

C. O. LUCE.

Machines for Lettering and Carving Stone.

No. 153,836.

Patented Aug. 4, 1874.

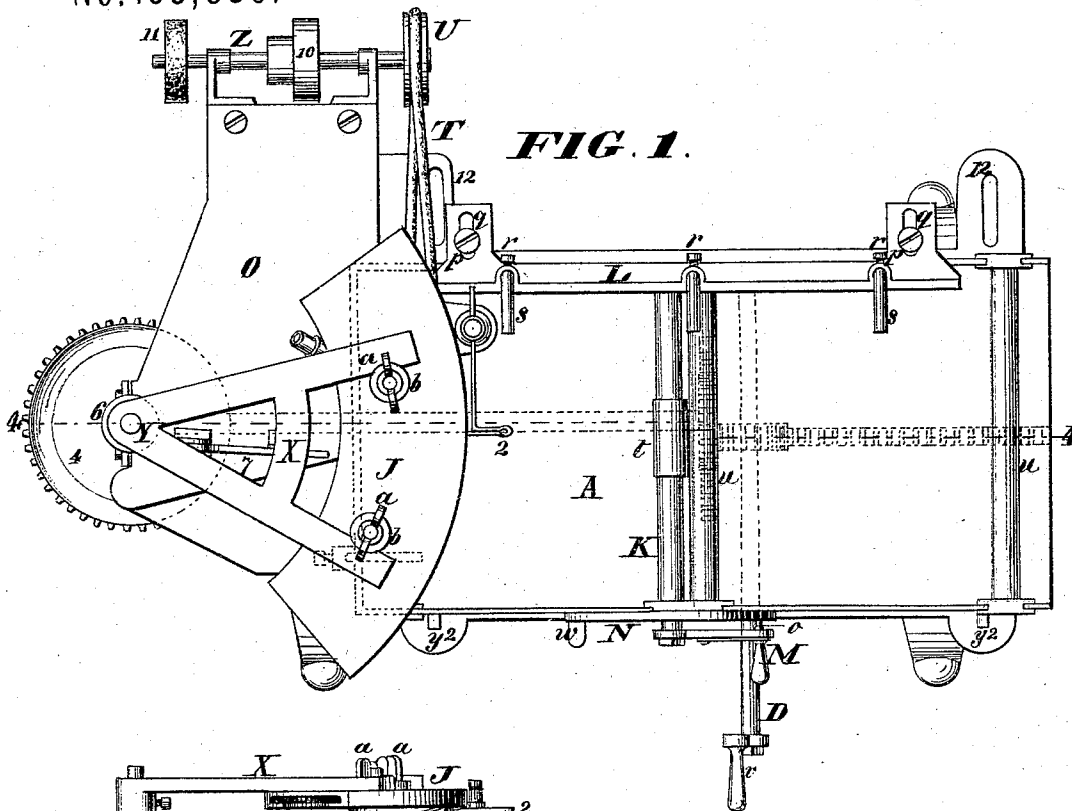


FIG. 1.

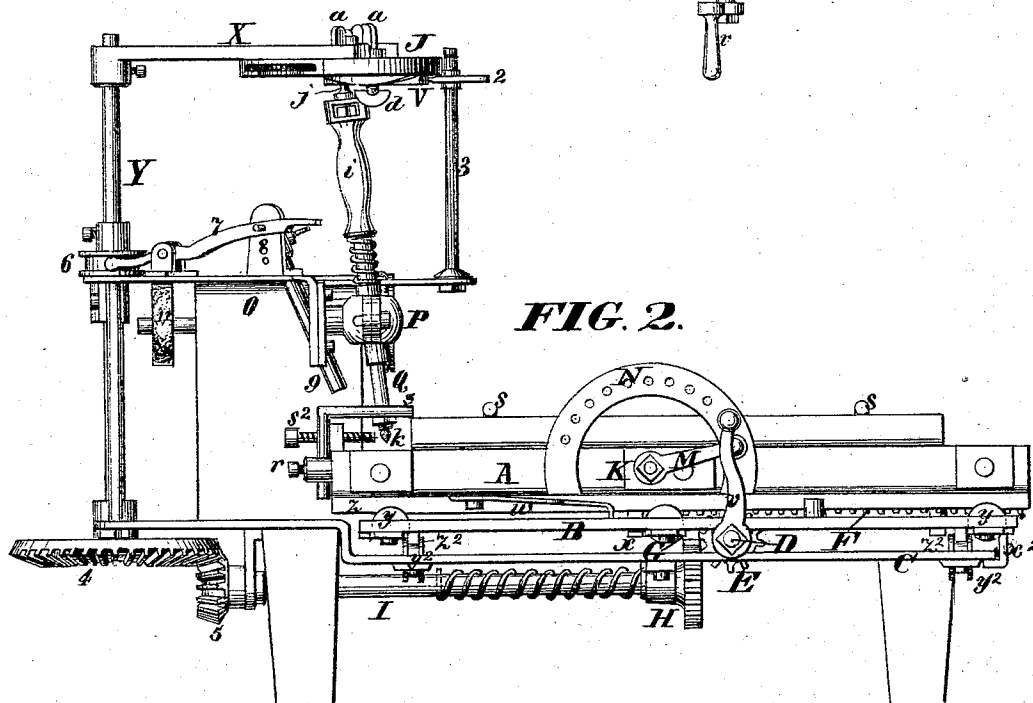


FIG. 2.

WITNESSES

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FIG. 3.

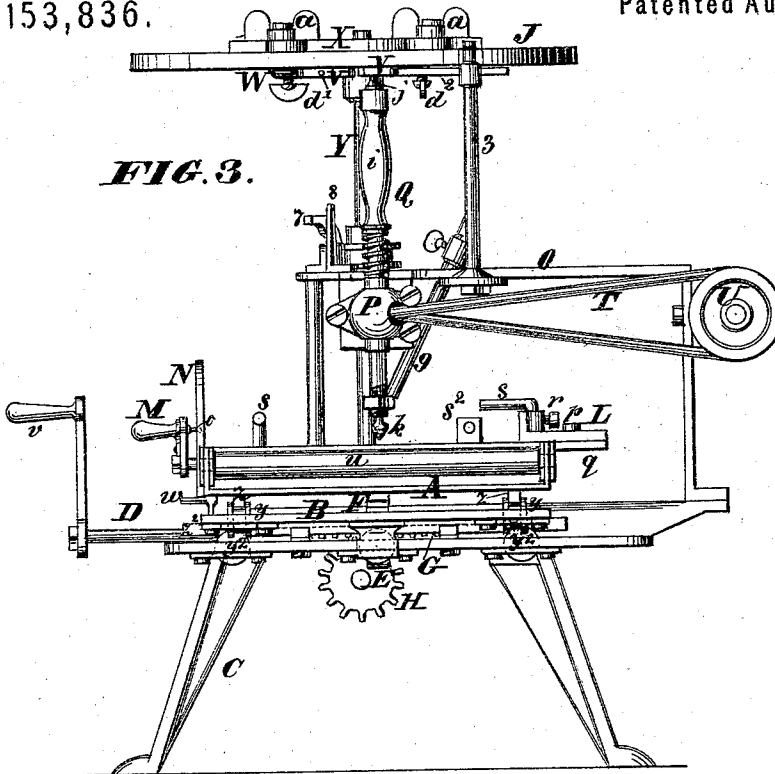
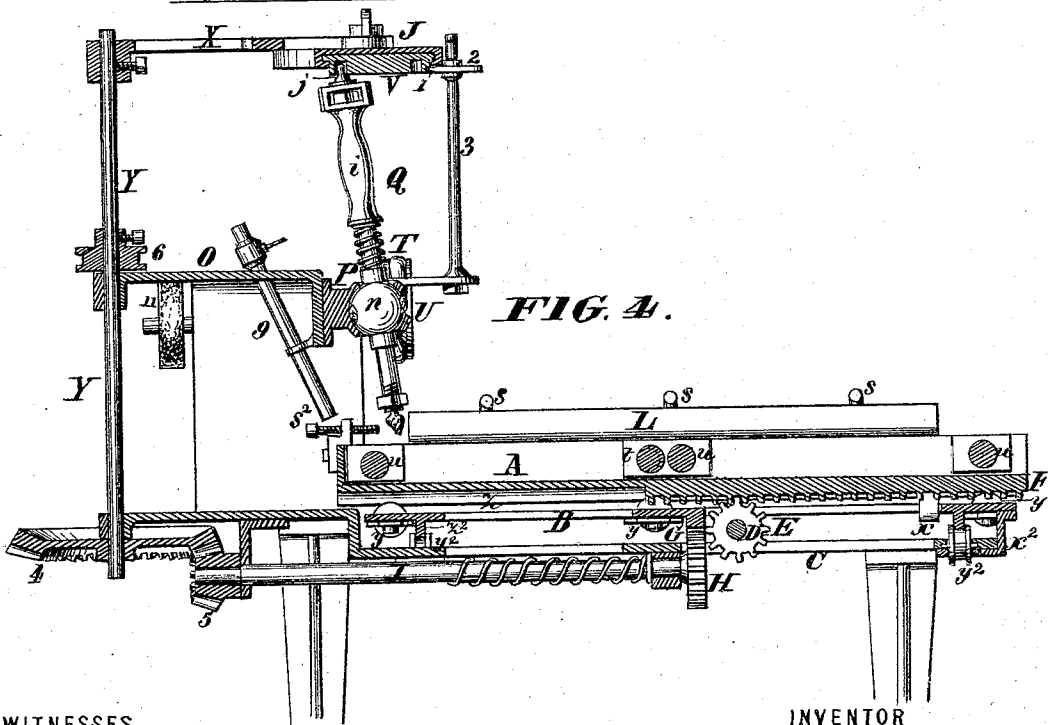


FIG. 4.



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FIG. 5.

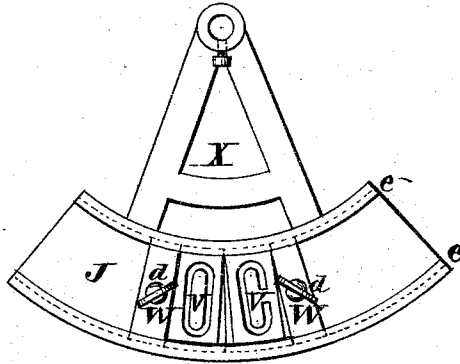


FIG. 6.

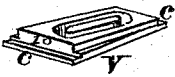


FIG. 7.



FIG. 8.

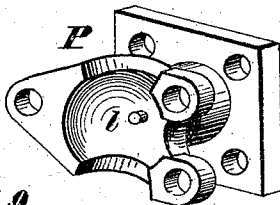


FIG. 9.

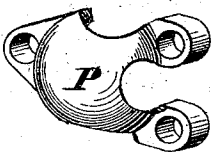


FIG. 10.

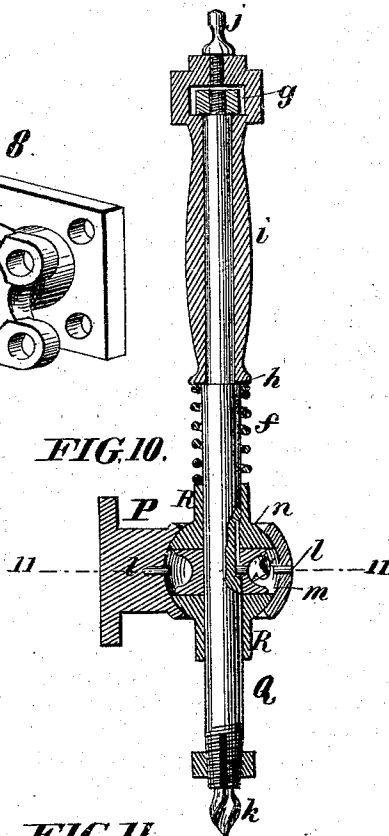
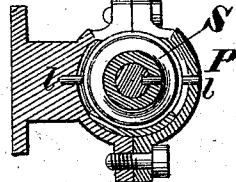


FIG. 12.



FIG. 11.



WITNESSES

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UNITED STATES PATENT OFFICE.

CURTIS ORANGE LUCE, OF BRANDON, VERMONT.

IMPROVEMENT IN MACHINES FOR LETTERING AND CARVING STONE.

Specification forming part of Letters Patent No. **153,836**, dated August 4, 1874; application filed June 2, 1874.

To all whom it may concern:

Be it known that I, CURTIS ORANGE LUCE, of the town of Brandon and county of Rutland, in the State of Vermont, have invented an Improved Machine for Lettering and Carving Stone, of which the following is a specification:

This invention relates primarily to a machine for cutting, with rapidity and accuracy, letters of any design in tomb-stones, but is applicable in part to machines for carving stone or marble. The first part of the invention consists in the combination of a horizontal carriage or bed for supporting the stone, an elevated pattern-carrier, and a rotary tool having a feeler or tracer at its upper end to follow the pattern, a cutting-bit at its lower end, and an intermediate fulcrum or pivot, the object being a simple and compact machine. The second part of the invention consists in a rotary tool, supported by a ball-and-socket bearing, and having a splined pulley within the bearing to receive a cord or band for driving the bit. By this means I am enabled to readily employ a straight tool in connection with an overhead pattern, and thus to follow the pattern by the tool itself. The third part of the invention consists in a swiveled handle applied to the upper end of the pivoted rotary tool, and having the feeler or tracer attached thereto. The feeler or tracer is thus manipulated very directly, and the tool is moved with greater steadiness and precision than would otherwise be possible. The fourth part of the invention consists in a spring applied to the handle of the pivoted rotary tool, between the lower end of the same and the fixed guide-bearing of the tool, for holding the feeler or tracer in contact with the depressed portions of the pattern or patterns, and for lifting the tool off the work when this is desired and permitted. The fifth part of the invention consists in providing the table or carriage with elevated stops or bearings, in combination with one or more eccentrics, or their equivalents, for keying the stone up thereto. The upper surface of the stone, in which the cutting is performed, is thus held in a plane fixed by adjusting the stops or bearings, and different stones may be readily and quickly introduced and held in proper position, whatever

their thickness may be, after the stops are once adjusted. The depth of cut may also be readily adjusted by this means. The sixth part of the invention consists in means for attaching the elevated pattern-carrier, so that it may be readily removed for changing the patterns. The seventh part of the invention consists in mounting the elevated segmental pattern-carrier on a vertical shaft, adapted to slide longitudinally in its bearings, and provided with a grooved collar engaged by a hand-lever, for lifting the patterns free of the tool, to provide for shifting the patterns and stone. The eighth part of the invention consists in pattern-plates, each designed to contain a single letter and having central detent-holes, in combination with a catch to engage therewith, so as to hold the individual patterns in proper position relatively to the center of the cutter, independently of the pattern-carrier. The ninth part of the invention consists in connecting the pivoted shaft of the elevated pattern-carrier with the carriage on which the stone is mounted, so that by moving the pattern-carrier laterally—the proper distance for a letter, for instance—the stone will be correspondingly adjusted in an automatic manner.

In the accompanying drawings, Figure 1 is a plan view of a machine for lettering tomb-stones, illustrating this invention. Fig. 2 is front elevation of the same. Fig. 3 is an end elevation thereof. Fig. 4 is vertical longitudinal section on the line 4, Fig. 1. Fig. 5 is a plan view of the pattern-carrier and its frame, inverted. Fig. 6 is a perspective view of a single pattern, detached and inverted. Fig. 7 is a perspective view of a keeper, employed in the pattern-carriers to secure the patterns. Figs. 8 and 9 are perspective views of the two parts of the fixed ball-and-socket bearing of the rotary tool. Fig. 10 is a vertical longitudinal section of the tool and its ball-and-socket bearing. Fig. 11 is a horizontal section on the line 11, Fig. 10. Fig. 12 is a perspective view of a portion of the tool, representing its ball and pulley. Figs. 8 to 12, inclusive, are drawn to a larger scale than the other figures.

Referring to the illustrative machine represented in the drawings, a horizontal table, A, provided beneath with longitudinal flanges or

rails z , is mounted on a parallel frame, B, having grooved rollers y in its upper surface, to receive the flanges z and transverse flanges or rails z^2 on its under side, which rest in the grooves of rollers y^2 in the top of a depressed horizontal portion, C, of the main frame. The table A and frame B constitute a carriage or movable bed for supporting the stone. The parts of the carriage are held together and to the main frame by clip-brackets x x^2 on the table A and frame B, respectively, projecting downward therefrom, and engaging, respectively, with longitudinal and transverse straight portions of the parts next beneath. The table A is adapted, by means of its supports, to slide either longitudinally or transversely. The first movement is utilized in spacing lines of lettering, and the transverse movement is used in spacing letters in the respective lines. A spring-pawl, w , attached to the bottom of the table, and engaging with sockets in the top of the sliding frame, arrests the table, and holds the same at proper points for the respective lines. For imparting the first movement, a transverse shaft, D, is mounted in suitable bearings in the bottom of the frame B, and provided with a pinion, E, which meshes with a longitudinal rack, F, on the bottom of the table. A transverse rack, G, is attached to the bottom of the frame B, and is meshed by a spur-wheel, H, on a longitudinal shaft, I, hung beneath the top of the main frame. A hand-crank, v , applied to the shaft G serves to adjust the table longitudinally. It receives its transverse movement in unison with an elevated pattern-carrier, J, as hereinafter set forth. The table A is constructed with longitudinal edge flanges, between which a series of rollers, u , are arranged. Parallel to the central one of these rollers, a transverse shaft, K, provided with an eccentric, t , is mounted on the table, and serves as means for lifting the stone. The stone is thus adjusted upward, and is arrested in proper position by elevated stops or bearings s attached to two sides of the table. Set-screws r , applied to the holders of the stops or bearings, provide for adjusting the latter vertically, and the depth to which letters are cut may be thus varied. The stops or bearings at the rear longitudinal edge of the table are attached thereto through the medium of a longitudinal bar, L, having slotted arms q to receive set-screws, p , which serve to adjust these stops or bearings laterally, so as to accommodate stones of different widths. An adjustable stop, s^2 , at the left-hand end of the table, provides for adjusting the stone longitudinally on the table. A hand-crank, M, having an elastic shank, and furnished with a spur, o , is applied to the eccentric shaft K, and its spur engages with perforations in a sector, N, by which the eccentric may be held in any position. At the left-hand end of the machine an elevated platform, O, is erected, and the socket-member P of a ball-and-socket bearing is attached to a downward projection

from the said platform. A rotary tool, Q, is provided with a loose sleeve, R, having a ball enlargement, n , which occupies the cavity of the socket P, and the ball is further constructed with a recess, m , which receives a pulley, S, which is arranged within the ball, and connected to the shank of the tool by a spline or pin and groove joint. The ball-and-socket bearing constitutes a universal pivot or fulcrum for the rotary tool, and accommodates the pulley, to which a driving-band, T, from a pulley, U, is applied, and operates without undue strain or friction. Pins l within the respective parts of the socket P engage with the ball, so as to prevent it turning in a horizontal plane to such an extent as to cut or bind the driving-band. The lower end of the tool is provided with a bit, k , of proper form, and its upper end is provided with a feeler or tracer, j , which is not, however, attached rigidly to the shank of the bit, but is applied to the end of a swiveled handle, i , secured against vertical displacement between a shoulder, h , on the shank of the cutter, and a nut, g , applied to the upper extremity of the shank within a recess in the handle. A spring, f , is applied between the upper end of the ball-sleeve and the projecting lower end of the handle i , so as to tend to press the tool upward away from its work. The feeler or tracer j is thus held against the bottoms of the depressed portions of the patterns, and requires to be moved by the hand in lateral directions alone. Intaglio patterns V are applied to the bottom of the carrier with faces downward, being secured between side flanges e and adjustable keepers W. The latter are provided with set-screws d , by means of which they may be fixed in any position within the depressed portion of the pattern-carrier. The letters and keepers are in shape narrow segments of an annulus, and have flanges c at their ends to occupy the grooves in the flanges e . The pattern-carrier is attached to a skeleton-arm, X, projecting from a vertical shaft, Y, and is attached to its arm by means of circular bosses b on the top of the pattern-carrier, and buttons a pivoted concentrically to these bosses. The bosses occupy curved notches in the ends of the arm, and the buttons turn over the said ends and support the pattern-carrier vertically. The bosses prevent any displacement of the pattern-carrier in a horizontal direction. The removal and replacement of the pattern-carrier for changing the pattern is thus facilitated. For holding the patterns in position, each pattern is provided with a detent-hole, 1, in its outer end, and a fixed catch, 2, projecting from a post, 3, mounted on the elevated platform, engages with the detent-holes in the patterns, and secures the one which is being traced in proper position relatively to the center of the tool. The vertical shaft y has applied to its lower end a large beveled gear-wheel, 4, meshing with a pinion, 5, on the adjoining end of the horizontal shaft I. The said

wheel 4 is attached to the vertical shaft Y by a spline, and the shaft is otherwise adapted to slide longitudinally for the purpose of lifting the pattern-carrier. To provide for imparting this movement to the shaft and pattern-carrier, the shaft is provided, above the elevated platform, with a fixed collar, 6, having a grooved periphery which receives one end of a hand-lever, 7, the other end of which engages with a holding-sector, 8, by which the pattern-carrier is secured in working position, and may be retained in the elevated position, if desired. A slight elevation of the pattern-carrier frees the patterns from the tool, and the latter is simultaneously lifted clear of the stone by its spring *f*, the spring-catch 2 having first been detached. In this condition of the parts the pattern-carrier is moved so as to bring the detent-hole 1 in the next pattern to the catch 2, and, through its arm X, vertical shaft Y, gearing 4 5, longitudinal shaft I, rack and spur wheel G H, and compound carriage B A. The stone is simultaneously moved the proper distance to receive the new letter. The pattern-carrier is then lowered and secured, and the work goes on; or, by a further elevation of the pattern-carrier, it may be swung to the front for removal or inspection, independently of the transmitting-gear. When a line is finished the spring-pawl *w* is lifted, and the table carrying the stone is adjusted longitudinally for the proper space between the lines. By turning the hand-crank *v* the tool may rotate continuously. A tube or nozzle, 9, projects downward through the elevated platform to a point near the bit, and is adapted, at its upper end, for the attachment of a flexible tube, and is provided with a stop-cock. This nozzle is for washing the cuttings from the stone during the progress of the operation. The main driving-shaft Z is mounted longitudinally at the back of the elevated portion of the frame, and the pulley V, by which the rotary tool is driven, is keyed to the right-hand end of the shaft. Power is applied by means of a central pulley or pulleys, 10. An emery-wheel, 11, at the left-hand end of the driving-shaft, provides for sharpening the bits.

A fixed or adjustable shelf or table may, if desired, be attached to the back of the machine. Slotted horizontal projections 12, on the depressed part C of the main frame, are provided for this purpose.

Having described this my invention, I claim—

1. The combination, in a machine for lettering and carving stone, of a horizontal table or carriage for supporting the stone, an elevated pattern-carrier, and a rotary tool having a feeler at its upper end, to trace the pattern, a cutting-bit at its lower end, and an intermediate fulcrum or pivot, substantially as herein shown and described.

2. A rotary tool supported by a ball-and-socket bearing, and having a splined pulley within the bearing to receive a cord or band for driving the bit, in the manner set forth.

3. The swiveled handle *i*, applied to the upper end of the pivoted rotary tool, in combination with the feeler *j*, attached thereto, substantially as specified.

4. The spring *f*, arranged and operating as described, in combination with the pivoted rotary tool Q *k* and its fixed universal guide-bearing P *n* and handle *i*, for the purpose set forth.

5. The table or bed A, provided with the elevated stops or bearings *s*, and one or more eccentrics, *t*, for keying the stone up to the same, substantially as described.

6. The circular bosses *b*, and buttons *a*, on the pattern-carrier J, in combination with the skeleton arm X, having notched ends to receive the same, for detachably holding the pattern-carrier, in the manner set forth.

7. The combination of the elevated segmental pattern-carrier J, the sliding vertical shaft Y, having the grooved collar 6 and the hand-lever 7, for lifting the patterns free of the tool, to provide for shifting the patterns, in the manner set forth.

8. The pattern-plates V, having central detent-holes 1, in combination with the catch 2 for holding the patterns in proper position, as described.

9. The combination of the elevated segmental pattern-carrier J, the shafting and gearing Y 4 5 I H, and the transverse rack G, for adjusting the table or carriage laterally by and in unison with the movement of the pattern-carrier for spacing letters, in the manner set forth.

In testimony of which invention I hereunto set my hand this 8th day of May, 1874.

CURTIS O. LUCE.

Witnesses:

OCTAVIUS KNIGHT,
WALTER ALLEN.