No. 771,756. PATENTED OCT. 4, 1904.

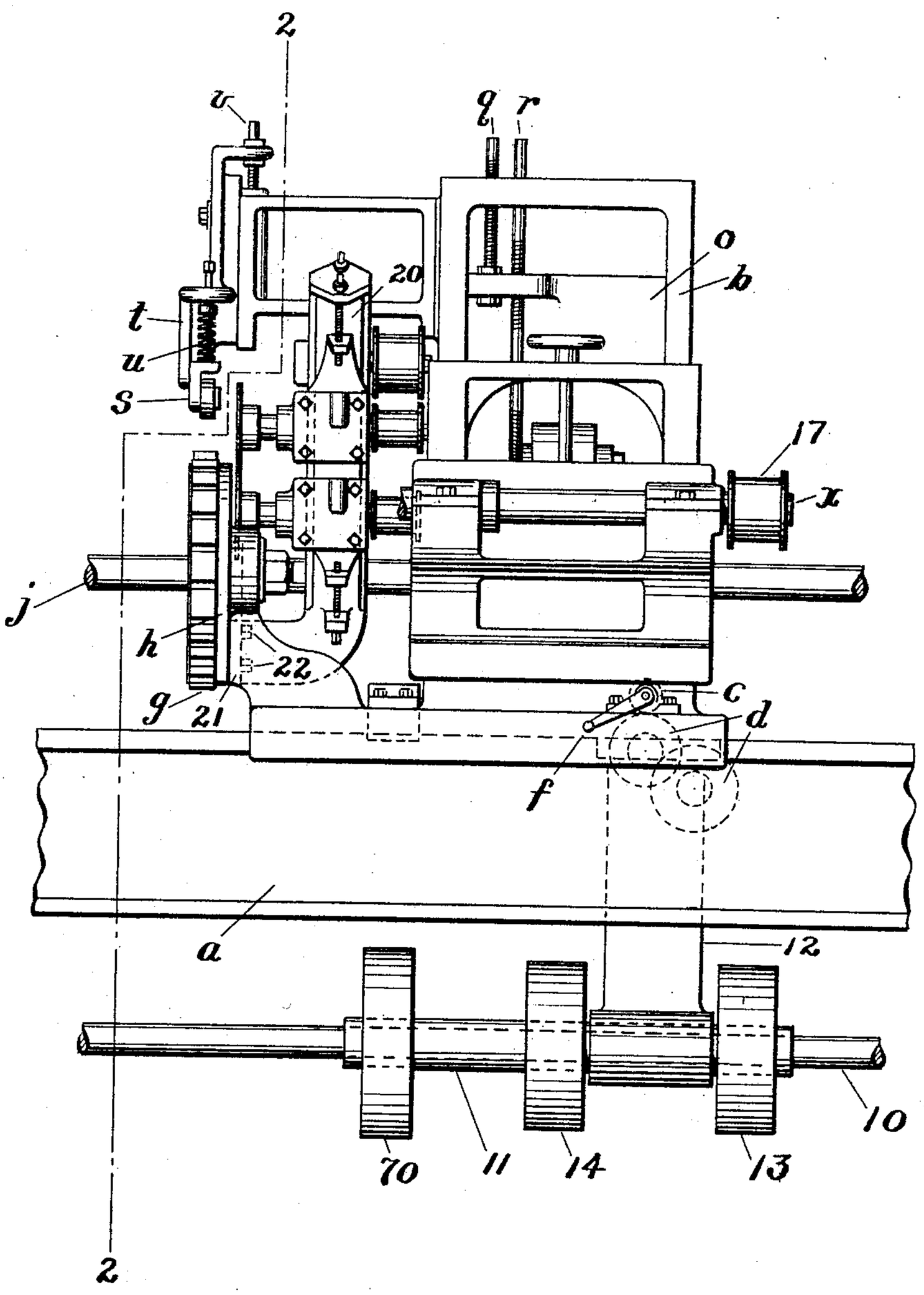
S. F. WISE.

TENONING MACHINE.

APPLICATION FILED JULY 23, 1903.

NO MODEL. 3 SHEETS—SHEET 1.

FIG. 1



WITNESSES:

M. M. Hamilton

M. F. Ellis

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ATTORNEYS

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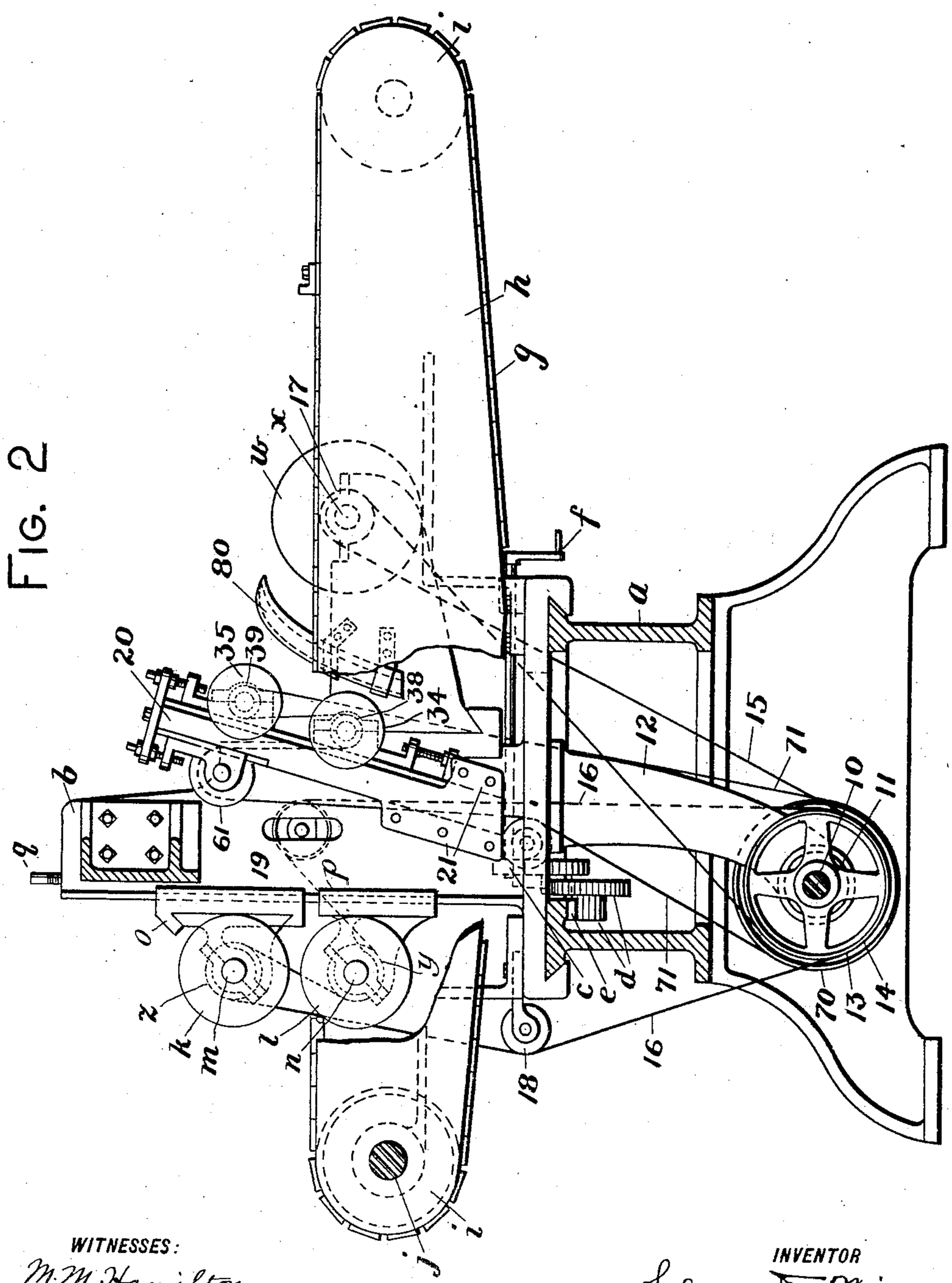
NO MODEL. 3 SHEETS—SHEET 2.

FIG. 2



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NO MODEL. 3 SHEETS—SHEET 3.

FIG. 3

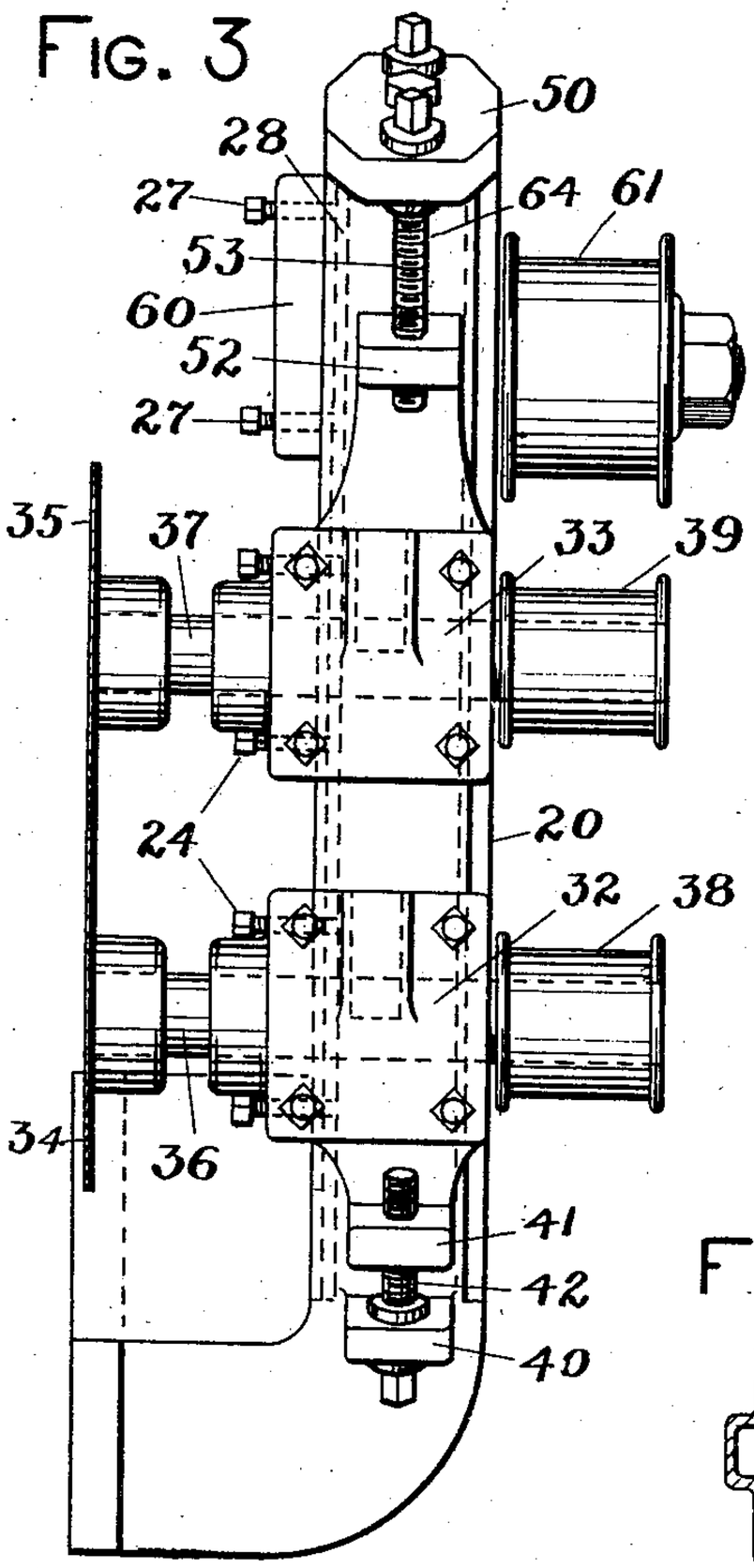


FIG. 4

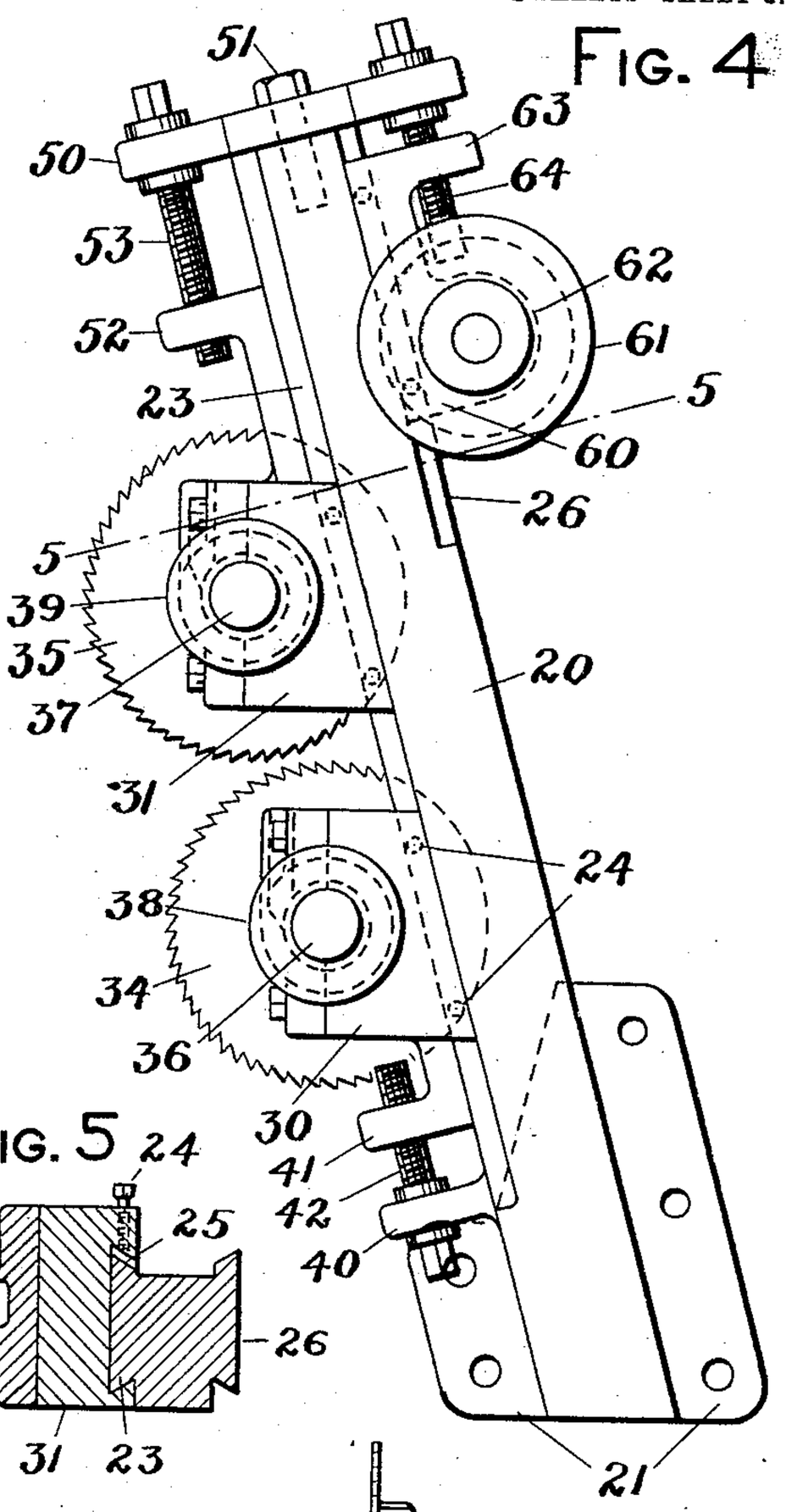


FIG. 5

FIG. 6

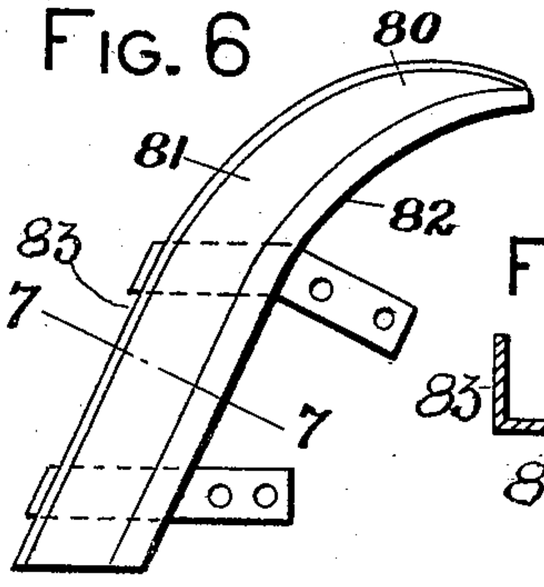


FIG. 7

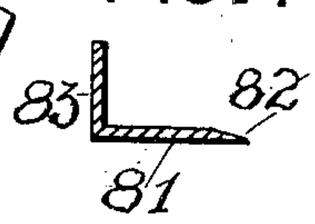
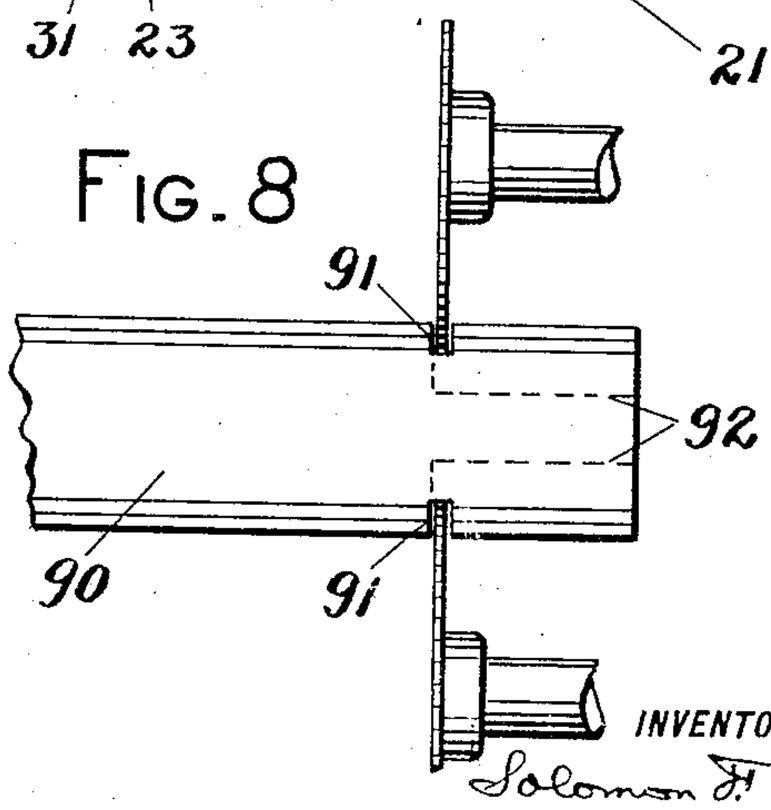


FIG. 8



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UNITED STATES PATENT OFFICE.

SOLOMON F. WISE, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO H. B. SMITH MACHINE COMPANY, OF SMITHVILLE, NEW JERSEY, A CORPORATION OF NEW JERSEY.

TENONING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 771,756, dated October 4, 1904.

Application filed July 23, 1903. Serial No. 166,655. (No model.)

To all whom it may concern:

Be it known that I, SOLOMON F. WISE, a citizen of the United States, residing at Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented a new and useful Improvement in Tenoning-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to tenoning-machines.

In machines of this class the tenons are cut by means of rotating cutters. With veneered stock the work of the cutter is imperfect, as it tends to split the veneered surface and to dislodge small strips or fragments of the veneer immediately adjacent to the tenon that it cuts. When the stock is ultimately worked into the finished product, the veneered surface is imperfect along the lines of junction with the pieces that are set into the tenons.

The object of my invention is to enable a tenon to be cut and still maintain the veneered surface perfect and intact up to the inner edge of the tenon.

My invention consists in a construction wherein preliminarily to the cutting of the tenon by the cutter a scoring-saw is caused to cut into the stock along a line substantially coincident with the inner edge of the tenon to be cut to a distance preferably slightly deeper than the thickness of the veneer.

The invention also consists in certain features and details of construction of these saws and their supporting-frames and actuating parts and in certain features and details of arrangement thereof with relation to the other parts of the machine.

In the drawings, Figure 1 is a front view of the machine. Fig. 2 is a section on line 2 2 of Fig. 1. Fig. 3 is a front view, and Fig. 4 a side view, of the scoring attachment. Fig. 5 is a section on line 5 5 of Fig. 4. Fig. 6 is a side view, of the deflector. Fig. 7 is a section on line 7 7 of Fig. 6. Fig. 8 is a view illustrating the action of the scoring-saws on the stock.

I have shown in the drawings only that portion of the machine which works upon one end of the stock, it being understood that in a double-end tenoning-machine for working upon both ends of the stock the sliding frame and the parts carried thereby are duplicated, the second frame, however, not ordinarily being slidable.

The machine to which the invention is applied will first be generally described, and thereafter the added construction embodying my invention will be more particularly described.

a is the main bed of the machine.

b is the sliding frame, carrying all the operative parts. Turnable in bearings in the sliding frame is a gear-wheel *c*, meshing, through intermediate gearing *d*, with a rack *e* on the main frame.

f is a crank secured to the shaft of the gear *c*. By turning the gear the sliding frame is longitudinally adjusted along the ways of the main bed.

The feeding mechanism consists of an endless chain *g*, extending around the plate *h* and engaging sprocket-wheels *i i*, one of which is on the feed-shaft *j*, which is driven from any appropriate source of power.

The cutter-heads *k l* are secured to the spindles *m n*, respectively, which rotate in bearings in the saddles *o p*, respectively, which are vertically adjustable on the sliding frame by means of screws *q* and *r* to accommodate them to different depths of tenon and different thicknesses of stock.

The presser-bar *s* is movably attached to the upright *t*. *u* represents springs confined between the presser-bar and a flange on the upright and the presser-bar. Thus the presser-bar is held with yielding pressure against the stock fed by the chain *g*. *v* is a screw for vertically adjusting the upright *t*.

The cut-off saw *w* is secured to the shaft *x*, which rotates in bearings in the sliding frame.

10 is the main driving-shaft. Splined on the driving-shaft, so as to rotate therewith, but be longitudinally movable thereon, is a sleeve 11 in bearings in a bracket 12, depending from the sliding frame. Thus as the

sliding frame is adjustable longitudinally the sleeve moves with it.

13 and 14 are pulleys on the sleeve 11.

17 is a pulley on the saw-shaft *x*.

z y are pulleys on the cutter-head spindles *m n*, respectively.

15 is a belt extending around pulleys 13 and 17.

16 is a belt connecting pulley 14 with pulleys *y* and *z* and passing around the idlers 18 and 19. Thus the cut-off saw and the cutter-heads are driven.

The foregoing description is applicable to a well-known type of tenoning-machine.

The attachments embodying my invention will now be described.

20 is an inclined bar having ears 21, through which and the plate *h* extend bolts 22, whereby the bar is secured to the frame. The bar 20 is provided with a longitudinally-extending projection 23, having inclined edges. Slides 30 and 31, having longitudinally-extending recesses adapted to the projection 23, are movable along the bar.

24 represents set-screws extending through the slides and engaging the gibs 25, extending along the inclined edges of the projection 23.

32 33 are journal-boxes secured to or integral with the slides 30 31, respectively. The slides 30 31 and journals 32 33 constitute the scoring-saw frames.

34 35 are respectively the lower and upper scoring-saws, whose spindles 36 37 rotate in the bearings 32 33.

38 39 are pulleys on the spindles 36 37.

40 is a lug secured to the bar 20.

41 is a lug secured to the slide 30.

42 is a screw extending through the lug 40 and in screw-threaded engagement with the lug 41. By means of this screw the lower saw-bearing may be moved up and down along the bar.

50 is a cap secured by bolt 51 to the top of bar 20.

52 is a lug secured to slide 31.

53 is a screw extending through the cap 50 and in screw-threaded engagement with the lug 52. By means of this screw the upper saw-bearing may be moved up and down along the bar.

The bar 20, on the other side and at its upper end, is provided with a longitudinally-extending projection 26. A slide 60, having a longitudinally-extending recess adapted to the projection 26, is movable along the upper end of the bar, and set-screw 27 extends through the slide and engages the gib 28, extending along the inclined edge of the projection 26.

61 is an idler-pulley in a bearing 62, secured to or integral with slide 60. The slide 62 is provided with a projection 63, having a screw-threaded orifice engaged by a screw 64, which extends through the cap 50. By means of this screw the pulley 61 is adjustable.

70 is a pulley on the sleeve 11. 71 is a belt extending over pulley 70, pulleys 38 and 39, and idler-pulley 61. When the scoring-saws are adjusted, the idler-pulley 61 will also be adjusted, so as to maintain the proper tension on the driving-belt 71.

80 is a deflector bolted to the plate *h* and located in advance of the saws 34 35 and to the rear of the cut-off saw *w*. This deflector consists of a forwardly-extending spreading portion 81, provided with a knife-edge 82 and in alinement with the cut-off saw, and a deflecting portion 83, extending outwardly from the spreading portion, the deflector as a whole extending longitudinally in a rearward and downward direction. The function of the deflector in addition to spreading the stock cut off after the manner of an ordinary kerf-spreader is to deflect such cut-off portion downwardly and break it off.

The operation of the machine is as follows: The sliding frame, cutter-heads, presser-bar, and cut-off saw are all adjusted according to the length of the stock to be tenoned, the thickness of the stock, and the length and depth of the tenon. The relative lateral adjustments of the scoring-saws and cutter-heads are such that the saws will be in a vertical plane coincident, or nearly so, with the inner edges of the cutters. The upper saw is adjusted vertically, so that its lower edge is somewhat above the level of the lower edge of the upper cutter—in other words, adjusted to such height that when the stock passes beneath it it will score the same on its upper surface to a depth preferably slightly exceeding the thickness of the veneer. Similarly the lower saw is adjusted vertically, so that its upper edge is somewhat below the level of the upper edge of the lower cutter, so that when the stock passes over it it will score the same on its lower surface to a depth slightly exceeding the thickness of the veneer. With the machine so adjusted the stock is fed forwardly by the chain, being first cut off to the required length by the cut-off saw, the several pieces being guided by the deflector 80 to the floor along a line away from the working parts of the machine. The stock next passes between the scoring-saws, being scored, as before stated, to a depth slightly exceeding the thickness of the veneer, as shown in Fig. 8. Thereafter it travels between the cutters, by which the tenons are cut, as shown in dotted lines, Fig. 8. The tenon extends, as shown, from the scored groove to the end of the stock as it has been severed by the cut-off saw. In said Fig. 8, 90 represents the stock, 91 the grooves scored therein, and the dotted lines 92 the subsequently formed tenons.

Tenons formed by the foregoing method present a perfectly sharp edge along the line of junction between the inner wall of the tenon and the veneered surface of the stock.

My invention is not limited in its application to stock having a veneered finish, al-

though its utility and advantage are more pronounced with stock of this character; nor is my invention limited to the details of construction shown, as it is obvious that these details may be modified without departure from the essential features of the invention.

When a tenon is to be formed only on one face of the stock, one of the scoring-saws, as well as one of the cutters, may be adjusted out of the line of travel of the stock or they may be omitted. My invention will be of more general application to a double-end tenoning-machine capable of forming tenons at both ends, as well as on both faces, of the stock, in which application a stationary frame similar to frame *b* and equipped with a cut-off saw, presser-bar, cutters, scoring-saws, and deflector similar to those carried by frame *b* will be secured to the main bed, as is well understood in the art.

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

1. In a tenoning-machine, the combination, with a tenon-cutter for cutting the tenon, of a scoring-saw located in advance of the tenon-cutter and adapted to score the stock on a line substantially coincident with the inner wall of the tenon to be formed, said tenon-cutter and scoring-saw being rotatable on separate parallel horizontal axes, and means to adjust said scoring-saw up and down whereby the scoring-saw may be arranged to score the stock to a less depth than the tenon to be formed, substantially as described.

2. In a tenoning-machine, the combination, with a tenon-cutter for cutting the tenon and a cut-off saw for cutting off the stock to the required length, of a scoring-saw located between the cut-off saw and the cutter and adapted to score the stock on a line substantially coincident with the inner wall of the tenon to be formed, said tenon-cutter and scoring-saw being rotatable on separate parallel axes, substantially as described.

3. In a tenoning-machine, the combination, with a pair of tenon-cutters rotatable on a horizontal axis, and a cut-off saw for sawing off the stock to the required length, of a pair of scoring-saws also rotatable on a horizontal axis, and located between the cut-off saw and the pair of tenon-cutters and adapted to score the stock on a line substantially coincident with the inner wall of the tenons to be formed, substantially as described.

4. In a tenoning-machine, the combination, with a cut-off saw near the front of the machine, of a deflector arranged in rear thereof, said deflector having a forwardly-extending spreading portion in substantial alinement with the cut-off saw and an inclined deflecting portion extending outwardly from the spreading portion, the longitudinal extension of said spreading and deflecting portions being in a rearward and downward direction, substantially as described.

5. In a tenoning-machine, in combination, an upright bar, a longitudinally-extending projection along each side thereof, saw-frames, each consisting of a slide and a bearing, a spindle rotatable in each bearing, a saw and a pulley secured to each spindle, said slides each having a longitudinally-extending recess adapted to one of the said projections on the bar, means for adjusting each saw-frame along said bar, an idler-pulley frame having a longitudinally-extending recess adapted to the other of said projections, an idler-pulley rotatable in a bearing in said idler-pulley frame, means for adjusting said idler-pulley frame along said bar, a belt passing over the saw-pulleys and the idler-pulley, and means for driving said belt.

6. In a tenoning-machine, in combination, an upright bar, a saw-frame slidable along said bar, a bearing on said frame, a spindle rotatable in said bearing, a scoring-saw and a pulley on said spindle, an idler-pulley frame slidable along said bar, a bearing on said idler-pulley frame, a pulley rotatable in the last-named bearing, a cap secured to the end of said bar, a lug on said saw-frame, a lug on said idler-pulley frame, adjusting-screws extending through said cap, one of said screws engaging one lug and the other of said screws engaging the other lug, a belt extending over said pulleys, and means for driving said belt.

In testimony of which invention I have hereunto set my hand, at Philadelphia, on this 22d day of July, 1903.

SOLOMON F. WISE.

Witnesses:
M. M. HAMILTON,
M. F. ELLIS.