

No. 697,787.

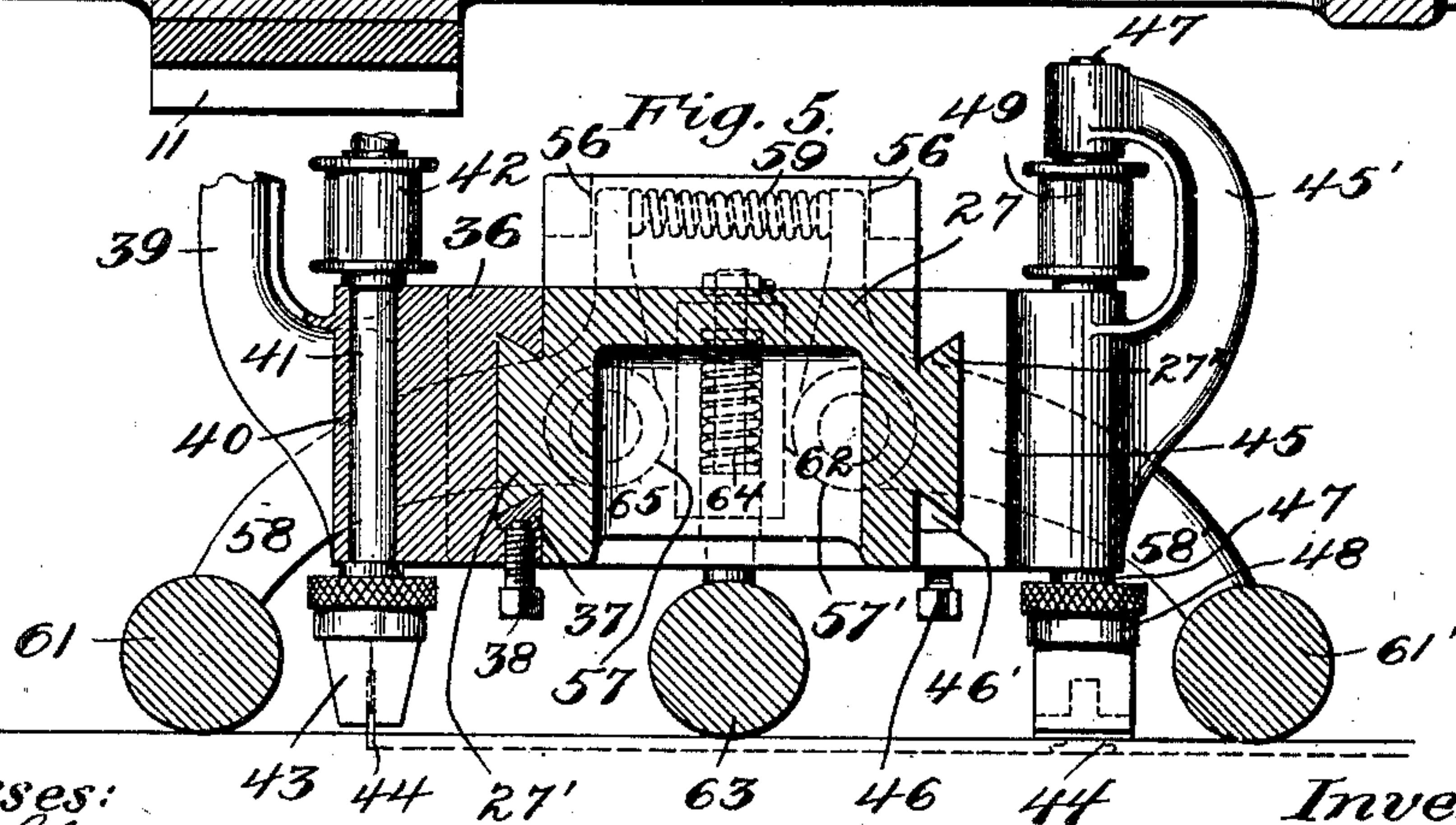
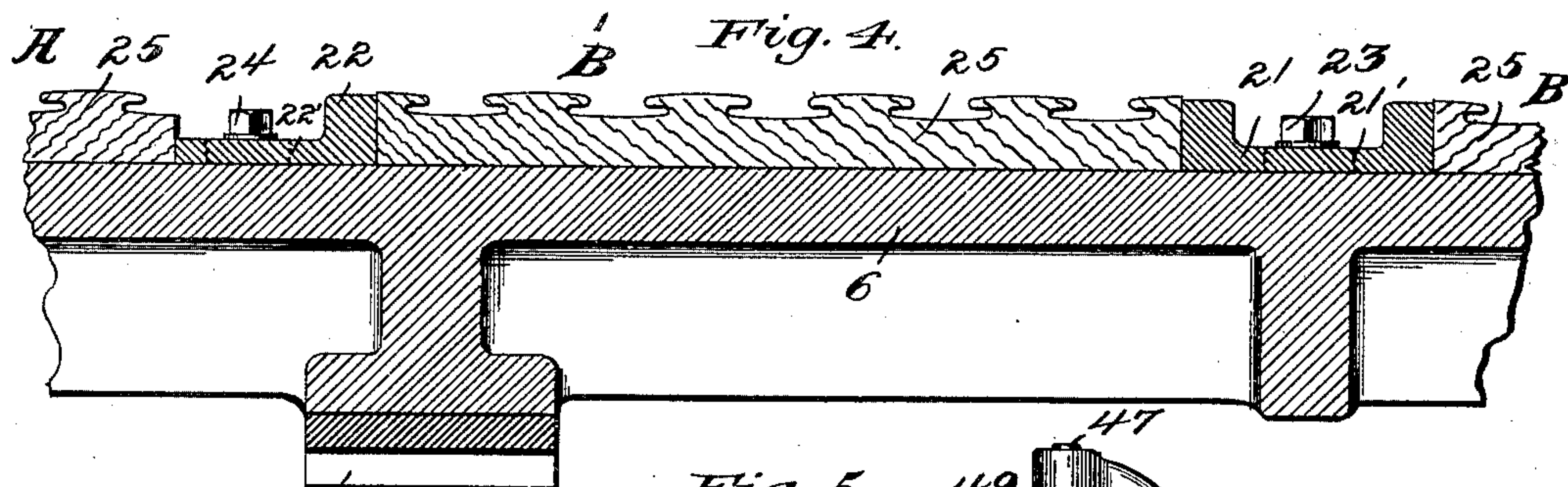
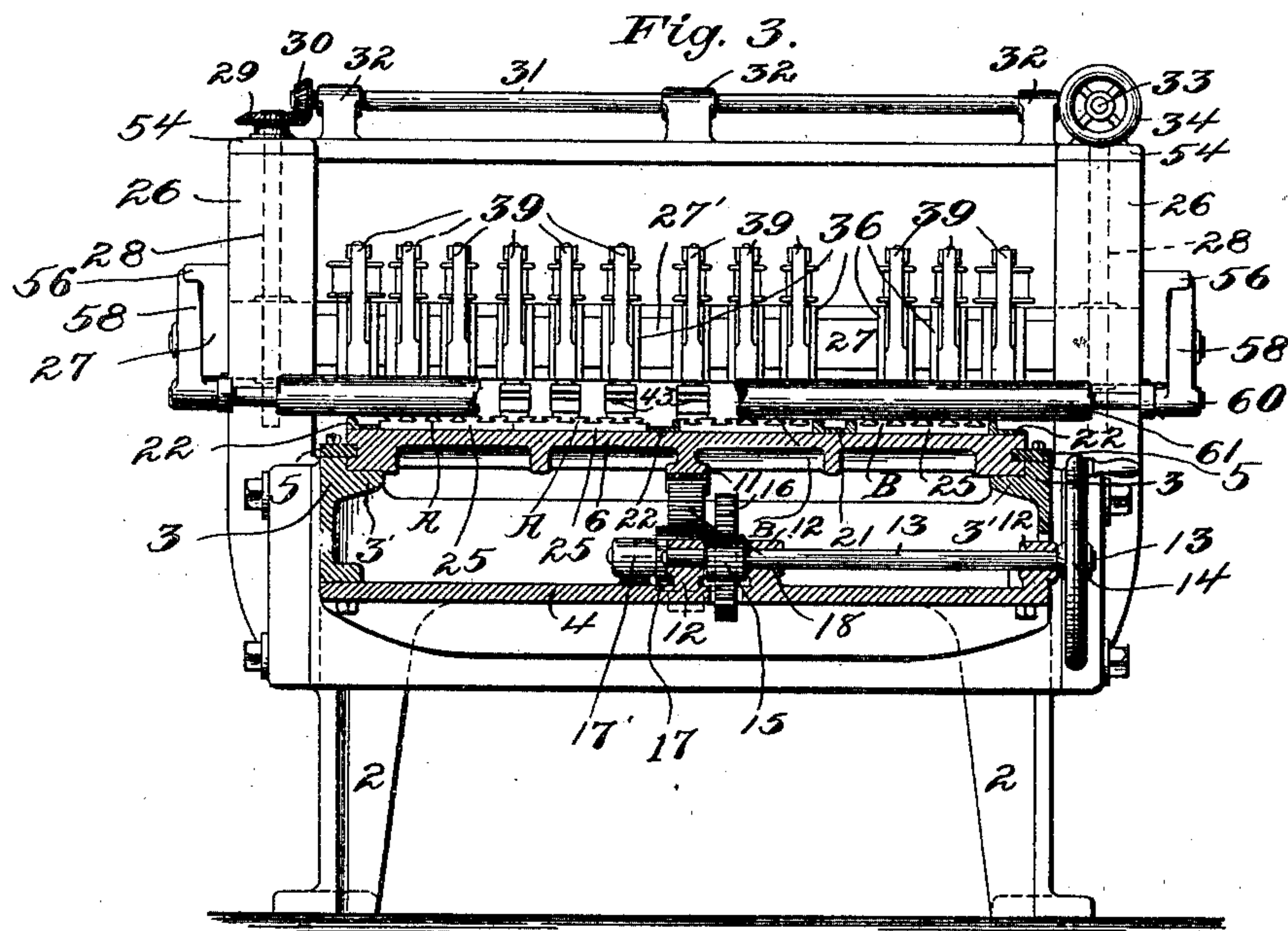
Patented Apr. 15, 1902.

J. J. BLACKMAN.
DOVETAILING MACHINE.

(Application filed Jan. 2, 1902.)

(No Model.)

2 Sheets—Sheet 2.



Witnesses:

Chas. R. Schuch
J. E. Campbell

Inventor:

J. J. Blackman,
By his Attorneys
Hodges & Peck

UNITED STATES PATENT OFFICE.

JOHN J. BLACKMAN, OF NEW BRITAIN, CONNECTICUT.

DOVETAILING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 697,787, dated April 15, 1902.

Application filed January 2, 1902. Serial No. 88,049. (No model.)

To all whom it may concern:

Be it known that I, JOHN J. BLACKMAN, a citizen of the United States, residing at New Britain, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Dovetailing-Machines, of which the following is a specification.

My invention relates to dovetailing-machines; and it has for its object the formation of sets of dovetails in wood or other material.

Primarily, the invention is designed for the production of blocks employed as surface finishings for floors, ceilings, &c., of the kind, for instance, like those shown in my patent dated September 17, 1901, No. 683,009, although it is not limited to such use.

A further object of the invention is the provision of sets of cutters for forming recesses of any desired configuration in material, the shapes of these recesses depending upon the configuration of the cutters.

A further object of the invention is the provision of sets of cutters arranged in a peculiar manner, whereby certain cutters will operate upon the material on the movement of said table to form one set of grooves in the material and other cutters will form grooves in similar material, the ribs or projections of one block fitting into the grooves or recesses in the other block when the cutters have completed their operations.

Further objects of the invention are the provision of means for holding the material upon the bed or table of the machine, of means for actuating said bed or table, of means for rotating the cutters, of means for adjusting the cutters, and of devices for bearing upon the material and holding it down upon the bed or table while the cutters are acting upon it, all as will be hereinafter set forth.

In the accompanying drawings, Figure 1 is a plan view of my improved dovetailing-machine. Fig. 2 is a side elevation thereof. Fig. 3 is a transverse vertical section on line 3 3 of Fig. 1 looking in the direction of the arrow. Fig. 4 is a transverse vertical section of part of the movable bed or table, showing sections of material in place thereon, said sections having been grooved or formed with dovetails by the cutters of the machine. Fig.

5 is a transverse vertical section taken on line 4 4 of Fig. 1, showing two of the cutter-spindles in position, the presser-roll arrangement, and means whereby the heads carrying the cutter-spindles may be adjusted along the sides of the cross-bar of the machine-frame and may be clamped in position after such adjustment. Fig. 6 is a perspective representation of a form of cutter which may be employed.

Referring to the drawings, the numeral 1 designates the framework of my improved machine, which framework may be of any desired kind and in the exemplification given is supported upon feet 2 and is composed of side beams or stringers 3, united by cross-bars 4. These side beams are provided with guideways 3', and upon said guideways are secured strips 5, which enter longitudinal grooves in the sides of a work-supporting table 6, as illustrated in Fig. 3. This table is provided with a flange or abutment 7, which extends transversely across one end of the same and may be either formed integral with said table or bolted thereto, as shown, and said flange constitutes an abutment for one end of the work—for instance, square blocks, which may be supported thereon. At its ends opposite the flange or abutment 7 the table is provided with a series of movable clamps 8, shown as of angular form, the angular portions of said clamps bearing against the ends of the blocks, and screws 9, working through nuts 10 in short standards of the table, being provided for adjusting said clamps and causing them to force the surface-finishing blocks or other material longitudinally against the flange or abutment 7. As will be observed by reference to Fig. 2, the flange or abutment 7 and the clamps 8 are located in a recess or depression of the table, so that their top surfaces will be below the level of the work and will not interfere with the action of the cutters employed in forming the dovetail grooves in said work, as hereinafter described. On its under side said table is provided with a rack 11. Any suitable gearing may be employed for advancing said rack, and I have shown one form of said gearing which works well in practice. Journaled in bearings 12 of one of the cross-bars 4, uniting the side bars 3 of the frame, is a shaft 13,

to which a hand-wheel 14 or other suitable power-transmitting devices may be applied, and this shaft 13 is provided with a pinion 15, in mesh with a large gear 16, carried by a short shaft 16', journaled in bearings 17' of the frame, and on this shaft 16' is a long pinion 17, in mesh with a gear 18, mounted on a shaft 19, journaled in bearings 20 of the frame, as illustrated in Figs. 2 and 3. This gear 18 is in engagement with the rack 11, and when power is applied to the shaft 13, either manually, by means of the wheel 14, or automatically, by any suitable means, if desired, it will be seen that through the arrangement of the gearing described the table will be reciprocated in its ways on the side bars or stringers 3 of the frame. The table is divided into compartments by longitudinal strips 21 and 22, as illustrated in Fig. 4, said strips being secured in place by bolts or other suitable fastenings 23 24, respectively, as illustrated in Figs. 1 and 4. Laterally supported by these strips and located on the table between them are the blocks 25 of wood or other material which it is desired to submit to the action of the cutters of the machine.

Rising from frame 1 of the machine are vertical standards 26, and fitted in guideways of these standards is a frame 27, capable of vertical adjustment in said guideways by screws 28, carrying gears 29 at their upper ends, said gears being connected to cause the screws 28 to rotate in unison by gears 30, mounted on the ends of a long shaft 31, supported in suitable bearings 32 of the frame, as illustrated in Fig. 1. Power may be applied to rotate these screws, either manually by means of a shaft 33, carrying a hand-wheel 34 and a gear 35, in mesh with one of the gears 29, or, if desired, other means may be employed for this purpose. This frame 27 is provided with longitudinal guideways 27' 27², preferably of dovetail shape, as illustrated in Fig. 5, the guideway 27' being on one side of the frame and the guideway 27² upon the other side of said frame.

Fitted upon the front guideway 27' are heads 36, adjustably secured to said guideway by shims 37 and screws 38, and each of these heads is provided with an overhanging arm or bracket 39, perforated at its top to receive the end of a cutter-spindle, hereinafter described, and with a bearing 40 for the reception of the main portion of said spindle. The spindles journaled in the bearings 40, just described, are designated by the numeral 41, and each is provided with a pulley 42 or suitable instrumentality to which power may be applied by a belt or otherwise, and carries a chuck 43, in which the shank 44' of a cutter 44 may be secured, as illustrated in Fig. 5. On the opposite side of the frame 27 heads 45, having overhanging arms 45', are secured, and these heads are slipped upon the guideway 27² and are adjustably fastened in position by screws 46 and shims 46' in the

same way that the heads 36 are secured. In the bearings of these heads 45 are journaled the spindles 47 of the chucks 48, in which cutters 44 are secured, and each spindle is also equipped with a pulley 49, or it may be other instrumentality, to which power is applied for rotating the spindle. While any desired means may be employed for rotating the cutter-spindles, I have shown a belt for this purpose, said belt passing around idler-pulleys 51 and 52, then around one of the cutter-spindle pulleys 49, then around a pulley 42 of one of the cutter-spindles, then around another pulley 49 of one of the cutter-spindles, and so on alternately over first one pulley and then another, it finally passing over an idler-pulley 53, as shown in Fig. 1 of the drawings. This well-known way of driving a series of spindles is merely shown as one convenient method of accomplishing this purpose, and it is distinctly to be understood that the invention is not limited in this respect, for, as is obvious, gearing or other means may be substituted therefore if desired. As will be observed by reference to Fig. 2, the standards 26 are chambered at 26' to receive and act as guides for the ends of the frame 27, and these chambers are closed at the top by caps 54, in which the screws are journaled, said screws being threaded into nuts 55 of the frame 27.

At its ends, which project slightly beyond the standards, the frame 27 is provided with a pair of lugs 56, and pivoted to each of these projecting ends at 57 57' are levers 58 58', the short arms of which are normally caused to bear against the lugs 56 by means of a spring 59, as illustrated in Figs. 1 and 2. The long arms 58 58' of these levers are provided with bearings 60 60', in which are mounted the reduced ends of presser bars or rollers 61 61', said bars or rollers acting forcibly upon the material on the bed or table to hold it down thereon during the action of the cutters.

At each of its ends the frame 27 is provided with a tubular boss or projection 62 for the reception of stems 63', projecting from a third and intermediate presser bar or roller 63, and within each of these tubular bosses is located a spiral spring 64, (see Fig. 5,) which spring when the roller comes into action against the material on the bed or table causes said roller to bear upon the same and to aid the other rollers in firmly holding said material in place during the time in which it is submitted to the action of the various cutters. By these means it will be seen that as the table is reciprocated by the gearing described or by other gearing suitable for the purpose the blocks of wood or other material will be held firmly in place thereon and will be prevented from the slightest displacement while the dovetail grooves are being formed therein. To decrease the weight of the frame 27, it may be chambered, as at 65, if desired.

It will be seen by reference to my Patent

No. 683,009, above mentioned, that when surface-finishing blocks of the kind disclosed therein are required to be manufactured the lower or base block will be provided with preferably five dovetail ribs or projections and with six grooves or reduced portions, four of said grooves being located between the projections and the side or edge grooves or reduced portions being formed, all of said grooves receiving ribs of a shape to fit them on the upper block. It will also be seen that the upper block is provided with six projections to fit the six grooves or recesses in the lower block and with five recesses to receive the five ribs of said lower block. To form these blocks in the manner stated, the cutter-spindles have to be peculiarly arranged, as shown in Fig. 1 of the drawings. To form these grooves and their intermediate projections in the lower blocks, several of said blocks are arranged end to end, and another series of said blocks is also arranged end to end, the side edges of said second series of blocks abutting against the side edges of the first series of blocks and both series being forced against the abutment 7 by the clamps 8, as illustrated in Figs. 1 and 3, in which said base-blocks are designated by the letter A. To form the grooves in these sets of base-blocks, a set of eleven cutter-spindles at the left of the frame 27 is employed, and it will be seen that the side grooves or reduced portions of the laterally-abutting blocks are formed simultaneously by one of the cutters, as illustrated in said Figs. 1 and 3. These sets of base-blocks are, as before stated, confined between the longitudinal strips 22, which are provided with a single flange, as illustrated in Fig. 4. Abutting at their side edges against the strip 22, located about over the rack 11 in Fig. 3, is a single series of surface-finishing or top blocks B, and as these blocks have five grooves and six projections a set of five cutter-spindles is employed arranged on the frame 27, as illustrated in Fig. 1, three of said cutter-spindles being located at the front and two at the rear of said frame. These blocks are arranged end to end on the table and are secured thereon by one of the clamps 8 in the manner above described, and they are laterally supported between two of the flanged strips 21 and 22, as illustrated in Fig. 4. Each of these strips may be slotted, as shown by dotted lines at 21' 22', to afford adjustment of said strips upon the table to accommodate different series of blocks. The right-hand edges of the series of blocks B fit against one of the flanges of the double-flanged strip 21, and between the other flanged edge of said strip 21 and the side of the strip 21 secured to the right-hand part of the table adjacent to its edge another series of blocks B is arranged, said blocks being grooved by a set of five cutters carried by spindles, two of which are located at the front and three at the rear of the frame 27, as shown in Fig. 1.

The arrangements of the sets of cutter-spindles shown is, as stated, suitable for the character of work described; but if differently-arranged longitudinal grooves or recesses should be desired in work the heads 36 45, carrying the cutter-spindles, may be adjusted upon the guides 27' 27² to arrange said spindles in the manner desired and then secured in position by the binding screws and shims described.

In the operation of my improved machine sets of plain blocks A and B are first clamped upon the table 6 in the manner described and then the wheel 14 is turned, and the gearing operated by said wheel actuates the rack 11 and the table to which it is secured, causing the work to be longitudinally grooved by the cutters 44, carried by the sets of spindles. Just before the work is engaged by the first sets of front cutters it passes beneath the presser bar or roller 61, which holds it down as said cutters enter upon their work, and then it passes beneath the spring-actuated presser bar or roller 63 before it reaches the rear sets of cutters carried by the spindles 47; and finally beneath the presser bar or roller 61', the work being firmly held against displacement, especially in an upward direction, by said presser bars or rollers. These presser bars or rollers may either be fixed in their bearings or may be permitted to rotate therein, as circumstances require. The shears or ways 3 3, upon which the table slides, are of considerable length—i. e., long enough to accommodate the full stroke of the table—and after the blocks have been grooved they may be removed from the table at the rear of the frame 27, or by actuating the screws 28 in the manner described the frame 27, carrying the cutter-spindles, may be raised and the table drawn back to the position represented in Fig. 1.

The cutters 44, one of which is represented in Fig. 5, may be stamped by dies from sheet-steel, and each cutter will be made of the shape of the recess it is desired to form. In the present instance the cutters 44 are designed to form what are known as "ogee" kinds of dovetail recesses and ribs or projections, and each is provided with a blade portion having sharpened edges 44² and with a bit portion of less width than the blade and having beveled lower cutting edges 44³ and beveled side cutting edges 44⁴, which are continuations of the edges 44². Any suitable cutters for forming the desired kind of recesses may be substituted for those shown, if desired, without departure from the invention, and in this way "plain," "zigzag," or other kinds of grooves may be produced at will.

My invention is not limited to the precise details of construction shown and described, nor to the location of the cutters and table, for said parts may be differently arranged, if desired, without departure therefrom. So,

too, material in other than block form may be placed and clamped upon the table, and the clamping and presser devices may vary in construction from those described, if desired.

Having thus described my invention, what I claim is—

1. The combination, with a movable work-support, of means for clamping material upon said work-support; cutters shaped to form recesses and counterpart intermediate projections in the work; and means for actuating said cutters, the said cutters disposed in sets, arranged to operate within different areas of the work, and the cutters of one set being proportioned to those of the others, so that the recesses produced by the former shall correspond to the projections produced by the latter.

2. The combination, with a movable table, of means for clamping sections of material to said table; a series of cutter-spindles, recessing-cutters secured to said spindles; said cutters being disposed in sets arranged to operate within different areas of the work, and the cutters of one set being proportioned to those of the others, so that the recesses produced by the former shall correspond to the projections produced by the latter.

3. In a dovetailing-machine, the combination, with a table, of gearing for reciprocating said table; means for clamping sections of material in which counterpart dovetail recesses and projections are to be formed to said table; a series of sets of cutters one set forming one series of recesses and projections in one section of material, and another set a different series of recesses and projections in the other section of material; spindles to which said cutters are secured; means for rotating the spindles; and a support for said spindles.

4. In a dovetailing-machine, the combination, with a reciprocating table, of means for securing sets of blocks in which a certain number of dovetail recesses are to be formed to one portion of said table; means for securing sets of blocks in which a different number of dovetail recesses are to be formed to another portion of said table; a set of cutter-spindles; cutters carried by said spindles for forming dovetail recesses in the first-named set of blocks; a second series of cutter-spindles; cutters carried by said second series of cutter-spindles for forming dovetail recesses in the second set of blocks; means for actuating the cutters; and means for actuating the table.

5. In a dovetailing-machine, the combination, with a reciprocating table, of strips upon said table; an abutment at one end of the table; clamps for forcing sections of material placed between the strips against said abutment; means for reciprocating the table; sets of cutters disposed to operate within different areas of the work; and the cutters of one set being proportioned to those of another

set, so that the recesses produced by one set of cutters shall correspond to the projections produced by another set of cutters; and means for rotating the cutters.

6. In a dovetailing-machine, the combination, with a table, of strips dividing said table into a series of compartments; means for clamping sections of material upon said table; means for actuating the table; a series of sets of cutters for recessing the material, said sets arranged to operate, respectively, within different areas of the work, and the cutters of one set being proportioned to those of the other set, so that the recesses produced by one set will correspond to the projections produced by another set; and means for rotating the cutters.

7. In a dovetailing-machine, the combination, with a frame having ways, of a table mounted on said ways; means for reciprocating the table; a frame located over the table and having a guideway on each of its sides; a series of heads adjustably mounted on the guideway on one side of said frame; a series of adjustable heads fitted to the guideway on the other side of said frame; spindles mounted in the heads; recessing-cutters carried by the spindles; means for rotating the cutters; and means for clamping material upon the reciprocating table.

8. The combination, with a movable support for sustaining and feeding the material, of means for actuating said support; a frame located at one side of said support; spindles carried by the frame; levers pivoted to each end of said frame; presser bars or rollers connecting said levers, and means for actuating the levers to cause said presser bars or rollers to bear against the material on the support.

9. The combination, with a movable support for sustaining and feeding material, of means for actuating said support; a frame located over said support and having a guideway on each of its sides; a series of heads adjustably mounted on each of said guideways; spindles journaled in the heads; cutters carried by the spindles; means for rotating the spindles; presser bars or rollers movably mounted on said frame; and means for causing said presser bars or rollers to bear against the material on the support.

10. The combination, with a support for sustaining material, of a frame located over said support; cutters, and means for actuating the same carried by said frame; presser bars or rollers movably mounted on the frame and located on each side thereof; means for actuating said presser bars or rollers to cause them to bear against the material on the support; an intermediate presser bar or roller carried by the frame; and means for forcing said intermediate bar or roller against the work upon the support.

11. The combination, with a support, of means for actuating said support; a frame adjustably mounted over said support and hav-

ing a guideway on each of its sides; a pair of
levers pivoted to each end of said frame, each
lever having a long arm and a short arm;
presser bars or rollers carried by the long arms
5 of said levers; lugs on the frame at each end
thereof; a spring for forcing the short arms
of the levers against said lugs; heads adjust-
ably mounted on the guideways of the frame;
cutter-spindles carried by said heads; and
10 means for actuating the cutter-spindles.

12. The combination, with framework hav-
ing guideways, of a table mounted on said
guideways; strips for dividing said table into
compartments; means for securing material
15 in said compartments; means for reciprocating

the table; a frame mounted over said ta-
ble; means for adjusting said frame; a series
of heads adjustably mounted on the frame;
spindles journaled in the heads; means for
rotating the spindles; cutters carried by the 20
spindles; presser bars or rollers; and means
for causing said presser bars or rollers to bear
with yielding pressure against the material
on the table.

In testimony whereof I affix my signature 25
in presence of two witnesses.

JOHN J. BLACKMAN.

Witnesses:

FRANCES E. BLODGETT,
HARRY L. HILTON.