

No. 842,676.

PATENTED JAN. 29, 1907.

O. LAVALLEE
LENS GRINDING MACHINE.

APPLICATION FILED SEPT. 28, 1906.

3 SHEETS—SHEET 1.

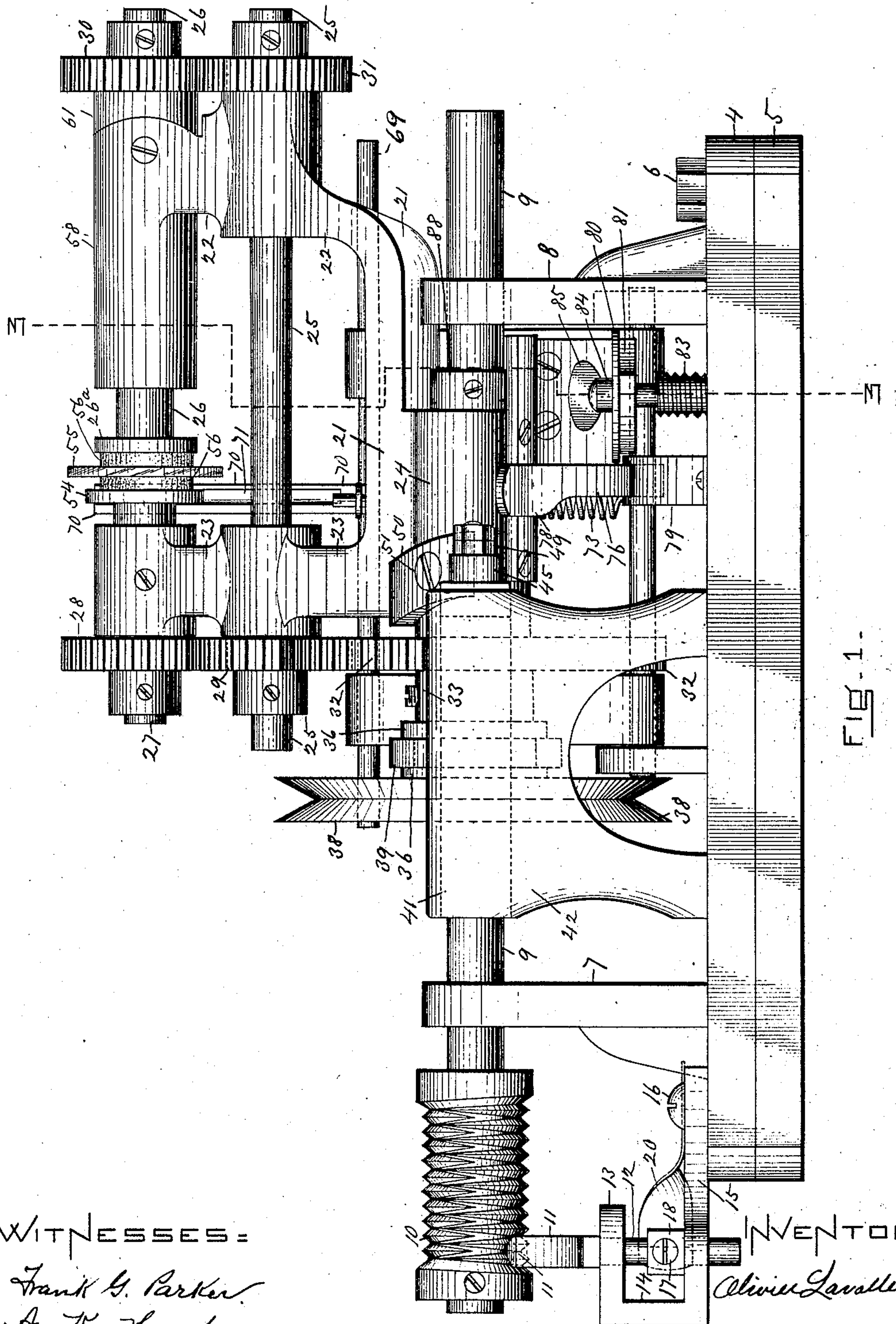


FIG. 1.

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By his Atty.

Springer

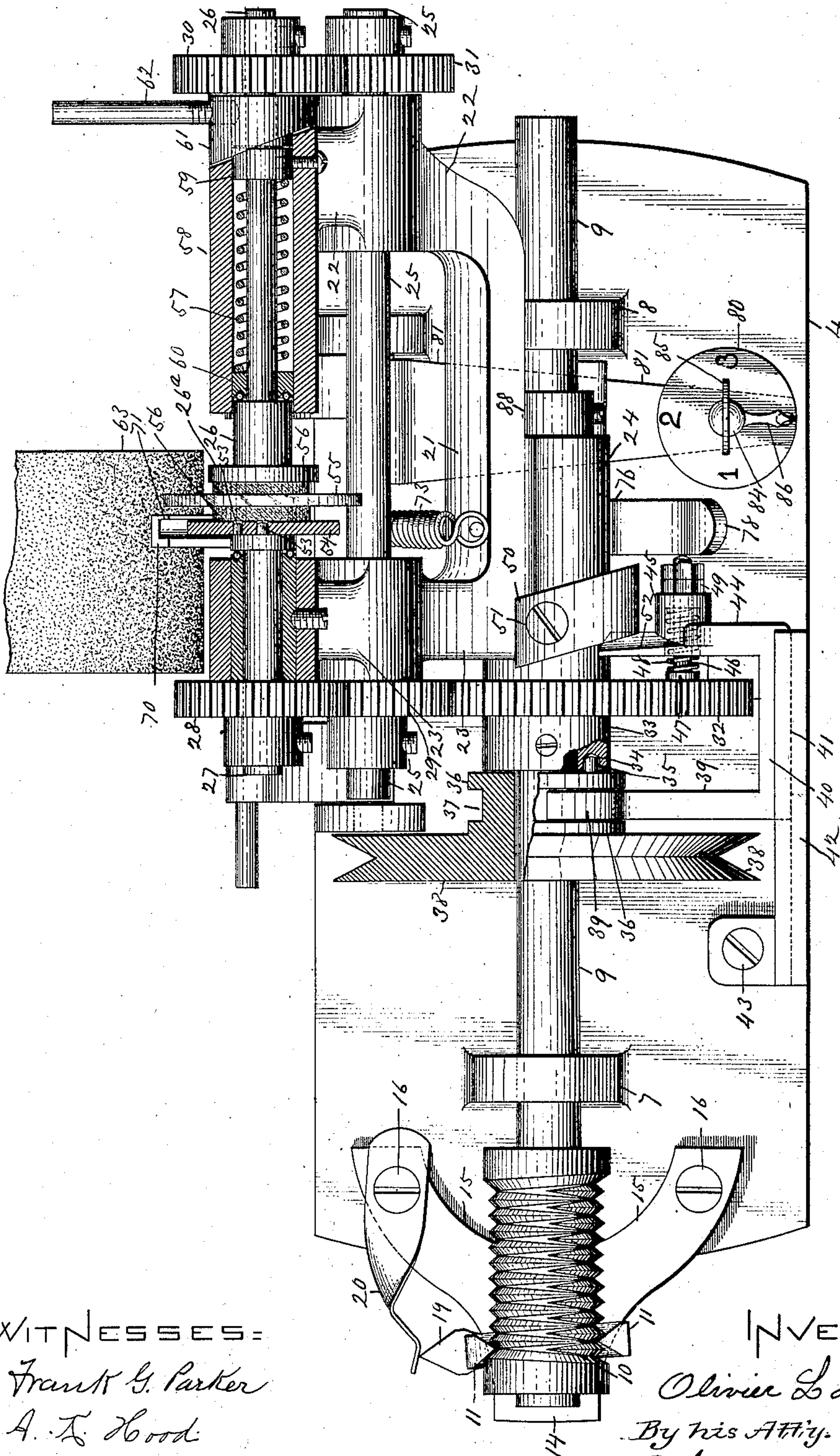
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3 SHEETS—SHEET 3.

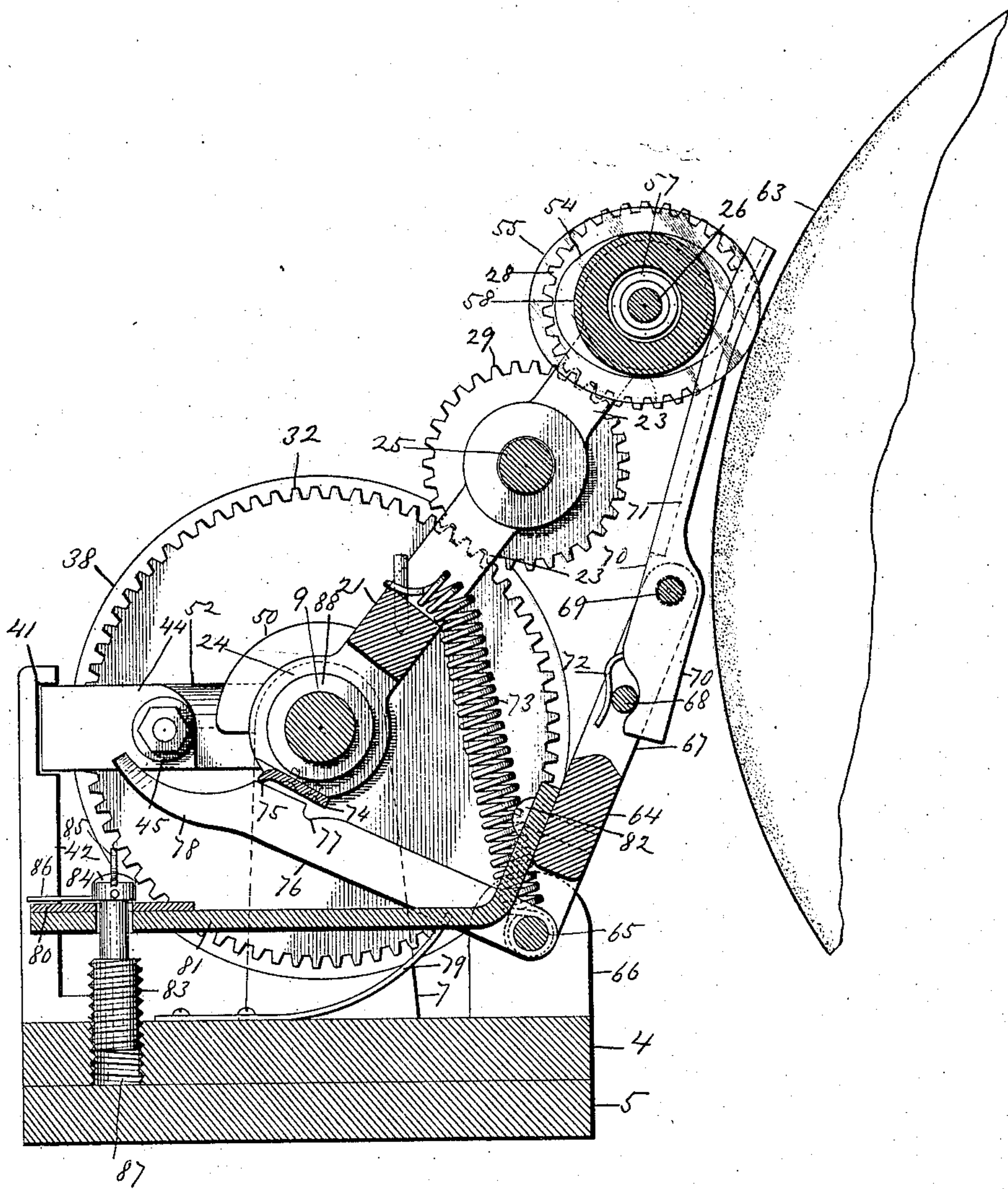


FIG. 3.

WITNESSES=

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UNITED STATES PATENT OFFICE.

OLIVIER LAVALLÉE, OF BOSTON MASSACHUSETTS.

LENS-GRINDING MACHINE.

No. 842,676.

Specification of Letters Patent.

Patented Jan. 29, 1907.

Application filed September 28, 1906. Serial No. 336,581.

To all whom it may concern:

Be it known that I, OLIVIER LAVALLÉE, a citizen of the United States, residing in Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Lens-Grinding Machines, of which the following is a specification.

This invention relates to a machine for grinding the edges of optical lenses whereby the desired shape—such as round, elliptical, &c.—is produced and the lens ground to a particular size.

The general object of this invention or improvement is to produce a lens-grinding machine which will be less expensive than those now in common use; and other objects of the invention consist in providing in a relatively inexpensive machine improved mechanisms for horizontally reciprocating the lens across the edge of the grindstone instead of reciprocating the stone across the edge of the lens, for regulating the size of the lens in connection with the mechanism for grinding across the edge of the stone, for holding or guiding the pattern, and for improving the efficiency of the machine, all as hereinafter described, illustrated in the accompanying drawings, and pointed out in the claims.

In the drawings, Figure 1 is a front elevation of a machine embodying my invention. Fig. 2 is a plan view of the same with portions shown in section and a small portion broken out. Fig. 3 is a section taken on line 3 3, Fig. 1. In all the figures a lens is shown in position to be ground, and in Figs. 1 and 3 a portion of a grinding-wheel is represented.

Similar numerals of reference indicate corresponding parts.

On a bed 4, adjustably secured to a base-plate 5 by means of suitable bolts 6, are mounted standards 7 and 8, which are provided with bearings for a horizontal shaft 9. This shaft has rigidly secured to it at one end a feed-screw 10, having interlacing right and left threads engaged on the under side by a curved pointer 11, which is integral with a vertical shank 12; extending through the U-shaped frame comprising the upper horizontal portion 13, the vertical portion 14, and the lower horizontal yoke-shaped portion 15,

which is secured at 16 to the bed 4. This pointer is adjustably held at the elevation required to hold it in engagement with the thread of the feed-screw by means of a set-screw 17, which extends through the hub 18 of a pawl 19. This hub 18 surrounds the shank 12 and rests on said portion 15; and the outer end of the pawl 19 is pressed by the free end of a spring 20, whose opposite end is secured to the yoke-shaped portion 15, and thus the pawl and hub are prevented from rotation on the shank 12, and the pointer 11 is held in line with the screw-thread.

Supported by the shaft 9 is a frame 21. This frame is of bifurcated or yoke shape and comprises two arms 22 and 23. The lower portion of the frame has integral with it a horizontally-bored extension 24, which surrounds non-rigidly the shaft 9 and is oscillated thereon. The arms 22 and 23 are provided with bearings for a horizontal shaft 25, and near their upper ends they are provided, respectively, with bearings for the shafts 26 and 27, the operation of which is described below. Rigid on the shaft 27 is a gear-wheel 28, which is engaged by a gear-wheel 29, rigid on the shaft 25, and rigid on the shaft 26 is a gear-wheel 30, which is engaged by a gear-wheel 31, which is rigid on the opposite end of the shaft 25 from the gear-wheel 29. These four gear-wheels 28, 29, 30, and 31, are of the same diameter and have the same number of teeth. The gear-wheel 29 is engaged by the large gear-wheel 32, rigid on the shaft 9, and this gear-wheel 32 is provided with an extended hub 33, which is horizontally bored at 34 to receive a pin 35, which extends from the extended hub 36 of the grooved pulley 38, which is normally idle on the shaft 9. The extended hub 36 is provided with an annular groove 37, which is engaged by the yoke 39, extending from and integral with the slide 40, which is adapted to move horizontally in the slideway or groove 41, formed in the rear or inner surface of the vertical plate 42, which is bolted at 43 to the bed 4. Thus the two parts 33 and 36 constitute the two members of a clutch which by means of the yoke 39 are moved into engagement, whereby when motion is imparted to the driving-wheel 38 it is transmitted to the gear-wheel 32 and thence to the shaft 9, gear-

wheels 28, 29, 30, and 31 and shafts 25, 26, and 27. The slide 40 is provided at the end opposite from the yoke 39 with an inwardly-projecting arm 44, provided with a bored extension 45, supporting a pin 46, provided with the head 47, which bears against the face of the gear-wheel 32. A spring 48 surrounds the pin 46 between the head 47 and the arm 44 and holds said arm normally with its extension 45 against a nut 49 on the opposite end of the pin 46. Thus the slide 40 and yoke 39 are held normally toward the right and the pin 35 is held normally in the recess 34, thus keeping the two members of the clutch in engagement. A cam 50 is secured at 51 to the portion 24 of the swinging frame 21, and the arm 44 is provided with an extension 52, which is held against the cam by the spring 48. When the frame is in working position—that is, swung rearward and in the position indicated in the drawings—the spring holds the extension 52 against the lower portion of the edge of the cam and holds the members of the clutch in engagement. When the frame is swung forward out of its working position, the cam moves the extension 52, and consequently the entire slide 40 39 44, toward the left against the power of the spring 48 and by means of the yoke portion 39 moves the clutch member 36 out of engagement with the member 33, thus causing the pulley 38 to run idly.

The shaft 27, which is directly driven by the gear 28, is provided on its inner ends with horizontal pins 53 for supporting or holding the pattern 54, and the shaft 26, which is directly driven by the gear-wheel 30, is provided on its inner end with a disk or head 26^a, and the lens 55 to be ground is held between two friction-cushions 56 by means of a spiral spring 57, which surrounds the shaft 26 within the tubular portion 58, said spring lying between the sleeve 59 and the ring 60. The outer end of the tubular portion 58 is beveled off, whereby it is in engagement with a cam 61, which surrounds the shaft between the beveled end of the portion 58 and the gear 30. The cam 61 is provided with a suitable lever or handle 62, whereby it can be rotated and the shaft thereby withdrawn into the portion 58 for applying and removing the lens 55 and the pattern 54. This method of holding the lens and pattern as the former is ground and for withdrawing the same is not broadly new in this invention.

63 represents the grindstone, which is not adapted to reciprocate horizontally, but rotates on a single plane.

64 represents a rearwardly-inclined frame which is adapted to swing on a shaft 65, supported by suitable ears 66, which are mounted on the bed 4 behind the swinging frame 21. This frame 64 is provided with upwardly-extending arms 67, which support a

horizontal guide-rod 68, and above the guide-rod a shaft 69, which is adapted to be reciprocated horizontally in the arm 67. Mounted on the shaft 69 is a pattern-holder 70, which extends upward and is adapted to be moved horizontally by means of said shaft until a vertical groove 71 in its front surface receives the edge of the pattern, as indicated in the drawings. This grooved holder is prevented from swinging toward or from the frame 21 by means of a wire or foot 72, which extends in front of the rod 68, while the lower end of the main portion extends behind the rod.

A spring 73 connects the frame 21 with the stationary shaft or rod 65, whereby said frame is held normally rearward, the pattern 54 extending into the groove 71 in the pattern-holder 70.

The under side of the portion 24 of the frame 21 has screwed to it a plate 74, whose forward end is provided with a downward-extending lip 75. A latch 76 swings at its rear end from the shaft or rod 65 and is provided on its upper surface with a notch 77. The forward end of the latch is extended into a handle or thumb-piece 78. This latch is held normally in the raised position illustrated against the lip 75 by a spring 79, which extends up from the bed 4 against the under side of the latch. Swinging the frame 21 forward not only causes the cam 50 to open the clutch and stop the machine, but brings the notch 77 in the latch in engagement with the lip 75 and locks the frame in its forward position.

80 represents a disk or dial suitably inscribed, preferably with figures indicating millimeters, said dial being rigidly mounted on the upper side of the front end of the arm or lever 81, whose rear end is bolted at 82 to the lower portion of the pattern-holder 70. A screw 83 is provided with a plain upper end which extends through corresponding openings in the arm 81 and dial 80 and is provided with a head 84, having a thumb-piece 85. A pointer 86 extends from this head 84 radially over the surface of the dial, and the threaded end of the screw turns in the suitably-threaded opening 87 in the bed 4. By rotating this screw by means of the handle 85 the upper end of the pattern-holder is swung forward or rearward, as desired.

In practical operation when the lens is to be ground to a particular size and shape the frame 21 23 is swung forward and locked, as above described, in such forward position by the latch 76. The proper pattern 54 is then applied by means of the pins 53, as shown, and the lens applied in position by swinging up the handle or lever 62, thus withdrawing the shaft 26, whereby the lens 55 may be placed between cushions 56, and the cushions and lens inserted between the disk or head

26^a on the inner end of the shaft 26 and the pattern 54 and held in such position by releasing the lever 62. The pointer 86 is then moved by rotating the handle 85 until it points to the number of millimeters indicating the amount in thickness from the edge of the lens desired to be moved. This operation having, by means of a screw 83, swung the pattern-holder 70 into the desired position, the swinging frame 21 23 is released by pressing down the latch 76, and the spring 73 forces said frame back until the pattern 54 enters the groove 71 in the pattern-holder, and the edge of the lens 55 comes in contact with the grindstone 63 and is held in such contact by the power of the spring 73. At the same time the cam 50 releases the open clutch mechanism and the spring 48 closes it, so that its members 36 and 33 are in engagement, and the lens is rotated with its edge against the grindstone until a sufficient amount of the edge is ground off to enable the pattern to reach the bottom of the groove 71, as indicated in Fig. 3. During this grinding process the frame 21 23, with its gear-wheels 28 29 30 31, the gear-wheel 32, the driving-wheel 38, and the clutch mechanism are reciprocated horizontally with the horizontal reciprocation of the shaft 9, produced by the interlacing right and left thread feed-screw, so that the lens traverses the width of the edge of the grindstone, such width being substantially equal to the length of said screw. At the same time the pattern-holder and pattern reciprocate horizontally with the reciprocation of the frame, such reciprocation being made possible by the pattern-holder being made rigid on the guide-rod 69, which slips in the frame 64. The communication of the horizontal reciprocating movement of the shaft 9 to the frame 21 and 23 and its connections and the driving-wheel 38 is made possible and produced by the slide 40, which engages, by means of the yoke 39, the clutch member 36, and a collar 88, which is rigid on the shaft 9, whereby the portion 24 of the swinging frame and the gear-wheel 32 are held on the shaft between said collar and yoke.

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

1. In a machine of the character described, a driving-shaft, means for longitudinally reciprocating said shaft, a swinging frame on said shaft adapted to be reciprocated longitudinally thereby said frame being provided with means for holding the shafts which rotate the lens and the pattern, a pattern-holder located intermediate of the edge of the pattern and the grindstone and adapted to be reciprocated with the pattern as said lens traverses the edge of the grindstone, means for holding the swinging frame with the edge

of the lens bearing against the grindstone, means for holding the swinging frame forward away from the grindstone, mechanism for transmitting motion from the driving-shaft to the shafts for rotating the lens and pattern, clutch mechanism intermediate of said transmitting mechanism and the driving-shaft, and mechanism for closing or bringing into engagement the clutch mechanism when the swinging frame is moved toward the grindstone and for opening or disengaging said clutch mechanism when the swinging frame is moved forward away from the grindstone.

2. In a machine of the character described, a screw having interlacing right and left threads rigid on said shaft whereby longitudinal reciprocation is imparted to the shaft, a swinging frame on said shaft and adapted to be reciprocated longitudinally thereby, shafts mounted in said frame for rotating the lens and pattern, mechanism intermediate of the driving-shaft and the lens and pattern-shafts for imparting rotation to the lens and pattern, a driving-wheel loose on the driving-shaft, clutch members rigid respectively with said driving-wheel and with the main driving-gear of the mechanism intermediate of the driving-shaft and the lens and pattern-shafts, a slide supported by the bed of the machine and provided with an arm which engages the clutch member which is rigid with the driving-wheel, a second arm extending from the slide toward the swinging frame, and a cam on the swinging frame and in engagement with said second arm whereby as the swinging frame is swung forward the clutch is opened and the machine allowed to stop.

3. In a machine of the character described, a swinging frame, shafts mounted in said frame for rotating the lens and the pattern, mechanism for longitudinally reciprocating said frame whereby the lens is reciprocated across the edge of the grindstone, a frame located between the swinging frame and the grindstone, a grooved pattern-holder supported by said frame and extending up therefrom between the pattern and the grindstone and adapted to receive in its groove the edge of the pattern, and means whereby the grooved pattern-holder is allowed to be reciprocated by the pattern while in engagement therewith.

4. In a machine of the character described, a swinging frame, shafts mounted in said frame for rotating the lens and the pattern, mechanism for longitudinally reciprocating said frame whereby the lens is reciprocated across the edge of the grindstone, a frame located between the swinging frame and the grindstone, a grooved pattern-holder supported by said frame and extending up therefrom between the pattern and the grindstone

and adapted to receive in its groove the edge of the pattern, a lip extending from the swinging frame, and a swinging latch extending from the pattern-holder frame and adapted to engage with the lip when the swinging frame is swung forward and hold it in such forward position.

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

OLIVIER LAVALLÉE.

Witnesses:

ARTHUR CARROLL,
A. K. HOOD.