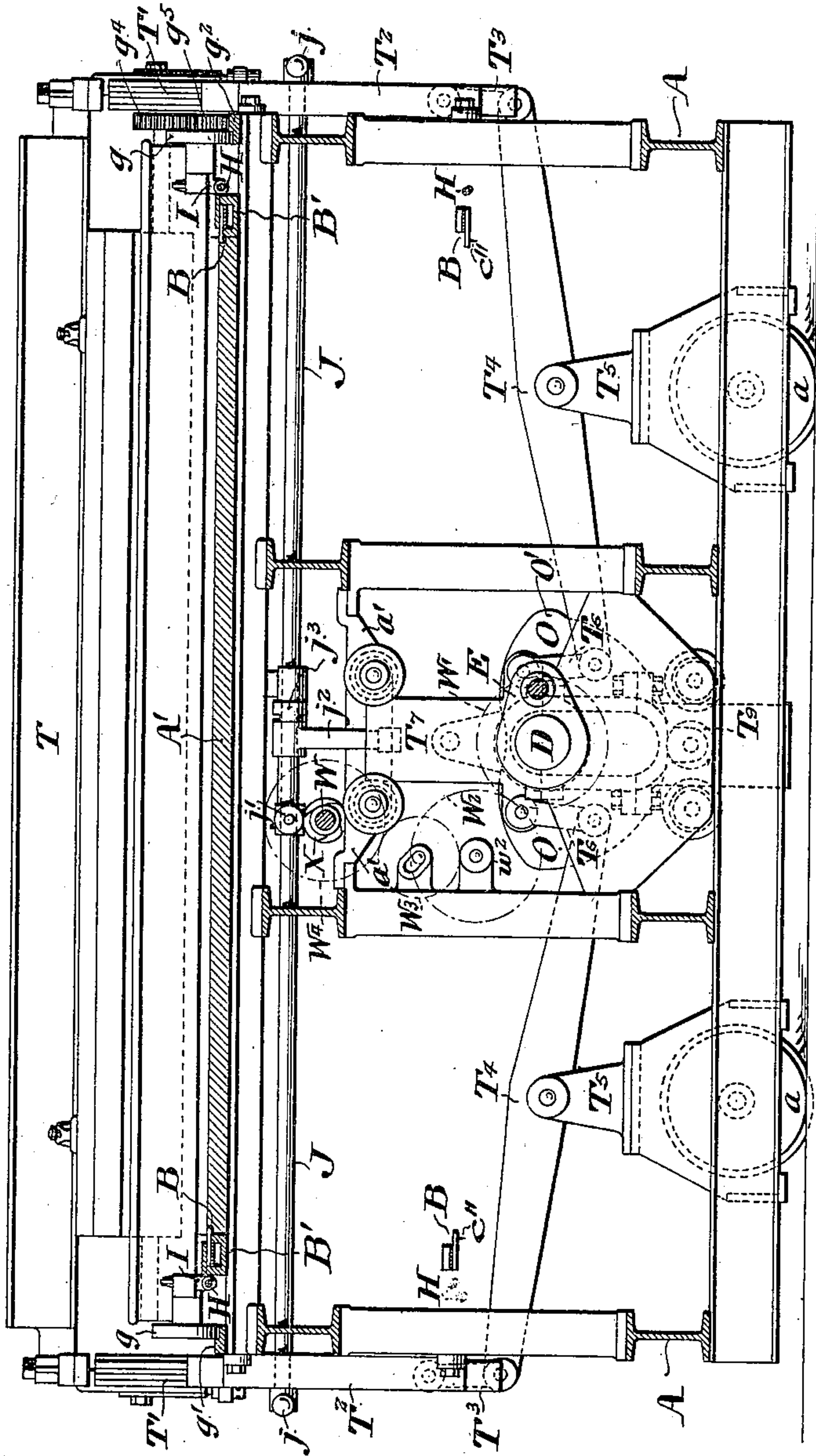
MACHINE FOR PRINTING OIL CLOTH.

(Application filed Dec. 27, 1899.)

(No Model.)

4 Sheets—Sheet 3.

FIG. 3.



WITNESSES:

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UNITED STATES PATENT OFFICE.

WILLIAM THOMPSON WIEGAND, OF PHILADELPHIA, PENNSYLVANIA, AS-
SIGNOR OF ONE-HALF TO JOHN HAVERSTICK, OF SAME PLACE.

MACHINE FOR PRINTING OIL-CLOTH.

SPECIFICATION forming part of Letters Patent No. 656,234, dated August 21, 1900.

Application filed December 7, 1899. Serial No. 739,464. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM THOMPSON WIEGAND, a citizen of the United States, residing in the city and county of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Machines for Printing Oil-Cloth and Kindred Products, of which the following is a specification.

My invention aims to provide a machine for printing oil cloth linoleum and kindred products which shall be simple in construction, and more positive and accurate in its working, and, therefore, less liable to get out of order, than such machines as heretofore arranged.

It is a further object of my invention, to provide a machine of such organization that selected individual printing blocks of the series employed may,—preferably under and by virtue of manually effected adjustment accomplished prior to the setting of the machine in operation for a run,—be automatically caused in the running of the machine, at periodically recurring intervals, to remain elevated and out of operation during a period controlled to last while the remaining elements of the machine perform their cycle of operations any required number of times.

The provision of means for maintaining at will selected printing blocks out of operation for prolonged periods, so that they are in the operation of the machine only caused to throw for instance at each fifth cycle of operation of the machine, is one which imparts to the machine a capacity for the printing of patterns and products of a character not possible with machines as heretofore constructed, in which it has only been possible to hold a printing block out of operation for but one cycle of operation of the machine.

In the accompanying drawings I show, and herein I describe, a good form of a convenient embodiment of my invention, the particular subject-matter claimed as novel being hereinafter definitely specified.

In the accompanying drawings,

Figure 1 is a view in side elevation, partly, however, in section, of what I term the delivery end of the machine.

Figure 2 is a view in vertical longitudinal

section of the front or receiving end of the machine.

Figure 3 is a transverse sectional elevation of the machine, section being supposed on the dotted line 3—3 of Figure 1.

Figure 4 is a plan view of the inking carriage operating mechanism.

Figure 5 is a vertical sectional elevation on the dotted line 5—5 of Figure 4.

Figure 6 is a vertical sectional elevation of the brake controlling valve.

Figure 7 is a view in end elevation of one of the inking carriages.

Figure 8 is a view in perspective of the printing block controlling cam.

Figure 9 is a view in perspective of the controller or rock shaft employed in connection with the cam illustrated in Figure 8. In this view the ring or collar j^3 is shown as drawn away from the controller bell crank to exhibit the stud on the latter. Normally said collar and the bell crank are close together so that their studs are in the same diametric plane.

Similar letters of reference indicate corresponding parts.

In the accompanying drawings,

A is the main frame of the machine composed of a series of girders united to form a strongly braced supporting structure of any convenient dimensions and form, the whole being mounted on wheels a (Figure 1) by which it may be laterally shifted to be carried into alinement with successive rolls on which blank fabrics to be operated upon are mounted side by side.

A' is the feed table or top of the machine, extending from end to end thereof.

The two carrying aprons or belts B B are each bent upon a pair of apron wheels C C', the member C' of each pair being located at the front or receiving end, and the member C of each pair at the rear or delivery end, of the machine.

The upper divisions of the apron belts travel along in apron guides B', shown in Figure 3, being merely metal trough like holders or receptacles, having cover plates which keep the aprons down in place and protect them from the granular material applied to the web to be printed.

The apron wheels are provided with suitable recesses for the reception of projections or bosses of any usual character mounted upon the inner faces of the carrying aprons, by the registration of which bosses in said recesses the aprons are prevented from slipping and caused to travel at a speed accurately proportioned to the speed of the wheels C C'.

The aprons are also shown as provided with outwardly projecting catch pins c'' (Figure 2) which take into the margin of the fabric operated upon and compel its travel through the machine with the aprons.

A^2 , Figure 2, is a deflecting plate mounted above the feed table A' , the lower face of which is so inclined with relation to said table A' that the distance between them diminishes from the front end to the rear end, the rear end of said deflecting plate being below the level of the points of the catch pins.

As a result of this arrangement the blank fabric fed into the receiving end of the machine between the feed table A' and the deflecting plate, will in its travel be by said deflecting plate, forced downwardly upon the points, so that said points will project through the fabric and engage it, whereupon the fabric will in the operation of the machine, be regularly and positively advanced, intermittently, with the aprons.

In the organization of my machine depicted, the apron wheels C' are, so to speak, idle, and the travel of the aprons and fabric is occasioned by driving mechanism which actuates the rear apron wheels C.

The main shaft of the machine, designated D, is mounted in suitable bearings in the central portion of the framework, and extends almost from end to end thereof.

Said main shaft is driven in any convenient manner from an external motor, (not shown), as for example through a worm shaft D' (Figure 1) in mesh with a worm wheel D^2 keyed upon said shaft D.

It is desired, as my machine is organized, to occasion the positive intermittent travel of the fabric, and I accordingly employ mechanism connective of the constantly rotating main driving shaft D and the common axle C^3 of the apron wheels C, which will effect the intermittent rotation of said axle and consequently of said wheels.

E, Figure 1, is a crank arm connected to the main shaft D, and E' is a pitman connected as to its lower end to the outer end of said crank arm, and as to its upper end to a rack E^2 adapted to have vertical reciprocation in suitable bearings in which it is mounted.

F, Figure 1, is a ratchet wheel fast upon the axle C^3 , and F' is a pawl-carrying wheel loose upon said shaft C^3 embodying or formed with a series of teeth in mesh with the teeth of the rack E^2 and provided with a pawl F^2 adapted to engage the ratchet teeth of the wheel F.

Said pawl F^2 is pivotally mounted upon a

plate carried by said wheel F' and is provided with a small projection F^3 against which a spring F^4 operates, through a latch bar around which it is coiled, to maintain the pawl against the ratchet wheel.

When it is desired to throw the apron driving wheels C out of operation the pawl F^2 , Figure 2, may be swung to the left Figure 1 and away from the ratchet wheel. In this swinging movement the nose of the projection F^3 passes downward so that its flat upper face comes into contact with the inclined front face of the latch bar, which latter thereupon, under the influence of its spring, operates through the projection F^3 , to hold the pawl F^2 away from the ratchet wheel.

Manifestly, as the main shaft rotates the rack E^2 will through the crank arm and pitman be caused to reciprocate constantly; as the rack descends it will cause the rotation to the right (Figure 1) of the wheel F' which is loose upon the shaft C^3 but will be without effect upon the wheel F which is fast upon the same shaft.

The distance traveled by the rack in its descent is, in the proportioning of the parts, sufficient to carry the pawl back into engagement with the preceding tooth of the ratchet wheel F.

When then the rack, having finished its downward stroke, begins to ascend, the wheel F' will be rotated to the left, (Figure 1), carrying the ratchet wheel F with it, until the rack reaches the upper limit of its stroke, then, upon the descent of the rack, the wheel F' will be carried back to bring its pawl into engagement with the next succeeding tooth of said wheel F.

As will be understood, therefore, the apron wheels C carried by the axle C^3 will be given a regular intermittent motion, the extent of which may be very readily predetermined and arranged by suitable proportioning of the parts in the construction of this portion of the machine.

The inking carriages are, in their general construction and arrangement, of usual character. Said inking carriages are shown as consisting each of an ink trough G, mounted upon suitable carrying wheels g which run upon ways g' (Figure 3) along one of which ways is preferably arranged a rack g^2 (Figures 3 and 7).

The inking roller g^3 is mounted in suitable bearings in the respective ends of the trough, and its axle is, as to one end, (Figure 7), conveniently provided with a gear g^4 in mesh through the interposed idle gear g^5 with the rack g^2 .

As a result of this arrangement, in the reciprocation of the inking carriage along its ways, the inking roller is through its operative connection with the rack, caused to rotate positively at a speed determined by the proportioning of the parts, and preferably such that in its contact with the acting faces

of the printing blocks, whereof hereinafter, it will roll over the faces of said printing blocks without rubbing or friction.

A pair of ropes or cables, which I term carriage actuating cables, H, are arranged in parallelism one on each side of the machine, and extending almost from end to end thereof.

Said cables each run over an idle cable wheel h' at the rear or delivery end of the machine, and over a driving cable wheel h at the front or receiving end of the machine, said driving wheels h being mounted upon a common axle H' upon which is also mounted and keyed a gear H^2 in mesh with a toothed sector H^3 mounted upon a rock shaft H^4 as shown particularly in Figure 2.

The carriage actuating cables are fixedly connected to the inking carriages by any suitable clamps I, mounted upon the latter.

In the operation of the machine the inking carriages are given a motion of reciprocation in unison alternately to the right and left hand sides of the several printing blocks beneath which they pass and the faces of which they ink in their passage; said carriages are furthermore allowed to pause or dwell after each movement to one or the other side, and during such pause or dwell the printing blocks are caused to throw, that is to say, descend upon and print the fabric and then ascend.

As will be understood, the reciprocation or oscillation of the toothed sector H^3 will through the gear H^2 occasion the corresponding movement of the cable wheels and cables and consequently of the inking carriages.

The means which I prefer to employ to effect the oscillation of the toothed sector are as follows:—

K, (Figures 2 and 4), is a driving bevel gear mounted upon the front end of the driving shaft D and in mesh with a pair of bevel gears L M mounted upon independent supporting shafts L' M' arranged in alinement with each other and in parallelism with the shaft H' .

L^2 is a stud projecting from the face of the gear L, and M^2 is a corresponding stud projecting from the face of the gear M.

The stud M^2 is mounted at a point upon the gear M diametrically opposite to that point of the wheel L at which is located the stud L^2 .

N is a rock arm mounted upon the shaft H^4 in such relation to said shaft and the toothed sector H^3 as to move in consonance with said sector, said arm and sector constituting in effect a bell crank lever.

Said arm N, which is conveniently formed in two divisions arranged on either side of the sector, embodies slots n , for engagement with the studs L^2 M^2 .

The rotation of the shaft D and wheel K being constant, the wheels L M will continuously rotate at uniform speed but in opposite directions.

If the wheel M, the stud of which is engaged in the slot n , be assumed rotating to the right in Figure 4, it is obvious that the operation of

said stud will be to depress the arm or arms N and carry the toothed sector to the left (Figures 2 and 4) the stud M^2 , eventually passing out of the slot n and leaving the arm N in its lowest position, and the sector at the limit of its movement to the left.

Just before the stud M^2 passes outwardly through the outer portion of the slot n as described, the arm N will have reached a position in which the motion of said stud will (the axis of the slot being then tangential to the imaginary circle described by the said stud in its rotation) be without effect upon said arm N and sector, so that said arm and sector will come to rest.

The arrangement of the parts being as described, the stud M^2 in passing out of the slot n leaves the arm N in such position that the stud L^2 mounted on the wheel L which is rotated in a direction opposite to that of the wheel M immediately enters said slot (said two slots n being for the purpose of description treated as one slot) and, in the continued rotation of the wheel L to the left (Figure 4) causes the elevation of the arm N and the consequent movement of the sector H^3 to the right (Figure 2).

As the stud L^2 enters the slot n , it will, owing to the tangential relation of the slot to the path of said stud, travel a short distance inward along said slot before deflecting upward the arm N, and the momentary pause or dwell of the parts is a continuation of the pause or dwell which began just before the stud M^2 left the slot n , the aggregate of the dwell however being sufficient to enable the printing blocks to be thrown.

As will be understood, therefore, the arm N and consequently the sector and the parts actuated through said sector come to rest for the brief period of time while one stud is passing outward through the outer portion of the slot n which rest continues as the other stud is passing inward through the outer portion of said slot n ; as each stud in turn passes inward along the slot it occasions the rocking of the arm N and sector H^3 and the consequent rotative oscillation of the cable wheels and shifting of the cables and inking carriages.

The shaft H' of the cable wheels h extends through a liquid chamber P (Figures 4 and 5) having a segmental liquid chamber sealed except for the ports P' P^2 at the respective edges of the cylindric wall of the chamber, connected exteriorly to the casing through a circulating pipe P^3 controlled by a valve.

Within the segmental interior of the liquid chamber the axle H' is arranged axially with respect to the cylindric wall thereof, and upon said axle is mounted and keyed a vane Q, the outer edge of which sweeps the inner face of the cylindric portion of the casing.

As the axle H' is caused to rotate in one direction its vane will drive the liquid out through the port toward which it is caused to travel, and said liquid will be caused to progress through the circulating pipe P^3 and

back to the interior space at the rear of the vane; while when the axle rotates in the opposite direction the correspondingly opposite circulation of the liquid takes place.

5 It is to be understood that the segmental chamber, the circulating pipe and all parts of the connected valve are preferably full of the liquid, so that no air space of any magnitude exists therein.

10 The inertia of the liquid encountered by the vane keyed to the axle H' , acts to regulate the throw of the cable actuating parts and inking carriages and permits only such movement of the parts as will preclude the inking carriages from attaining any such momentum as would carry them beyond the desired point of stoppage and beneath for instance the next adjacent printing blocks.

In order to absolutely lock the inking carriages in the position in which they come to rest, during the throw of the printing blocks, I provide a valve in the circulating pipe, which valve, when closed after the movement of the shaft H' will, by preventing further movement of the liquid, and, therefore, further movement of the vane Q , act to prevent movement of the inking carriages or the inking carriage actuating mechanism.

20 R , Figure 6, is the valve referred to, mounted in a valve casing or chamber R' in communication with the circulating pipe P^3 .

The valve head is formed as a solid cylindrical body fitted to the cylindrical interior of the valve casing, and embodying a port 7 which when the valve is in open position, as shown in Figure 6, is in registry with the interior of the circulating pipe and permits of the flow of the liquid along said pipe.

When the upper end of the body portion 40 of the valve is in the descent of the valve brought into line with the mouths of the circulating pipe it acts to close said pipe against the further passage of liquid.

The valve casing is as stated full of liquid. 45 The valve head conveniently has a duct extending through it from end to end by which equilibrium of pressure will exist at the upper and lower ends of the valve head and casing.

R^2 is a valve stem connected to the valve 50 head, which stem extends through a suitably packed opening in the lower end of the casing, and is pivoted as to its lower extremity to a rock arm R^3 hingedly connected to any convenient part of the framework.

55 S is a cam mounted on the shaft L' and provided with the two crests illustrated particularly in Figure 5. Said cam works against the arm R^3 conveniently through a roller mounted in said arm as shown.

60 R^4 is a spiral expansive spring encircling the valve stem and bearing as to its respective ends respectively against the lower end of the valve casing and a collar mounted on said stem, the operation of which spring is to 65 normally draw the valve head down to its closed position.

In the rotation of the shaft L' the crests of

the cam S come successively into play to throw the valve to open position just as in the organization and timing of the apparatus the 70 sector is to be thrown in one direction or the other.

As the sector comes to the end of its movement, the cam space between the crests comes into line with the roller of the arm R^3 , said 75 arm drops, the valve closes, and the inking apparatus and its actuating mechanism are firmly secured in position.

The printing blocks T are in themselves of any usual and preferred construction. Each 80 printing block is provided with a pair of arms T' depending from its respective extremities and mounted free for vertical reciprocation in suitable slide plates T^2 . To the lower end of each depending arm is connected 85 a link T^3 .

T^4 are a pair of walking beams, or walking beam levers, of which one pair is employed in connection with each platen, extending transversely of the machine, each pivotally 90 connected intermediate of its length to any suitable support T^5 , each as to its outer end hingedly connected to an adjacent link T^8 and each as to its inner end hingedly connected to a link T^6 .

Said links T^6 are in turn pivotally connected 95 to projecting arms of a follower plate T^7 mounted, as shown particularly in Figure 3, free for vertical reciprocation between sets of suitable anti-friction rollers. 100

The follower plate, as shown in Figures 2 and 3, embodies a vertically extending central slot through which the driving shaft D extends, the slot being of course of such dimensions as to permit the necessary rise and 105 fall of the plate.

O , (Figures 2 and 3) is a heart-shaped cam mounted upon and keyed with respect to the driving shaft D and bearing against a stud T^9 which projects rearwardly from the fol- 110 lower plate beneath said cam.

Conveniently said stud is, to diminish the friction, equipped with a roller against which the edge of the cam makes contact.

It is, of course, to be understood that in con- 115 nection with each printing block is employed the train of operating devices described, including the follower plate, heart cam, walking beam or levers, etc.

As will be understood from a contemplation 120 of Figure 3, the weight of a printing block operating through the depending arms and walking beam levers, tends to constantly raise the follower plate, so that the stud T^9 is constantly presented closely against the heart-shaped 125 cam, with the result that the vertical movements of the follower plate, connected devices, and printing blocks, conform absolutely to the contour of the periphery of the cam.

The rotation of the driving shaft, there- 130 fore, will through the agency of the cam, at the proper times depress the follower plate and occasion the elevation of the printing block, and at the proper times the depressed

portion of the cam will face the stud T^9 and permit the descent of the printing block.

A lug U is mounted on the hub of the cam and provided with what I term a pressure pin U' .

In the rotation of the cam, when the pressure pin U' which is, in Figure 2, shown as occupying its uppermost position, is brought to its lowermost position, the follower plate will have been elevated, and the printing block, when the parts are in this last named position, will be down upon the face of the fabric.

When the printing block is thus down on the face of the fabric, the pressure pin, passing in the rotation of the heart-shaped cam, upon the lower side of the roller on the stud T^9 , will, owing to the proportioning of the parts, bearing against the lower face of said roller, tend to effect a slight elevation of the roller and the follower plate and consequently a corresponding depression of or pressure upon the printing block, to bring about a very close heavy momentary contact of the printing block with the fabric, and the production of a sharp well defined impression.

The means which I employ in the form of apparatus herein shown and described to control the holding of the printing blocks out of operation are as follows:—

J , Figures 1, 2, 3, and 9, is a rock shaft which I term the controller shaft, extending transversely through the machine, provided, conveniently at each end, with projecting weight arms j , and intermediately of its length with a sleeve free for rotation with respect to said shaft, on which sleeve are mounted two arms j' j^2 extending in different directions.

The two arms and sleeve together constitute in effect a bell crank lever and I herein-after term said bell crank lever the controller bell crank.

Keyed to the shaft at a point in the vicinity of the controller bell crank is a controller collar j^3 carrying a stud adapted in the rotation of the controller shaft to encounter a corresponding stud upon the adjacent face of the controller bell crank.

W , Figures 2, 3, and 8, is a cam shaft extending longitudinally of the machine and equipped in the vicinity of each of the controller shafts with a controller cam X of the characters shown particularly in Figures 2 and 8, which cams may be manually shifted to and secured by set screws or otherwise in different positions longitudinally with respect to the shaft W , according as it is desired to have them in or out of contact with the controller bell cranks.

The shaft W itself is actuated to constant rotation by the main driving shaft through a train of gears W^1 W^2 W^3 W^4 w^2 , shown in Figure 1.

Each controller cam is provided with a series of circumferential cam crests of dissimilar lengths, and while each cam crest is in operation independent of the others, as a matter of practical construction they are con-

veniently formed as laterally continuous, so to speak, as one integral structure.

By adjusting a controller cam so that one or another of the circumferential cam crests will exist beneath the short arm j' of the controller bell crank it is obvious that said cam crest will in the rotation of the shaft W tilt the controller bell crank (see Figure 2) from the position which it normally occupies, namely, with its long arm in contact with the transverse frame bar a' , forward to the position illustrated in Figure 2, in which its long arm is in contact with the upper edge of a keeper t upon the rear face of the follower plate.

It is manifest that in the continued rotation of the shaft W and cam X said controller bell crank will be maintained in contact with said keeper for a period determined by the length of the particular circumferential cam crest which happens to exist in contact with the acting face of the short arm of the controller bell crank. In the drawings I illustrate said short arm as equipped with the anti-friction member.

The operation of the controller bell crank in its contact with the keeper on the follower plate is to maintain the follower plate down in the position shown in Figure 2, regardless of the rotation of the heart cam, and consequently to maintain the printing block associated with such follower plate, elevated.

It is manifest, therefore, that in the operation of the machine, by setting any selected cam crest of a cam X in operative relationship with respect to the controller bell crank associated with it, any particular printing block may be maintained in an elevated position for any ordinary selected period.

When, in the rotation of a controller cam X the particular cam crest which has operated against the controller bell crank lever passes out from beneath the short arm of said lever, the long arm of said lever does not as the machine shown in the drawings is organized immediately fly back into contact with the frame member a' , but maintains, under the upward pressure exerted upon the follower plate by the weight of the printing block, its engagement with the keeper at the upper end of said follower plate.

It is in order to prevent the descent of the printing block prior to the moment at which in the timing of the movements of the other active elements of the machine it is desirable it should descend, that I so form the controller bell crank and the keeper that they remain in engagement as stated, and I provide means whereby the keeper is released from the holding operation of the controller bell crank, which means come into play just at the moment when it is desirable that the printing block should be allowed to be brought again into operation.

The arrangement referred to consists of a releasing swell O' mounted or formed upon the periphery of the heart cam, as shown particularly in Figure 3, and which releasing

swell operating, in the rotation of the heart cam, against the stud T^9 on the follower plate, causes said plate to descend sufficiently far below the position it is shown as occupying in Figure 2, to carry the keeper out of reach of the arm of the controller bell crank, whereupon the controller bell crank, by reason of its own weight and disposition, and assisted by the weight of the weighted arms at the ends of the controller bar acting through said bar and the collar and collar stud, swings swiftly into the position in which its longer arm rests in contact with the frame member a' .

The follower plate is thereupon, of course, free to reciprocate vertically under the actuation of its cam, accompanied, of course, by the synchronous reciprocation of the printing block which it controls.

The timing of the movements of the parts is such that the printing blocks are caused to throw ordinarily once in each revolution of the shaft D and heart cam.

Consequently in each rotation of the heart cam the releasing swell O' operates,—even when the controller bell crank is engaged in holding down the follower plate as shown in Figure 2,—against the follower plate to cause the slight extra depression referred to. This will not, however, allow the controller bell crank to become released from the keeper on the follower plate until the acting crest of the cam X has been carried out from beneath the arm of the controlling bell crank, that is to say, it is only after the cam X has so far rotated that the cam projection has ceased to hold the controller bell crank in the position shown in Figure 2 that the slight additional descent of the follower plate enables the return of the controller bell crank to its normal position.

The shaft on which the cams X are mounted, rotates at a much slower rate than the shaft D, and it may rotate so slowly and carry such number of independent cam projections operative in connection with a given controller bell crank, that each individual printing block may be held out of operation for any predetermined period.

The controller collar j^3 on the controller shaft J and which is keyed to said shaft, operates through its stud against the stud on the controller bell crank,—the parts bearing the relation to each other shown in Figure 9,—and the weight of the weighted arms transmitted to the controller bell crank through the shaft, collar, collar stud, and controller bell crank stud, tends to hold the parts in such position that the long arm of the controller bell crank is in contact with the frame member a' .

When it is desired, however, to maintain a given printing block permanently elevated and out of operation, the weighted arms mounted on the controller shaft associated with said printing block are swung (see Figure 1) over to a position on the right of the controller shaft, and, in such movement, the collar

rotates with the shaft, and the collar stud, making contact with the controller bell crank stud, forces the long arm of the bell crank forward into engagement with the keeper on the follower plate, in which position it is maintained by the weight of the arms, and thereupon the follower plate is maintained for the time being depressed.

When the follower plate is maintained in its depressed position the printing block associated with it is, of course, maintained in an elevated position.

In other words, when the parts are in the position shown in Figures 2 and 9, the stud on the collar j^3 is supposed to bear against the upper edge of the stud on the controller bell crank,—that is to say, the stud shown in Figure 9 at the base of the arm j^2 . In this position the weighted arms tend to cause the controller bell crank to swing toward the frame member a' (Figure 2.) In the reversed position of the weighted arms, however, the stud on said collar j^3 , having been, of course, rotated with the collar and the shaft J, is in contact with the under face of the stud on the bell crank lever, and consequently the weighted arms tend to maintain the longer arm of the controller bell crank swung forward into contact with the follower plate.

The operation of my apparatus as a whole will be readily understood from the description of the several operative parts hereinbefore set forth.

As will be understood from a contemplation of the construction herein set forth, a single block-lifting cam, situated beneath the body of the machine, operates, through a pair of walking beam levers and the connective devices described, against or upon both ends of an associated printing block; apart from the special economy of this construction, this general arrangement is one productive of particularly good results in the operation of the machine, in that both ends of each printing block being lifted through devices operated from a single cam, it becomes practically impossible for one end to drag or for the parts to bind in the manner liable to happen where the respective ends of the block are actuated by independent cams in turn actuated by independent trains of gearing.

One of the essential characteristics of a machine of the character herein shown and described is that not only may individual printing blocks be automatically thrown out of operation for periods in which a number of cycles of operation of the machine occur, but the periods during which said printing blocks are automatically thrown and held out of operation may be ununiform or non-coincident, that is to say, such periods may, as respects the individual blocks, begin at different times and be of different duration.

It will be obvious to those skilled in the art that my machine, in its capacity for being so operated that individual printing blocks may be held out of operation for given periods of

time, enables the machine to do work of a character not possible with machines as heretofore constructed and arranged, as for instance, the work of printing the peculiar formations of patterns involved in the production of bordered rugs and large squares.

This will be the more readily understood from the following brief description:—

When a bordered rug,—and which may be for example of length equal to three times the breadth of a printing block,—is to be produced, it is manifest that the border lines which appear in the finished rug will constitute a rectangular panel, so to speak.

The printing blocks being in breadth each only one third of the length of the rug three distinct impressions (assuming for simplicity of explanation that it be all in one color) will be necessary, one by one block on one end section of the rug, one by one block on the central section of the rug, and one by one block on the other end section of the rug.

The border lines on each of the respective end sections of the rug constitute, so to speak, the three sides of a rectangular figure.

The three lines on each end section are arranged as follows: one, the end line in the completed rug, extends across the section the full breadth of the rug, the other two, the side lines in the completed rug, extend from the line first mentioned, to that edge of the section which adjoins the central section, where they meet and register with the corresponding lines on said central section.

As the side lines on both end sections extend from the end line of the rug to the edge of the central section, it follows that the border lines of the two end sections while of the same pattern, are reversely disposed so to speak, that is to say, face in opposite directions. Consequently the printing block which prints one end section of the rug cannot print the other end.

The printing block which descends and prints upon the fabric to print the advance end of the rug, must thereafter remain out of operation while the block which prints the central section descends and makes its impression, and, further, while the block which prints the rear section descends and makes its impression.

The block which prints an end section, therefore, descends in every third cycle of operations of the machine only.

Where the rug is longer the descents of a given block will be less frequent. Consequently in machines in which every block must descend once at least in every two cycles of operation, rugs cannot be produced.

A cycle of operations as mentioned in the claims refers to such movement of the operative parts of the machine as occasions and is accompanied by the descent of a printing block.

In the machines described in the references the printing blocks may be held out of operation only at alternate strokes. This adjust-

ment is fixed. No means are disclosed for holding them out for a longer period, or for throwing them out and returning them after variable periods, as to some blocks longer and as to some shorter.

Machines as heretofore constructed, therefore, have not been adapted to print rugs. By the provision of machines of the character devised by me the production of machine printed rugs, an achievement broadly new in the art, has become possible.

Having thus described my invention, I claim—

1. A machine for printing oil cloth linoleum and kindred products, comprising means for systematically advancing a web to be imprinted,—a series of printing forms or blocks, and means for occasioning the throws of the printing blocks in such order that individual blocks will, in a run of the machine, be automatically held out of operation periodically but ununiformly, each being so held out during two or more cycles of operation of the machine, substantially as set forth.

2. A machine for printing oil cloth and kindred products, comprising means for advancing a web to be imprinted,—a series of printing blocks,—means for supplying color to said blocks,—and automatic means for occasioning the throws of the printing blocks so that selected blocks will be periodically held out of operation during a run of the machine for non-coincident periods of time, during one of which periods two or more cycles of operation of the machine occur, substantially as set forth.

3. In a machine for printing oil cloth and kindred products, in combination, a supporting framework, a series of printing blocks, means for occasioning the regular intermittent travel of a web of fabric, means for normally occasioning the throw or operative descent of the several printing blocks at regular intervals, and means for automatically holding individual printing blocks out of operation, during a run of the machine, for various predetermined ununiform periods of time, substantially as set forth.

4. In a machine for printing oil cloth and kindred products, in combination, a supporting framework, a series of printing blocks, means for occasioning the advance of a web of fabric to be printed, mechanism adapted to normally occasion the regular throw of each printing block at regular measured intervals, and means for so manually setting or prearranging said mechanism as to automatically occasion the holding of selected printing blocks out of operation during periods in each of which the machine makes or performs two or more of its cycles of operation, such periods being ununiform as respects individual blocks of those so held out, substantially as set forth.

5. In a machine for printing oil cloth, a supporting framework, a series of printing blocks, means for occasioning the advance of

a sheet of fabric to be printed along said framework, a series of independent mechanisms for occasioning the throw of the printing blocks at predetermined regular intervals, and means, manually adjustable, to automatically interrupt, during the run of the machine the operation of selected blocks of such series at periodically recurring intervals for predetermined lengths of time, ununiform as respects the several blocks so interrupted, substantially as set forth.

6. In a machine for printing oil cloth, in combination, a framework, a series of printing blocks, a driving shaft, independent trains of mechanism leading from said shaft to the respective blocks to occasion the throw of said printing blocks, adjustable automatically operated mechanism which interrupts the operation of selected trains of mechanism at periodic intervals during a run to hold printing blocks out of operation for predetermined variable non-coincident lengths of time, substantially as set forth.

7. In a machine for printing oil cloth, in combination, a framework, a series of printing blocks, means for occasioning the feed of a sheet of fabric to be printed, a main driving shaft, a series of cams mounted on said shaft one in connection with each printing block, arms depending from said printing blocks, studs or devices against which the respective cams operate in their rotation, and connections between each stud and the arms of an associated printing block, the arrangement being such that the weight of a printing block normally holds a stud in operative relation against the edge of its cam, and a single cam occasions the elevation of a printing block substantially as set forth.

8. In a machine for printing oil cloth, in combination, a framework, a series of printing blocks, means for occasioning the feed of a sheet of fabric to be printed, a main driving shaft, a series of cams mounted on said shaft, one in association with each printing block, two arms depending from each printing block, studs or devices corresponding in number to the cams against one of which each of said cams operates in its rotation, connections between each stud and the two arms of the associated printing block, the arrangement being such that the weight of a printing block normally holds the stud in operative relation against the edge of the cam, and the movement of said stud under the actuation of said cam is transmitted equally to both arms of a printing block and controls the movement of said block, substantially as set forth.

9. In a machine for printing oil cloth, in combination, a framework, a series of printing blocks, means for occasioning the feed of a sheet of fabric to be printed, a main driving shaft, a series of cams mounted on said shaft, one in association with each printing block, two arms depending from each printing block, studs or devices corresponding in

number to the cams against one of which each of said cams operates in its rotation, connection between each stud and the two arms of the associated printing block, the arrangement being such that the weight of a printing block normally holds the stud in operative relation against the edge of the cam, and the movement of said stud under the actuation of said cam is transmitted equally to both arms of a printing block and controls the movement of said block, and automatically operated devices for holding said stud in fixed position for predetermined periods, substantially as set forth.

10. In a machine for producing oil cloth, linoleum, and kindred products, in combination, a main frame, means for occasioning the advance of a sheet of fabric to be ornamented, a series of printing forms or blocks, pairs of walking beam levers, one pair employed in connection with each form or block, a connection between the outer ends of the members of each pair and the respective ends of a form or block, and means located at the inner ends of the members of each pair for contemporaneously rocking or tilting said members, substantially as set forth.

11. In a machine for printing oil cloth, in combination, a main frame, means for occasioning the advance of a sheet of fabric to be printed, a driving shaft, a printing block, a cam on said shaft, a follower plate having a projection against which said cam operates, a pair of walking beam levers, and connections between said levers and the follower plate on the one hand and the printing block on the other, substantially as set forth.

12. In a machine for producing oil cloth and kindred products, in combination, a main frame, a printing form or block, means for occasioning the advance of a sheet of fabric, a main driving shaft, a cam mounted on said shaft, a pair of walking beam levers, a connection between the said levers and the printing form or block, and a device through which said cam operates to tilt or throw said walking beam levers, substantially as set forth.

13. In a machine for printing oil cloth, in combination, a main frame, a printing block, means for occasioning the advance of a sheet of fabric, a main driving shaft, a cam, a follower plate having a central longitudinal slot through which the driving shaft extends, a stud projecting from said plate against which the cam bears, a pair of walking beam levers, means for connecting said walking beam levers to the follower plate on the one hand and to the printing block on the other, a lug connected to said cam and a projection carried by said lug adapted when the parts are in a given position to pass beneath the stud on the follower plate, substantially as set forth.

14. In combination, a main frame, a series of printing blocks, means for occasioning the advance of a web of fabric to be printed, a

main driving shaft, independent trains of mechanisms leading from the driving shaft to the several printing blocks, and each embodying a reciprocating or other movable device caused to positively move in one direction and caused to move in the opposite direction by the weight of a printing block, and an adjustable controlling device for encountering said reciprocating device and holding it in fixed position against the weight of the printing block for variable periods without interrupting the operation of the other portions of the machine, substantially as set forth.

15. In combination, a main frame, a series of printing blocks, means for occasioning the advance of a web of fabric to be printed, a main driving shaft, independent trains of mechanisms leading from the driving shaft to the several printing blocks, and each embodying a reciprocating or other movable device caused to positively move in one direction and caused to move in the opposite direction by the weight of a printing block, a controlling device adapted to encounter said reciprocating device and hold it out of operation against the weight of the printing block without interrupting the operation of the other portions of the machine, and means for automatically throwing said controlling device into contact with said reciprocating device, at predetermined intervals for predetermined selected periods, substantially as set forth.

16. In combination, a main frame, a series of printing blocks, means for occasioning the advance of a web of fabric to be printed, a main driving shaft, independent trains of mechanisms leading from the driving shaft to the several printing blocks, and each embodying a reciprocating or other movable device caused to positively move in one direction and caused to move in the opposite direction by the weight of a printing block, a controlling device for encountering said reciprocating device and holding it out of operation against the weight of a printing block without interrupting the operation of the other portions of the machine, and means for automatically throwing said controlling device into contact with said reciprocating device and maintaining it in contact for predetermined periods variable at the will of the operator, substantially as set forth.

17. In combination, a main frame, a series of printing blocks, means for occasioning the advance of a web of fabric to be printed, a main driving shaft, independent trains of mechanisms leading from the driving shaft to the several printing blocks, and each embodying a reciprocating or other movable device caused to positively move in one direction and caused to move in the opposite direction by the weight of a printing block, a controlling device for encountering said reciprocating device and holding it out of operation against the weight of the printing block with-

out interrupting the operation of the other portions of the machine, and a cam surface mounted on a rotating shaft and adapted to be manually brought to a position in which it will hold said controlling device in engagement with said reciprocating device for a period of time determined by the length of the cam, substantially as set forth.

18. In a machine for printing oil cloth, in combination, a framework, a main driving shaft, a series of printing blocks, means for occasioning the advance of a sheet of fabric to be printed, a series of mechanisms independent of each other through which the motion of the driving shaft is independently communicated to the several printing blocks, and each such train consisting of a cam, a follower plate, a pair of walking beams, connections between said beams and said printing block on the one hand and said follower plate on the other, a controlling bell crank one arm of which is adapted to engage the plate, a rotating shaft, and a cam mounted on said shaft and adapted to encounter the other arm of said controlling bell crank, substantially as set forth.

19. In a machine for printing oil cloth, in combination, a framework, a main driving shaft, a series of printing blocks, means for occasioning the advance of a sheet of fabric to be printed, a series of mechanisms independent of each other through which the motion of the driving shaft is independently communicated to the several printing blocks, and each such train consisting of a cam, a follower plate, a pair of walking beams, connections between said beams and said printing block and said plate, a controlling bell crank one arm of which is adapted to engage the follower plate, a rotating shaft, and a series of cam crests mounted on said shaft in such arrangement that any one of them may be brought into position to encounter the other arm of said controlling bell crank, substantially as set forth.

20. In a machine for printing oil cloth and kindred products, in combination, a main frame, a follower plate, means for occasioning the rise and fall of said follower plate, a connection between said follower plate and said printing block, a bell crank lever one arm of which is adapted to engage said follower plate, a rotatable shaft, and a cam mounted on said shaft adapted to be moved into and out of a position in which it will encounter the other arm of said bell crank lever, substantially as set forth.

21. In a machine for printing oil cloth and kindred products, in combination, a main frame, a printing block, a follower plate, a connection between said follower plate and printing block, means for occasioning the vertical reciprocation of said follower plate, a bell crank one arm of which is adapted to encounter said follower plate and prevents its rise, a cam embodying a series of cam crests mounted free for adjustment with re-

lation to the other arm of said bell crank, and means for occasioning the rotation of said cam, substantially as set forth.

22. In an oil cloth printing machine, in combination, a main frame, a printing block, a follower plate, means for occasioning the reciprocation of said follower plate, a bell crank lever adapted to engage said follower plate, a cam embodying a series of cam crests of dissimilar length, a constantly rotating shaft on which said cam is mounted, and means for securing said cam in different positions on said shaft, substantially as set forth.

23. In an oil cloth printing machine, in combination, a main frame, a printing block, a vertically reciprocating follower plate, a connection between said follower plate and said printing block, a bell crank lever, a cam adapted to encounter said lever, a shaft on which said bell crank lever is loosely mounted, a ring fast on said shaft, and a device through which said ring engages said bell crank, substantially as set forth.

24. In an oil cloth printing machine, in combination, a main frame, a printing block, a vertically reciprocating follower plate, a connection between said follower plate and said printing block, a bell crank lever, a cam adapted to encounter said lever, a shaft on which said bell crank lever is loosely mounted, a ring fast on said shaft, a device through which said ring engages said bell crank, and a weighted arm connected to said shaft, substantially as set forth.

25. In a machine for printing oil cloth, in combination, a main frame, a printing block, a driving shaft, a heart cam on said shaft, a follower plate operatively connected to said cam, walking beams connected respectively to the follower plate and to the printing block, a bell crank lever, a constantly rotating cam shaft, and a cam adjustably mounted on said shaft and embodying a series of cam crests of different length adapted to engage each with one arm of the bell crank substantially as set forth.

26. In a machine for printing oil cloth, in combination, a main frame, a series of printing blocks, means for occasioning the throw of said printing blocks, a traveling apron embodying a series of engaging points, and an inclined deflecting plate supported over the traveling apron at the receiving end of the machine the lower end of which is below the level of the engaging points, substantially as set forth.

27. In a machine for printing oil cloth, in combination, a series of printing blocks, means for occasioning the vertical reciprocation of said printing blocks, a series of inking carriages, cables connected to said carriages bent upon suitable cable wheels, a gear wheel mounted on the shaft of a cable wheel, a rocking toothed sector in mesh with said gear wheel, an arm adapted to rock with said sector and embodying a slot, and a pair of oppositely rotating gears having studs at

opposite points of their faces adapted to alternately engage said slot, substantially as set forth.

28. In a machine for printing oil cloth, in combination, a series of printing blocks, means for occasioning the vertical reciprocation of said printing blocks, a series of inking carriages, cables connected to said carriages and bent upon suitable cable driving wheels, a device in the nature of a bell crank lever one arm of which is slotted and the other arm of which occasions through interposed mechanisms the intermittent advance of the carriage actuating cable wheels, a pair of oppositely rotated wheels, and studs mounted on said wheels and adapted to alternately engage in said slot to occasion the throw of the bell crank, substantially as set forth.

29. In a machine for printing oil cloth, in combination, a series of printing blocks, means for occasioning the vertical reciprocation of said printing blocks, a series of inking carriages, cables connected to said carriages and bent upon suitable cable driving wheels, means for occasioning the rotative oscillation of said wheels, a liquid chamber through which extends a shaft connected with the cable operating mechanism, and a vane mounted on said shaft and submerged in the liquid in said chamber, substantially as set forth.

30. In a machine for printing oil cloth, in combination, a series of printing blocks, means for occasioning the vertical reciprocation of said printing blocks, a series of inking carriages, cables connected to said carriages and bent upon suitable cable driving wheels, a segmental liquid chamber through which extends a shaft connected with the cable actuating mechanism, a circulating pipe the respective extremities of which open into the liquid chamber at the respective sides thereof, and a vane mounted on said shaft and extending across the interior of said chamber and the edge of which in the rotation of the shaft sweeps the cylindric interior face of the same, substantially as set forth.

31. In a machine for printing oil cloth, in combination, a series of printing blocks, means for occasioning the vertical reciprocation of said printing blocks, a series of inking carriages, cables connected to said carriages and bent upon suitable cable driving wheels, a segmental liquid chamber through which the shaft of a cable wheel extends, a circulating pipe the respective extremities of which open into the liquid chamber at the respective sides thereof, a vane mounted on said shaft extending across the interior of said chamber and the edge of which in the rotation of the shaft sweeps the cylindric interior face of the chamber, a valve in communication with the circulating pipe, and means for automatically operating said valve after each regular movement of the shaft and vane, substantially as set forth.

32. In a machine for printing oil cloth and kindred products, a bed plate, a series of print-

ing plates, means for occasioning the reciprocation of said printing plates, means for occasioning the travel of a web to be printed, inking carriages, cables connected to said carriages and bent upon wheels, mechanism for occasioning the rotative oscillation of said wheels, and the backward and forward movement of the inking carriages, a segmental liquid chamber through which the axle of one of said wheels extends axially with respect to its cylindric wall, a vane mounted in said chamber and connected to said axle, a circulating pipe the respective extremities of which communicate with the interior of said chamber at opposite sides of the vane, the said chamber and pipe being normally full of liquid, a valve chamber connected with said pipe, a valve mounted in said chamber, a spring which normally holds said valve in closed position, and a cam mounted on a rotating part of the machine which cam operates to open said valve each time before each regular movement of said axle, substantially as set forth.

33. In an oil cloth printing machine, in combination, a bed plate, a series of printing plates, means for occasioning the rise and fall of said printing plates, inking carriages, cables or kindred devices connected to said carriages, wheels over which said cables pass, one of which has an extended axle, a liquid chamber inclosing part of said axle, the vane mounted on said axle, the circulating pipe, the valve chamber connected with said circulating pipe, the valve mounted in said chamber and having a protruding stem, and a cam having two crests mounted on a moving part of the apparatus and adapted to occasion the predetermined movement of the said valve head, substantially as set forth.

34. In an oil cloth printing machine, in combination, printing plates, means for occasioning the rise and fall of said printing plates, inking carriages, cables connected to said inking carriages, wheels over which said cables run, one of which cables is provided with an axle, a liquid chamber inclosing part of said axle, a vane mounted on said axle, the circulating pipe, the valve chamber connected with said circulating pipe, the valve mounted in said chamber and having a protruding stem, an arm connected to said valve stem, and to a fixed part of the framework, a spring which maintains said valve normally closed, and a cam mounted upon a moving part of the apparatus and adapted to encounter said arm, substantially as set forth.

35. In a machine for printing oil cloth, in combination, a series of printing blocks, a se-

ries of groups of mechanism adapted to occasion the throw of said printing blocks, a constantly rotating shaft extending longitudinally of the machine, and provided with devices adapted to interrupt the operation of said groups of mechanism, substantially as set forth.

36. In a machine for printing oil cloth, in combination, a series of printing blocks, a series of groups of mechanism adapted to occasion the throw of said printing blocks, a series of controller shafts, one arranged in the vicinity of each of said groups of mechanism, bell crank levers mounted one on each of said controller shafts, each of which when in thrown position interrupts the operation of that group of printing block operating mechanism near which it is located, a cam shaft extending through the machine, and a series of cams mounted on said shaft one in the vicinity of each of said bell cranks, substantially as set forth.

37. In a machine for printing oil cloth, in combination, a series of printing blocks, and a series of inking carriages, a pair of oppositely rotating wheels, means for operating said wheels in unison in the opposite direction, studs mounted on said wheels, a bell crank lever one arm of which is alternately engaged by said studs, and mechanism connective of the other arm of said lever and said inking carriages, substantially as set forth.

38. In a machine for printing oil cloth, in combination, a series of printing blocks, means for occasioning their throw, a series of inking carriages, means for occasioning the reciprocation of said carriages connected with which means is a vane mounted in a liquid chamber, substantially as set forth.

39. In a machine for printing oil cloth, in combination, a series of printing blocks, means for occasioning their throw, a series of inking carriages, means for reciprocating said carriages including a member provided with a vane disposed within a liquid chamber, a pipe or channel the respective ends of which are in communication with the opposite sides of said liquid chamber, a valve which controls said pipe or channel, and means for automatically opening and closing said valve, substantially as set forth.

In testimony that I claim the foregoing as my invention I have hereunto signed my name this 1st day of December, A. D. 1899.

WM. THOMPSON WIEGAND.

In presence of—

F. NORMAN DIXON,

THOS. K. LANCASTER.