

J. M. BENJAMIN.
SPLITTING MACHINE.
APPLICATION FILED APR. 7, 1911.

1,048,278.

Patented Dec. 24, 1912.

3 SHEETS-SHEET 1.

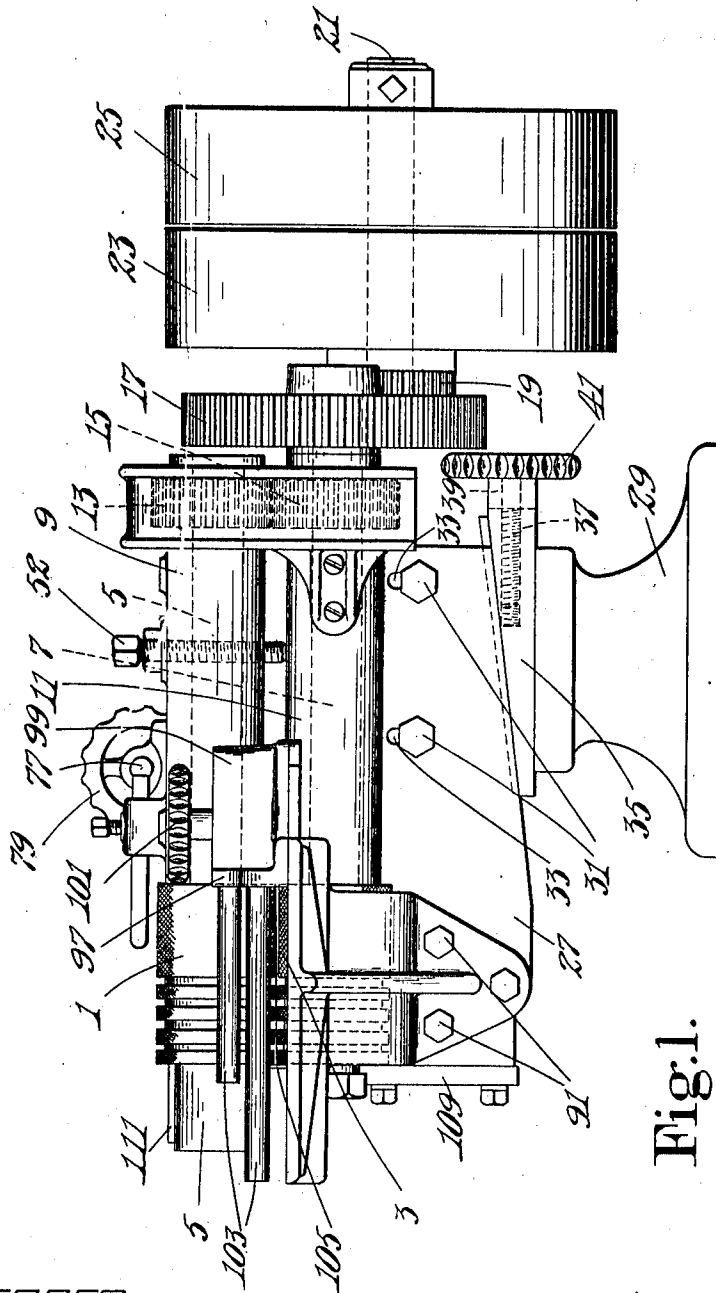


Fig. 1.

WITNESSES:

Elizabeth C. Coups
J. Blanche Hargraves.

INVENTOR.

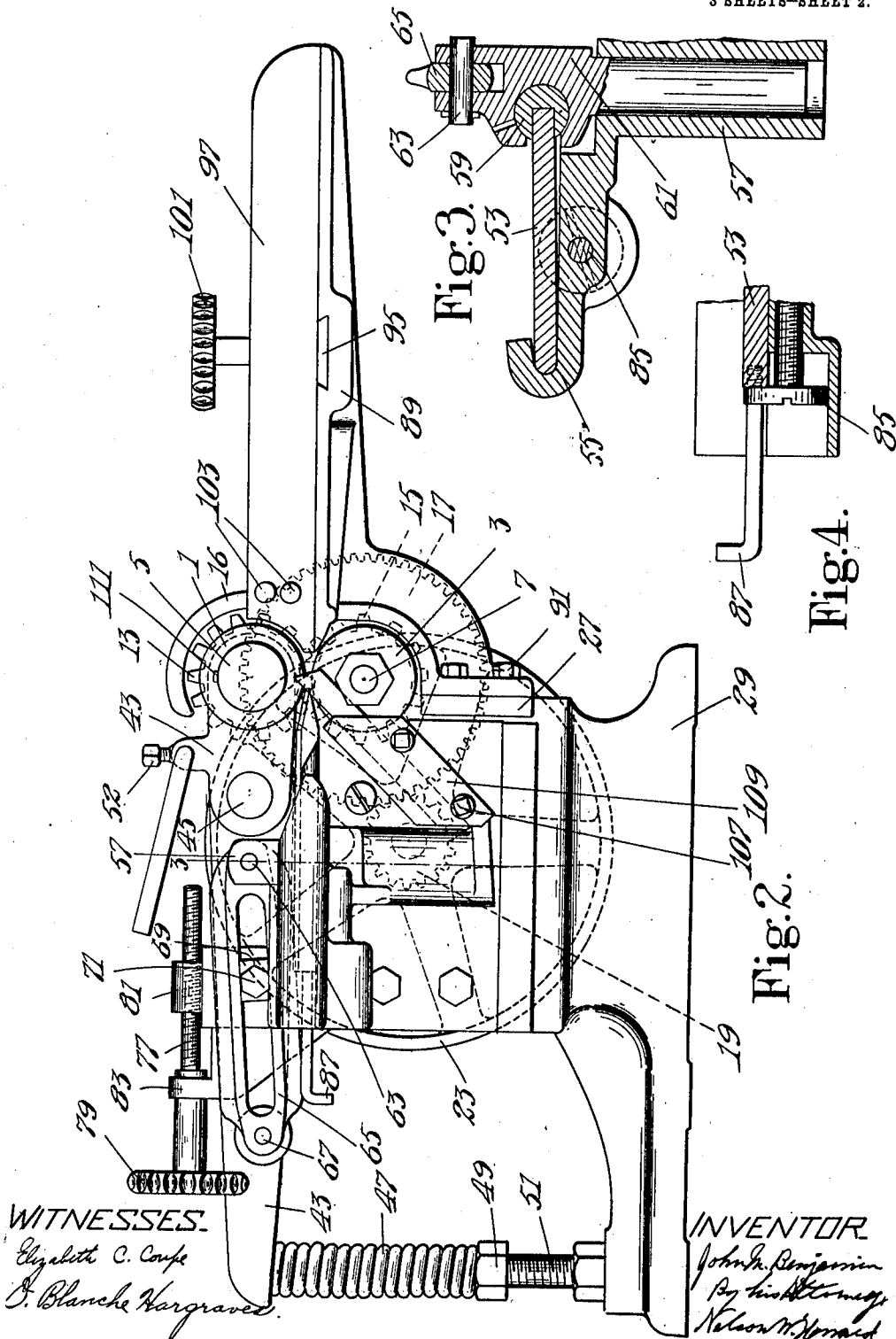
John M. Benjamin
By his Attorney
Nelson & Howard

J. M. BENJAMIN.
SPLITTING MACHINE.
APPLICATION FILED APR. 7, 1911.

1,048,278.

Patented Dec. 24, 1912.

3 SHEETS-SHEET 2.



WITNESSES:
Elizabeth C. Coupe
J. Blanche Hargraves.

INVENTOR
John M. Benjamin
By *Wm. H. H. H. H.*
Nelson W. H. H.

J. M. BENJAMIN.
SPLITTING MACHINE.
APPLICATION FILED APR. 7, 1911.

1,048,278.

Patented Dec. 24, 1912.

3 SHEETS—SHEET 3.

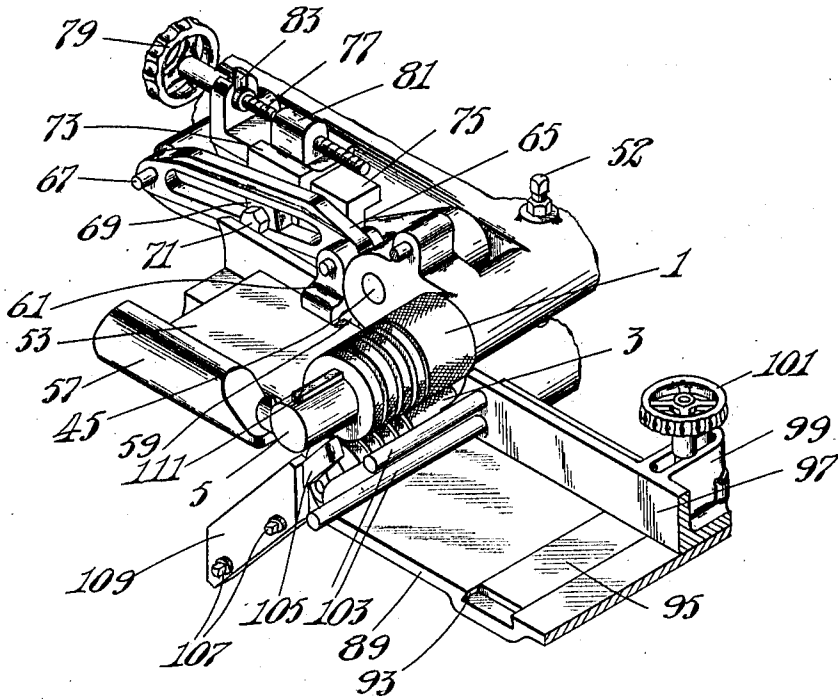


Fig. 5.

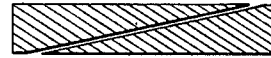


Fig. 7.



Fig. 8.

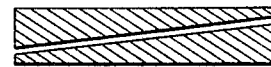


Fig. 9.

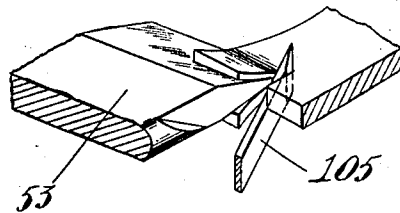


Fig. 6.

WITNESSES.

Elizabeth C. Cook
J. Blanche Hargraves.

INVENTOR.

John M. Benjamin
By his Attorney,
Nelson Howard

UNITED STATES PATENT OFFICE.

JOHN MILTON BENJAMIN, OF BEVERLY, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY COMPANY, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

SPLITTING-MACHINE.

1,048,278.

Specification of Letters Patent.

Patented Dec. 24, 1912.

Application filed April 7, 1911. Serial No. 619,570.

To all whom it may concern:

Be it known that I, JOHN M. BENJAMIN, a citizen of the United States, residing at Beverly, in the county of Essex and State of Massachusetts, have invented certain Improvements in Splitting-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to machines designed for use in the manufacture of boots and shoes and is herein set forth in connection with a machine for cutting from a sheet of leather-board or similar material a strip of desired width and for splitting the strip so cut into two symmetrical portions irrespective of variations in the thickness of the strip.

The particular purpose of the machine is to produce beveled strips from which wedge-shaped heel lifts may subsequently be died out, but it should be understood that the beveled strips may be used for other purposes if desired.

Machines have been known comprising two feed rolls, an angularly movable knife and connecting means between the knife and one of the rolls whereby the angular position of the knife varied with the thickness of the stock passing between the rolls. Such machines, however, have been capable of acting upon strips of a given width only owing to the fact that a given extent of movement of the transversely movable roll produced a predetermined and fixed extent of angular movement of the knife.

Accordingly one feature of the present invention consists in the provision with a plurality of feed rolls, an angularly movable knife, and connecting means between said knife and one of said rolls whereby movement of said last named roll transverse to its axis serves to move said knife angularly, of means for varying the extent of angular movement of the knife which corresponds to a given extent of movement of said roll. In the illustrated embodiment the knife is angularly movable about a fixed axis which passes through the outer corner of the edge, and the inner side of the knife is raised and lowered by means of a lever which in turn is actuated by movement of the bearing of the upper roll, the lever being mounted upon

an adjustable fulcrum, the position of the fulcrum determining the extent of angular movement of the knife which corresponds to a given extent of movement of the bearing of the roll. And preferably the parts are so arranged that the adjustment referred to above serves also to vary the initial angular position of the knife.

When narrow strips are to be operated upon it is necessary to adjust the knife at a considerable angle and in order to provide for such adjustment and at the same time maintain the edge of the knife in close proximity to the bite of the rolls, another feature of the present invention consists in the provision of a construction whereby one of the rolls may be adjusted longitudinally; and in the illustrated embodiment the upper roll is splined to its driving shaft and may be moved longitudinally thereon.

These and other features of the invention including certain details of construction and combinations of parts will be described in connection with the accompanying drawings and pointed out in the appended claims.

Referring now to the accompanying drawings. Figure 1 is a front elevation of a machine in which the present invention is embodied; Fig. 2 is a side elevation; Fig. 3 is a section on line 3 of Fig. 2 showing the mounting of the splitting knife for angular adjustment; Fig. 4 is a detail showing the means for accomplishing longitudinal adjustment of this knife; Fig. 5 is a detail perspective showing the connection between the upper roll and the splitting knife; Fig. 6 is a detail perspective showing the operation of the splitting knife and the severing knife; and Figs. 7, 8 and 9 are cross sections of strips which have been split on this machine.

Referring now more particularly to Fig. 1, the feed rolls shown at 1 and 3 are carried by shafts 5 and 7 which in turn are rotatable in bearings 9 and 11. The shafts have fast to them intermeshing gears 13 and 15 the teeth of which are of sufficient length to permit the shafts 5 and 7 to be separated without interfering with the mesh of the gears. A guard 16 is provided for the protection of the operator. The lower shaft has fast to it a large gear 17 which meshes with a smaller gear 19, this last gear being fast to a stub shaft 21 which is furnished with the usual fast and loose pulleys 23 and

25. For a purpose presently to be described the lower bearing 11 is carried by a member 27 which is adjustably fastened to the frame 29 of the machine by means of bolts 31 which pass through slots 33, and in order to facilitate raising and lowering of the member 27 a wedge 35 is provided upon which it rests, said wedge being slidable upon a portion of the frame 29. A screw 37 provided with a handhold 41 and held from longitudinal movement by means of an ear 39 on the wedge is threaded into the frame.

Referring now more particularly to Figs. 2 and 5, the bearing for the upper roll is provided with an extension 43 pivoted at 45 and normally held in the position shown by a spring 47 which engages with its upper end the under side of the extension 43 and with its lower end a nut 49 threaded upon an upright bolt 51, the nut serving to vary the tension of the spring when desired. As best shown in Fig. 1, a set screw 52 serves to limit the downward movement of the bearing for the upper roll. With the construction thus far described, if the shaft 21 is rotated and a piece of leather-board or other stock is fed to the machine, the upper roll will rise and fall in accordance with any inequalities in the thickness of the stock. The mechanism by which the angular position of the knife is caused to vary with the vertical position of the roll will now be described.

Referring more particularly to Figs. 3 and 5, the knife 53 is rounded at one side as shown at 55 and is held in a correspondingly shaped socket in a bracket 57 which is fast to or integral with the frame of the machine so that the knife is free to be adjusted angularly. The opposite side of the knife is held by a carrier comprising a cylindrical support or holder 59 which is free to move angularly in the correspondingly shaped socket in a plunger 61, the lower part of said plunger being cylindrical and free to move vertically in a bore of the bracket 57. This plunger has formed at its upper end a yoke through the arms of which passes a pivot 63, said pivot also passing through one end of the lever 65 the opposite end of which is pivoted at 67 to the extension 43. This lever is slotted to receive a fulcrum block 69 which is pivotally held by a bolt 71 upon a slide 73, said slide being mounted upon a suitable guide 75 and being adjustable thereon by means of a screw 77. The guide is fast to the frame of the machine, and the screw, which is provided with a handhold 79, is threaded through the projection 81 on the slide 73 and is held from longitudinal movement by means of a yoke 83, as shown. It will now be evident that as the upper roll rises the plunger 61 will rise thereby raising the right hand or inner side of the knife as viewed in Fig. 3, the cylin-

dricul holder or support 59 turning slightly in its socket during the movement, and as the roll is lowered the reverse movement of the knife takes place. It should be noted that the angular movement of the knife takes place about an axis which coincides with a median line through the outer side of the knife and that consequently the outer corner of the cutting edge of the knife remains stationary. The knife is normally held against rearward movement by means of a screw 85 the shank of which is threaded into the bracket 57 while the head engages the rear end of the knife. The knife may be adjusted rearwardly, however, by loosening said screw and moving the knife in the desired direction, a handle 87 being provided to facilitate such movement of the knife.

In order to provide for feeding of the stock, a table 89 is fastened to the member 27 by means of bolts 91. This table is formed with a dove-tailed guideway 93 to receive the slide 95 of a stock guide 97 said guide being provided with a slotted extension 99 through which passes a clamping screw 101 which is threaded into the table 89 and serves to hold the stock guide in adjusted position. Projecting from the stock guide are a plurality of rods 103 to prevent the fingers of the operator from being caught in the rolls. A severing or trimming knife 105 is adjustably held in position by means of bolts 107 and a holder 109; and it will be understood that the distance from the trimming knife to the stock guide determines the width of the strip which will be severed from the sheet of stock.

As has been stated, the present machine is adapted to sever from a sheet of stock a strip of desired width and to split the strip into two symmetrical portions irrespective of its thickness.

With the parts of the machine properly adjusted the operation is as follows: Power having been applied to the shaft 21 a sheet of leather-board or other material is fed to the rolls with its edge in contact with the stock guide 97. A strip is severed from the sheet by the knife 105 and then this strip is split on an angle by the knife 53. If there are any inequalities in the thickness of the strip, the upper spring pressed roll will rise and fall. As the roll rises, the extension 43 is rocked about its pivot 45 thereby rocking the lever 65 about its fulcrum 71 and tilting the knife about its rounded edge 55. As the upper roll falls the reverse movement will take place. These movements maintain the inner corner of the knife at an approximately constant distance from the upper roll. The outer corner, as has been stated, is stationary. Consequently the stock is split into two symmetrical portions, the symmetry being maintained irrespective of va-

riations in the thickness of the strip. As soon as the strip has been severed from the sheet and split in the manner described, the remnant of the sheet is again presented to the machine; and this operation may be repeated until the sheet has been entirely cut up. Let it be supposed that the cut referred to above is the one illustrated in Fig. 7, that the strip is approximately equal in width to the width of the knife and that it is now desired to produce the cut shown in Fig. 8. The lower roll will be lowered until the strip is so positioned that the outer edge of the knife will pass through the lower corner of said strip; and then the handhold 79 will be turned to adjust the fulcrum block 69 forwardly so as to lower the inner portion of the knife to proper position. If it is now desired to produce the cut illustrated in Fig. 9 the roll 3 is lowered still further and the fulcrum block properly adjusted. Thus far, strips have been considered the width of which was equal approximately to the width of the knife. If now the stock guide 97 is adjusted so as to cause the machine to produce a narrow strip, for example, one-half as wide, it will be evident that only the outer half of the knife will be effective and that now the extent of angular movement of the knife which corresponds to a given extent of transverse movement of the roll must be increased in order to cut the strip into two symmetrical portions. The adjustable fulcrum provides for this requirement since the farther the fulcrum is moved to the left, as viewed in Fig. 5, in order to increase the angle at which the knife stands initially, the greater the extent of automatic angular movement which corresponds to a given extent of transverse movement of the roll.

In the present machine the knife 53 is comparatively wide and might therefore come into contact with the upper roll, if the knife were adjusted for narrow strips. The upper roll is accordingly splined to the shaft 5 as indicated at 111 and can be adjusted along said shaft so as to permit the inner side of the knife 53 to be raised sufficiently; and in order that this longitudinal adjustment of the roll may not interfere with the action of the severing knife 105, the roll is provided with a plurality of grooves, as shown, in any one of which the upper portion of said knife may be received. The width of the strip which can be split in the various ways described is therefore limited only by the width of the knife, and any strip of a width less than that of the knife may be operated upon.

Having described the nature of my invention, what I claim as new and desire to secure by Letters Patent of the United States is:—

1. A machine of the class described having, in combination, a plurality of feed rolls

for advancing a strip of stock, an angularly movable knife for acting upon stock so fed, connecting means between said knife and one of said rolls whereby movement of said roll transverse to its axis serves automatically to move said knife angularly, and means for adjusting the initial angular position of said knife, said last-named means serving also to vary the extent of automatic angular movement of said knife.

2. A machine for splitting a strip of stock of a given width into two symmetrical portions irrespective of its thickness comprising a plurality of rolls, a knife mounted for angular movement, connecting means between said knife and one of said rolls whereby movement of said last-named roll serves automatically to tilt said knife, and means for adjusting the initial angular position of said knife to accommodate narrower strips; said adjustment also serving to increase the extent of angular movement of the knife which corresponds to a given extent of movement of the roll.

3. A machine of the class described having, in combination, a plurality of feed rolls, one of said rolls being transversely movable, a knife angularly movable about a fixed axis, a plunger movable transversely of the bite of said rolls, an angularly movable support for said knife mounted in said plunger, and means compelling said plunger to move with said transversely movable roll.

4. A machine of the class described having, in combination, two feed rolls, a rigid bearing for one roll, a yielding bearing for the other roll, an angularly movable knife, means for adjusting the initial angular position of said knife, connecting means between said knife and yielding bearing, and means permitting adjustment of said yielding roll longitudinally.

5. A machine of the class described having, in combination, two feed rolls, a rigid bearing for one roll, a yielding bearing for the other roll, an angularly movable knife, means for adjusting the initial angular position of said knife, connecting means between said knife and yielding bearing, and a fixed knife arranged at an angle to said angularly movable knife, one of said rolls being longitudinally adjustable to provide space for the adjustment of the angularly movable knife and being provided with grooves to receive said fixed knife.

6. A machine of the class described having, in combination, a plurality of feed rolls for advancing a strip of stock of a given width, a comparatively wide knife for acting upon a strip so fed, said knife being angularly movable with respect to the bite of said rolls, connecting means between said knife and one of said rolls whereby the angular position of said knife varies automatically with the thickness of the strip of

stock, and means for adjusting the angular position of the knife to accommodate narrower strips, one of said rolls being longitudinally adjustable to provide space for the adjustment of the knife.

7. A machine of the class described having, in combination, two feed rolls, one of said rolls being transversely movable, an angularly movable knife, connecting means between said knife and one of said rolls whereby the angular position of said knife varies with the distance between said rolls, means for adjusting the initial angular position of said knife, said means serving also to vary the extent of movement of said knife which corresponds to a given extent of movement of said roll, and a fixed knife arranged at an angle to said angularly movable knife, one of said rolls being longitudinally adjustable to provide space for the adjustment of the angularly movable knife.

8. A machine of the class described having, in combination, an angularly adjustable knife, two rotary shafts and feed rolls

mounted upon said shafts, one of said rolls being longitudinally adjustable to permit one end of the knife to extend above the bite of said rolls.

9. A machine of the class described having, in combination, a plurality of cooperating feed rolls, shafts upon which said rolls are mounted, bearings in which said shafts are rotatable, one of said bearings being movable toward and from the other and having an extension, a spring acting upon said extension to force one roll toward the other, a slotted lever pivoted to said extension, a knife, a carrier therefor pivoted to said slotted lever, and a fulcrum for said lever adjustable in said slot.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN MILTON BENJAMIN.

Witnesses:

CHESTER E. ROGERS,
LAURA M. GOODRIDGE.