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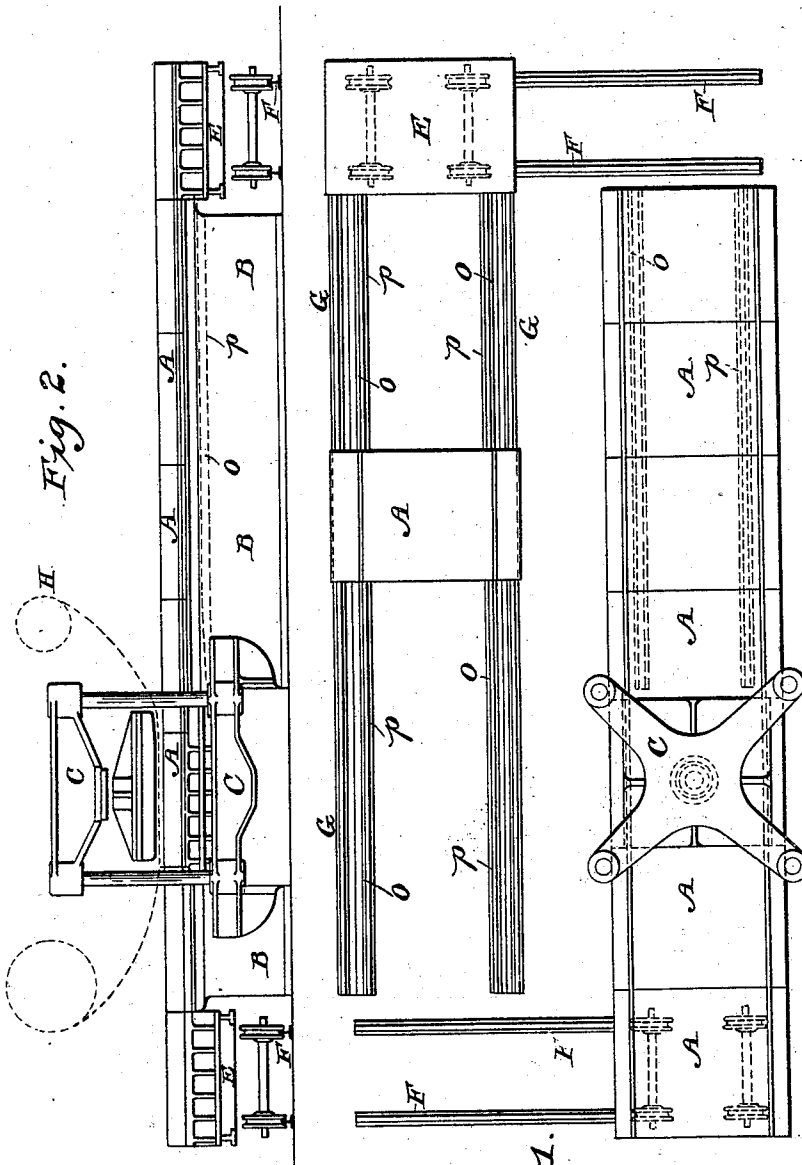
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J. INGLEBY.

MACHINE FOR MANUFACTURING LINOLEUM, &c.

No. 553,342.

Patented Jan. 21, 1896.



WITNESSES

E. J. Overance.
G. A. Schmann

INVENTOR

John Ingley
by
Wm H Babcock
Attorney

(No Model.)

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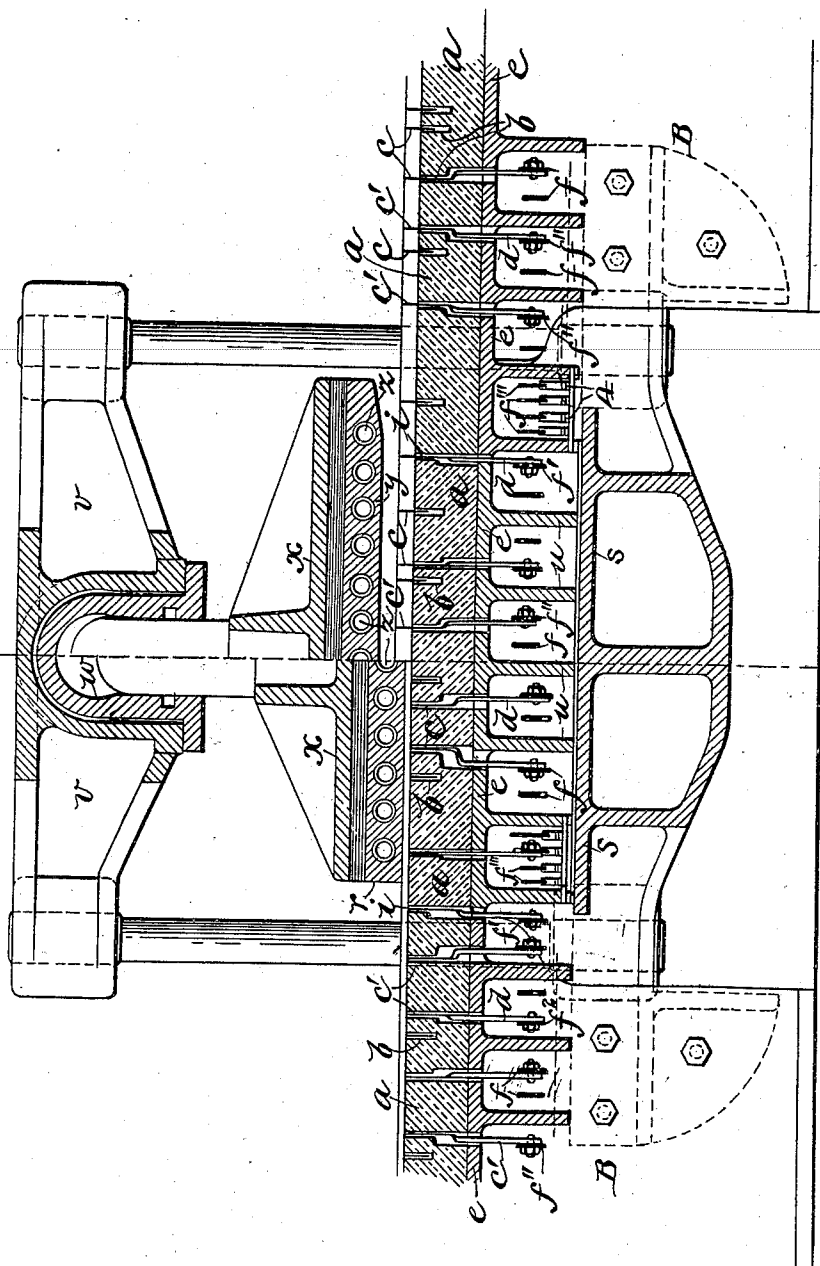
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Fig. 3.



WITNESSES

C. Leverance
J. A. Lehmann

INVENTOR

John. Ingley
by Wm. H. Babcock
Attorney

(No Model.)

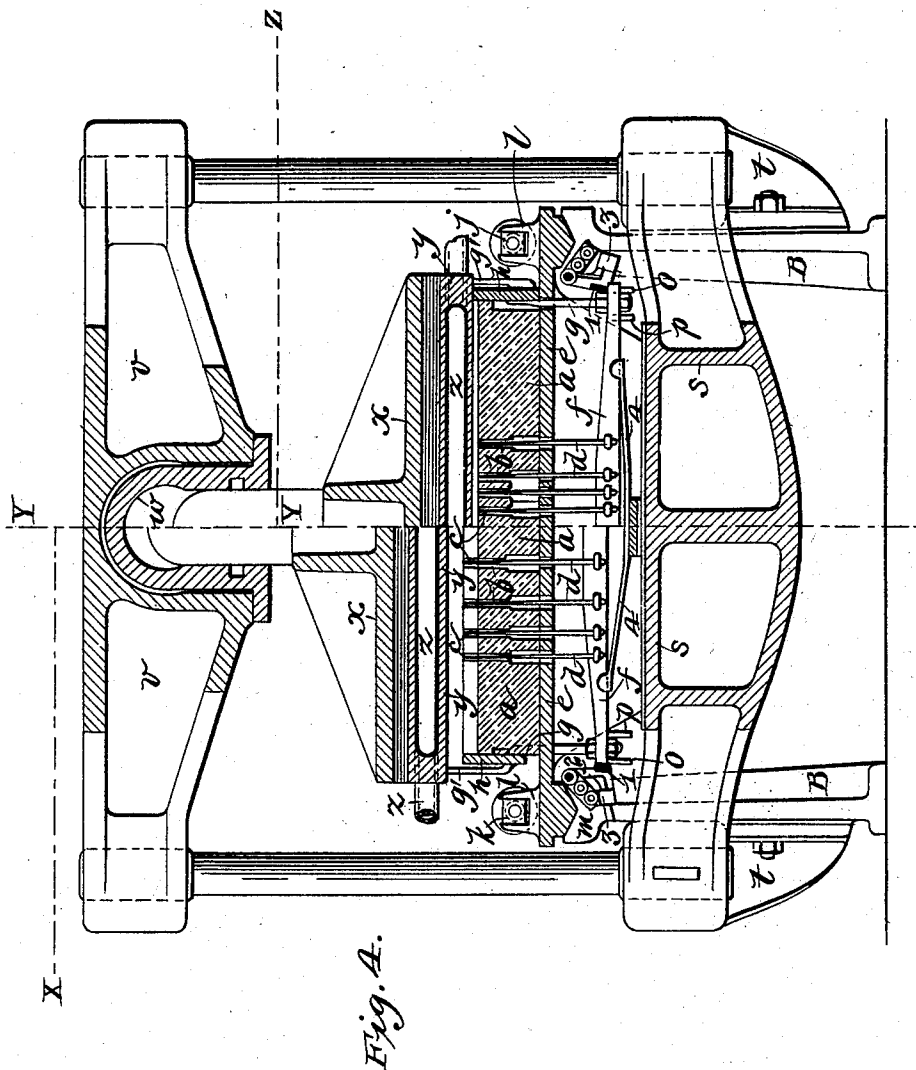
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J. INGLEBY.

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WITNESSES

Everance
T. A. Lehmann

INVENTOR

John Ingleby
by
W. H. Babcock
Attorney

(No Model.)

4 Sheets—Sheet 4.

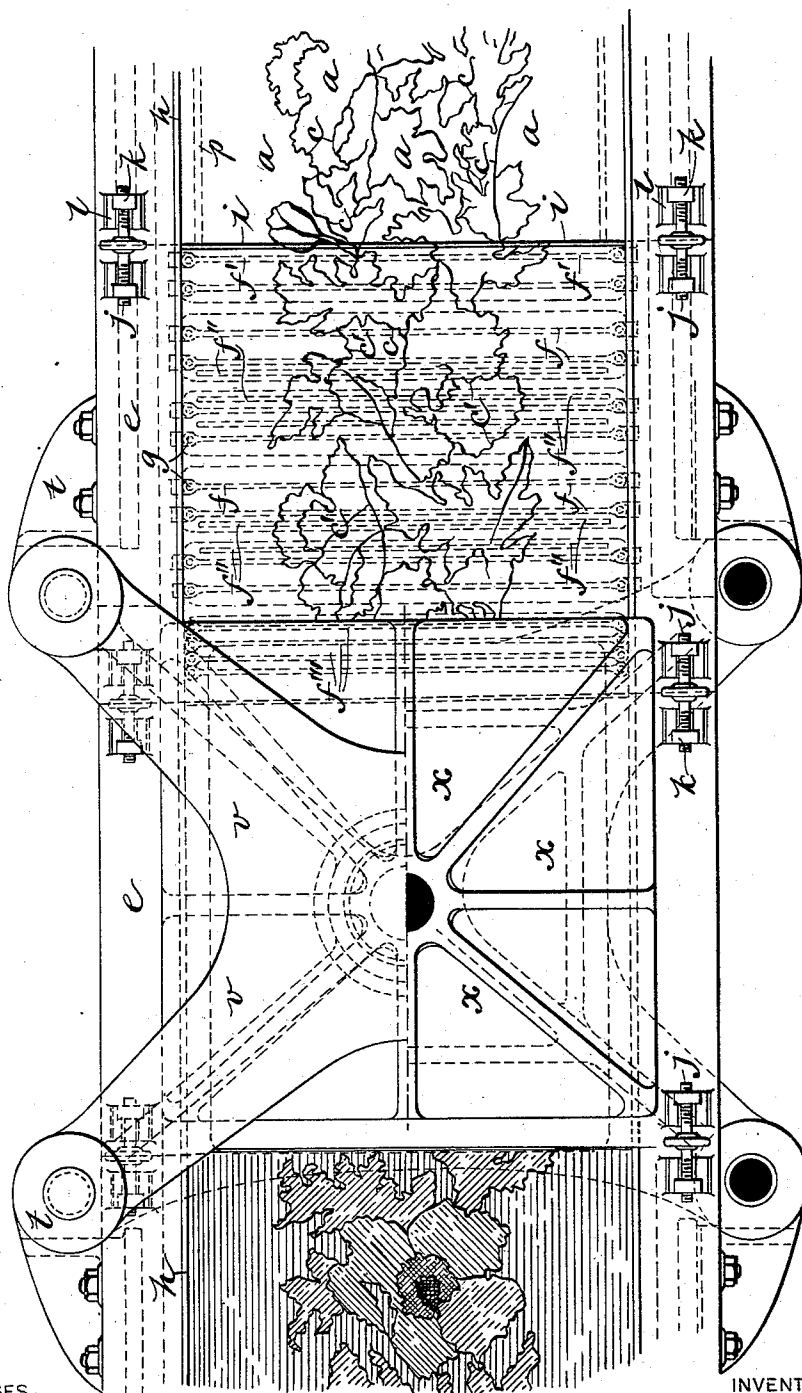
J. INGLEBY.

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Fig. 5.



WITNESSES

Everance
J. A. Lehmann

INVENTOR

John Ingleby
by
W. H. Babcock
Attorney

UNITED STATES PATENT OFFICE.

JOHN INGLEBY, OF LEEDS, ENGLAND.

MACHINE FOR MANUFACTURING LINOLEUM, &c.

SPECIFICATION forming part of Letters Patent No. 553,342, dated January 21, 1896.

Application filed January 7, 1895. Serial No. 534,113. (No model.) Patented in England September 29, 1894, No. 18,469.

To all whom it may concern:

Be it known that I, JOHN INGLEBY, a subject of the Queen of Great Britain and Ireland, residing at Leeds, in the county of York, England, have invented certain new and useful Improvements in Machines for Manufacturing Linoleum and Similar Fabrics, (for which I have applied for Letters Patent in Great Britain, No. 18,469, bearing date of September 29, 1894,) of which the following is a specification.

This invention relates to the manufacture of linoleum, cork carpets and the like fabrics, which are made by the compression to adhesion or consolidation of loose particles of prepared ingredients, and in which the pattern or design is formed in and exists through the full thickness of the fabric; and the object of the invention is to enable floral and other intricate and irregular designs or patterns to be produced in such fabrics, the present methods and means of manufacture being suitable only for simpler, more regular and geometrical designs. My improved manufacture of such fabrics consists in filling the disintegrated material previously stained or colored into molds divided into compartments by means of retractile webs, the latter corresponding to the outlines between the different colors and shades of color of the pattern, the filling being effected by placing several different stencil-plates successively over the molds and raking or brushing the correspondingly colored or shaded material over each stencil-plate. The several stencil-plates have respectively openings corresponding to those parts of the pattern which are of the same color or shade—that is, the number of stencil-plates corresponds to the number of different colors and to the number of different shades of each color. The molds are successively locked together as the filling in each commences, and after being filled are successively pushed under a press to compress the material to adhesion or consolidation, the retractile webs being withdrawn either simultaneously with or previous to the compressing movement of the press. By withdrawing the whole or a portion of the retractile webs simultaneously with and at the same rate as the compression motion of the press, the outlines of the whole or of a portion of the pat-

tern obtained are sharper and more distinct than if withdrawn previously, so that a greater variety and effect can be produced than if the outlines were all equally sharp or distinct.

My new machine or apparatus for carrying out this improved manufacture of linoleum and the like fabrics is illustrated in the accompanying drawings, in which—

Figure 1 is a general plan view, and Fig. 2 a general side elevation. Fig. 3 is a longitudinal vertical section. Fig. 4 is a cross vertical section; and Fig. 5 a plan, on lines X Y Y Z, Fig. 4, of the press portion of the machine. The right-hand side of Fig. 3 shows the press-plate in its highest position and the left-hand side in its lowest position, while the left-hand side of Fig. 4 shows the press-plate in its highest and the right-hand side in its lowest position.

The machine or apparatus comprises a series of molds A A, Figs. 1 and 2, which are mounted on a bed-slide B, and which, as they are filled and locked together, are traversed up to and under a press C. After compression the molds A are moved from under the press C, the compressed fabric D is raised and coiled round a drum or guided over drums to be passed to a drying-room or to be passed through hot or cold rolls, while the mold is disengaged from the next succeeding mold, and by means of carriages E E running on transverse rails F F and a return bed-slide G is traversed back to the starting end of the bed-slide B.

If the fabric is to be backed with canvas or other backing material, a roll H of such material is provided and the material is passed under the press-plate and adheres to the back—that is, the top—of the fabric material as the compression is effected.

The molds A are formed of a block or blocks a (see Figs. 3, 4 and 5) of wood or metal, provided with deep vertical grooves b in the upper part of the block or blocks corresponding to the outlines between the different colors and shades in the pattern. In these grooves or spaces b, and capable of moving vertically therein, are fitted the retractile webs c of thin sheet metal or other suitable material. These webs c are of such a depth that when in their highest position their upper edges stand above

the surface of the blocks *a* by a height equal to the thickness of the uncompressed fabric material, and at the same time the lower edges of the webs *c* are a sufficient distance
 5 down the grooves *b* to afford the necessary lateral support for the webs. The depth of the grooves *b* also is such as to admit of the webs *c* being drawn down until their upper edges lie perfectly flush or level with the surface of the blocks *a*.
 10

The retractile webs *c* are connected at various sufficiently numerous points of their lower edges with bars or rods *d* passing through correspondingly-situated holes in the
 15 bottom plate *e* of the mold. It will be understood that at the parts where the bars or rods *d* are attached to the webs *c* the grooves *b* are carried through to the underside of the blocks *a* and enlarged to the necessary size to permit of the vertical motion of the rods *d*. The
 20 lower ends of the rods *d* are attached to cross-bars *f*, situated below the mold-plate *e*. The ends of these cross-bars *f* are attached to the lower ends of side rods *g*, which pass upward through guide-holes in the mold-plate *e*, and
 25 are attached at their upper ends to the side or frame plates *h* of the mold. Suitable recesses are formed in the under side of the corresponding blocks to permit of the vertical
 30 movement of these side rods *g*. The depth of the side frame-plates *h* is made approximately equal to the thickness of the blocks *a* plus the thickness of the compressed fabric material. The upper edge of the plates *h* before,
 35 during, and after compression is level with the surface of the fabric material at such times.

The mold-frame for each mold-plate *e* comprises two side plates *h* and only one end plate or web *i*, the latter being connected to the end cross-bar *f'* in a similar manner to the connection of the webs *c* to the cross-bars *f*. Each plate *e* is tightly locked to the next adjoining plates *e* by means of some locking arrangement—as, for example, by means of the
 45 right and left hand screws *j*—which enter the loose nuts *k* carried in rectangular recesses in the lugs *l*. By rotating the small hand-wheel on the screws *j* in one direction or the other the adjoining mold-plates can be tightly locked
 50 together or disengaged. As only one end plate *i* is required for each plate *e* when the plates are locked together, it will be necessary to provide each with a loose removable end, to be attached when the plate is disengaged;
 55 otherwise any loose sections or blocks *a* at the corresponding end would be liable to fall out, unless it is arranged to secure the blocks permanently in position by screws through the under plate *e* or by other means.
 60

The mold-plates *e* are mounted on V-shaped grooves *m* of the bed-slide B in a similar manner to that common in metal-planing machines. On the inner sides of the bed-slide *n*
 65 are provided the supporting-rails *o*, on which the ends of the cross-bars *f* are supported, so

as to keep the webs *c* and the frame-plates *h* and *i* set up to the full height, while the plates *e* are on and traversing along the bed-slide B toward the press.
 70

When the pattern is such that it is desired to have certain of the outlines between different colors or shades more indistinct than the rest, a second inner set of rails *p* are provided, which do not extend up to the press as do the rails *o*, and which terminate preferably with a downward inclination. The webs *c'* corresponding to such indistinct outlines in the pattern are not connected to the webs *c* corresponding to the sharp outlines, and are also
 75 attached to independent cross-bars *f''*. (See Fig. 5.) The ends of these latter do not extend so far as to meet the rails *o*, but rest only on the inner rails *p*. When, therefore, the mold-plate *e* reaches the point where the rails *p* terminate, (in a downward incline,) the cross-bars *f''* begin to fall, drawing down the corresponding webs *c'*, and consequently before the material of the fabric begins to be compressed such webs *c'* are completely drawn
 80 down.
 85

The press comprises a supporting-bed *s*, attached by brackets *t* to the ends of the bed-slide *n*. The strengthening-ribs of the plates *e* slide onto and rest upon the planed surface of the press-bed *s*. Four vertical shafts connect the press-bed *s* with the upper cross-frame *v*, which carries the press-cylinder *w*. The plunger of the cylinder is attached to the top plate *x*, to which is attached the lower
 90 plate *y*, with an intermediate wood packing in case the lower plate is heated, which may be effected by steam-pipes *z* cast in the plate, as shown in Fig. 3, or by other usual means for heating press-plates.
 95

As the press-plate *y* descends it first catches against the upper edges of the side frame-plates *h*, which stand very slightly above the surface of the uncompressed material. It at the same time depresses such of the webs *c* as are connected to the plates *h*, by means of the connections previously described, until the lower edges of the side plates *h* come to rest upon the top of the mold-plate *e*, when the upper edges of the webs will be perfectly level
 100 with the upper surface of the blocks *a*. In order to lock the webs *c* exactly in this position during compression of the material, a locking-bar 1, carried at the ends by hinged levers 2, is provided on each side of the gap in the bed-slide *n* left for the press. By means of weights 3, attached either to the levers 2 or bars 1, the latter have a tendency to swing inward, but during the descent of the cross-bars *f* are forced outward by the ends of said
 105 bars until the bars reach their lowest position, when the ends of the bars *f* are just below the lower edge of the locking-bars 1, which now swing inward and abut against the beveled ends of the bars *f*, locking these, and consequently also the webs *c*, in their lowest position. This position is shown on the right-
 110
 115
 120
 125
 130

hand side of Fig. 4. The left side of Fig. 3 shows the press-plate *y* in its lowest and the right side in its highest position.

In order to avoid any distinct marks between successive portions of the fabric carried on adjoining mold-plates *e*, one end of the press-plate *y* is beveled slightly in an upward direction, and the press-plate is made correspondingly longer than one of the mold-plates; also, the vertical side rods of the first three or four cross-bars *f'''* are not connected to the side plates *h* but are bent so as to pass outside the side plates *h*, as shown at *g'*, Fig. 4, and are therefore depressed independently, first, by the overhanging edge or the beveled portion of the press-plate *y*, and the surface of the fabric at this part is left correspondingly inclined on compression. When this portion afterward comes under the opposite (straight) end of the press-plate *y*, the said side rods *g'* and the surface of the fabric are depressed level with the top of the side plates *h* and the rest of the fabric. These three or four cross-bars *f'''* may be balanced by springs 4, so that they are retained in the stepwise positions shown in Fig. 3, while the mold-plate *e* is being pushed away toward the opposite end of the press. It will be evident that those portions of the webs *c*, which are respectively attached to the three or four cross-bars *f'''*, must be of separate short pieces, unconnected—that is, independent of each other and of the rest of the webs—in order to permit of their movement in two separate stages and to different extents during such stages—that is, corresponding to the step wise positions of the cross-bars *f'''* above referred to. (See left-hand side of Fig. 3.)

If desired the surface of the blocks *a* may be embossed so as to give an embossed surface to the fabric.

The *modus operandi* of my improved manufacture of linoleum and the like fabrics in connection with the apparatus above described is as follows: The disengaged or unlocked mold-plate on passing onto the return bed-slide *G* has the retractile webs *c* set up to their full height by the sliding of the cross-bars *f* up the inclines at the commencement of the rails *o* and *p* of the bed-slide *G*. The loose removable end plate *i* of the mold-frame, previously referred to, is attached to the open end, and the mold will now be formed as a shallow rectangular box, divided into compartments by the set-up webs along lines corresponding to the outlines of the desired pattern. The first stencil-plate is now placed over the mold and part of the material to form the fabric, of the proper color, is now raked or brushed over the openings in the stencil, filling the corresponding compartments. The mold is then pushed forward and covered with a second stencil, (the first stencil having been removed to be placed over the next succeeding mold,) and the compartments left uncovered by the openings in the second stencil

are filled in a like manner by material correspondingly colored. This operation is repeated until the molds are filled or reach the end of the return bed-slide *G*. By means of the carriage *E* on the transverse rails *F* the mold is transferred to the bed-slide *B*. This carriage *E* is provided also with supporting-rails (corresponding to rails *o* and *p*) to retain the webs *G* in the set-up position. The filling of the compartments, if not completed, is continued on the bed-slide *B*, or it may be first commenced and completed on this bed-slide. The stencils, if desired, may be fixed to the bed-slides, so that the mold-plates are intermittently and successively pushed under them. As the mold-plate reaches the bed-slide *B* it is locked, as previously described, to the next preceding mold-plate. Before reaching the press *C*, Figs. 1 and 2, those of the webs corresponding to the indistinct outlines of the pattern have moved past the ends of the rails *p* and have completely receded to their lowest position. On reaching the press the cross-bars *f* have moved past the ends of the rails *o*, so that as the press-plate *y* descends, catching against the side plates *h* and side rods *g'*, these are depressed slightly in advance as the fabric is compressed. When the side plates *h* come to rest upon the mold-plate *e*, those of the webs *c* connected to the side plates *h* are fully depressed, and the compression about such webs is completed. The press is then operated to raise the press-plate *y*. As I do not wish to limit myself to any particular type of press all details of and for operating such press are omitted. The junction between the compressed and the uncompressed portion of the material is formed by the portion having an inclined surface, as previously described. The mold, with the compressed material now forming the fabric, (with or without canvas or other backing, as the case may be,) is now moved away from under the press, and before reaching the end of the bed-slide *B* the fabric is raised from the mold to be led away for drying or other finishing operations. The mold-plate *e* is now unlocked from the next succeeding mold-plate and run onto the carriage *E* to be traversed onto the return bed-slide *G*.

It will be understood that the mold-plates are moved forward on the bed *B* locked together in an intermittent manner. The movement along either or both bed-slides may be effected by hand or by mechanism, but as I do not wish to limit myself to any particular mechanism, if used, no description of such is added.

The material may if desired be molded and compressed of a thickness sufficient to form several carpets or other fabrics, and afterward split by a splitting-machine in a similar manner to that in which leather is split.

Having fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A machine for the manufacture of linoleum, cork carpets and the like fabrics, comprising molds A, formed of side and end pieces *h* and *i* and a block or blocks *a*, having the upper surface grooved along the outlines of the pattern to be produced, and provided with retractile webs *c* fitting in said grooves and capable of retractile movement therein; said blocks *a* mounted on successive bed mold plates *e*, which latter are carried capable of being slid thereon on a bed slide B, means and connections for setting up, supporting and withdrawing said end pieces and webs *c*, consisting of rails *o* and *p* cross bars *f'* *f''* and *f'''*, vertical rods *d*, and side rods *g*; and a press having a press plate *y* acting during compression on the side plates *h*, all substantially as set forth.

2. In a machine for the manufacture of linoleum, cork carpets and the like fabrics; a mold consisting of blocks *a*, grooved or divided on the upper portion along the outlines of the desired pattern, provided with retractile webs *c* fitting therein capable of retractile movement, whereby the webs can be set up to the height of the uncompressed material and withdrawn until their outer edges are perfectly level with the surface of the blocks *a*, substantially as herein set forth.

3. In apparatus for the manufacture of linoleum and the like fabrics, the combination of grooved blocks *a*, retractile webs *c*, connecting rods *d*, cross bars *f*, and side rods *g*, substantially as herein set forth.

4. In apparatus for the manufacture of linoleum and the like fabrics, the combination of

grooved blocks *a*, mold plate *e*, connecting rods *d*, cross bars *f*, hinged locking bars *l*, and retractile webs *c*, substantially as and for the purpose herein set forth.

5. In apparatus for the manufacture of linoleum and the like fabrics, the combination of a bottom press plate *s*, movable top press plate *y*, with a compartment mold formed of movable side and end plates *h* and *i* and grooved block or blocks *a*, having retractile webs *c*, and the mold plate *e* substantially as herein set forth.

6. In compartment molds used for manufacturing linoleum and the like fabrics, the combination of retractile webs *c* attached to the side plates *h* depressed only by the action of the press plate *y* and supported up to the press by rails *o*, with independent retractile webs *c'* and additional supporting rails *p* the webs of the series last mentioned being arranged to drop when left unsupported by the rails last mentioned substantially as set forth.

7. In apparatus for the manufacture of linoleum and similar fabrics, a series of molds divided into compartments, retractile webs corresponding to the boundary lines between the different colors and tints of the pattern, devices for locking these molds together, mechanism for compressing their contents and mechanism for withdrawing the said webs, substantially as set forth.

JOHN INGLEBY.

Witnesses:

JAMES W. ADDYMAN,
J. CLARK JEFFERSON.