

(No Model.)

3 Sheets—Sheet 3.

E. D. MACKINTOSH.
CARVING MACHINE.

No. 346,596.

Patented Aug. 3, 1886.

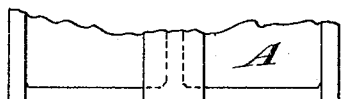
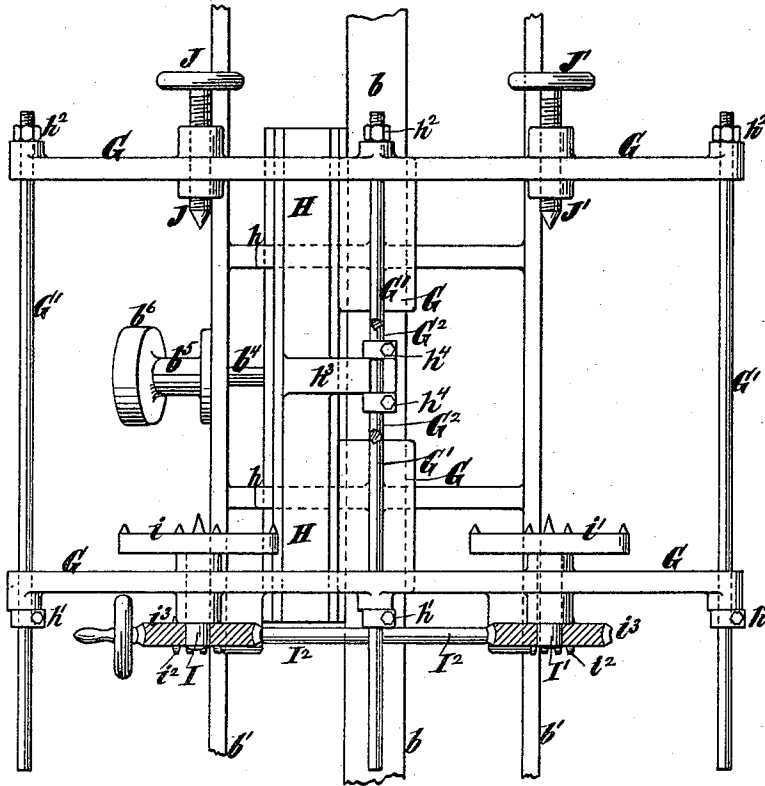
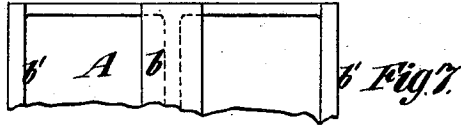
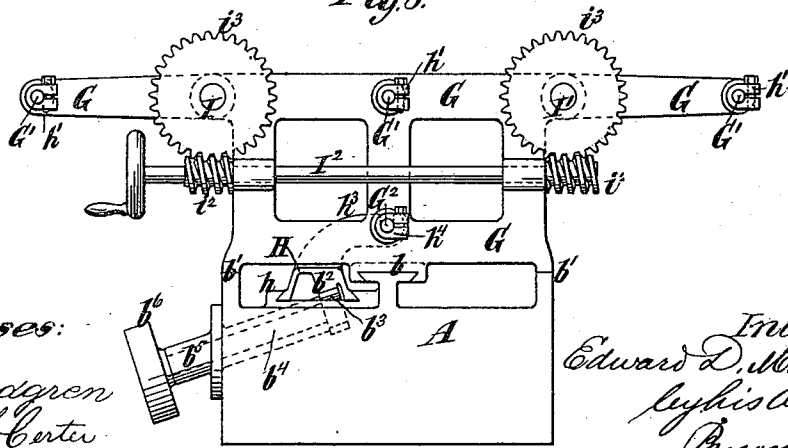


Fig. 8.



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UNITED STATES PATENT OFFICE.

EDWARD D. MACKINTOSH, OF BROOKLYN, ASSIGNOR TO PAUL PRYIBIL,
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CARVING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 346,596, dated August 3, 1886.

Application filed March 20, 1886. Serial No. 195,944. (No model.)

To all whom it may concern:

Be it known that I, EDWARD D. MACKINTOSH, of the city of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in Carving-Machines, of which the following is a specification.

My invention relates to carving-machines which comprise a bed or fixed frame, tables, or a support for the work, and the pattern movable by gearing, operated by hand, along tracks or ways on the bed or fixed frame, and a movable frame arranged above the work and pattern tables or supports and carrying a tracker or forming pin, which engages with the pattern, and a rotary spindle and carving-cutter, which operates on the work along lines, the direction of which is controlled by the forming-pin following the pattern, the tables or support and the movable upper frame providing for a universal change in position between the cutter and the work and the forming-pin and the pattern. When operating on flat work, the work and pattern are supported on two tables, which travel side by side on the fixed frame or bed, and when operating on round work—such as columns, statues, &c.—the two tables are removed and there is substituted therefor a frame which, like the tables, is movable on the bed and has journaled in it pairs of spindles or centers, whereby the pattern column or object and the corresponding piece of work to be carved are supported.

My invention consists in a novel combination of gearing whereby the tables or work and pattern supports are moved along the fixed frame or bed; also, in a novel and adjustable combination of parts whereby the tables for the work and pattern will receive a variable movement, the one relatively to the other, by a movement imparted to one of them, as is necessary to enlarge or reduce work from a pattern; also, in a novel combination of parts whereby the upper frame, carrying the work-cutter and the forming-pin, is supported so as to permit of its movement, and has its weight balanced, whatever be its height above the fixed frame or bed; also, in a novel combination of the forming-pin with its support, so as to provide for enlarging or

reducing the work from the pattern in its dimensions, which are transverse to the direction of movement of the work and pattern, and to further provide for arranging the forming-pin so that it may operate on the work when secured to the same table with the pattern or on the other table, and to provide for the ready adjustment of the forming-pin upward and downward in its holder; and, also, to provide for sustaining and properly moving and turning the work and pattern when the machine is employed on round work—as columns, statues, &c.

In the accompanying drawings, Figure 1 is an end elevation of a machine embodying my invention. Fig. 2 is a plan and horizontal section on the plane of the dotted line $x x$, Fig. 1. Figs. 3, 4, 5, and 6 are detail views hereinafter described. Fig. 7 is a plan of the bed or fixed frame and the frame for holding round work and a pattern movable upon said bed or fixed frame; and Fig. 8 is an end view of the parts shown in Fig. 7.

Similar letters of reference designate corresponding parts in all the figures.

A designates the fixed frame or stationary bed, provided with tracks or ways $b b'$, along which are movable two tables or work and pattern supports, B B'. As here represented, the track or way b is dovetailed, so that the tables will not lift when any weight comes on their outer edges, but the tracks b' are plain, and hence the tables may be readily removed by first lifting its outer edge.

The stationary frame of the machine also comprises L-shaped upright arms A', which are secured to opposite sides of the bed A, and are connected at their top by a cross-bar, A².

The tables B B' are connected, so that a movement imparted to one is transmitted to the other, as I shall soon describe. The work-table B has upon it a rack, b^2 , with which engages a pinion, b^3 , on an inclined shaft, b^4 , journaled in a bearing, b^5 , on the bed A. The shaft b^4 has motion imparted to it through an internal gear, b^6 , and a pinion, b^7 , on a shaft, b^8 , which is fitted in a bearing, b^9 , on the bed, and carries a hand-wheel, b^{10} , whereby it may be turned. The employment of the internal gear-wheel, b^6 , is advantageous, because its

teeth are not liable to be obstructed by chips, and because when it is used the top of the hand-wheel b^{10} will move in the same direction as the table, which facilitates the movement of the table B by the workman. Were ordinary external spur-wheels employed to gain equal power, the top of the hand-wheel would move in a reverse direction to the table. It is advantageous to arrange the shafts $b^4 b^8$ in an inclined position, because then a large hand-wheel may be employed without projecting above the table and in the way of overhanging work, and without necessitating the employment of large gears.

The means employed to connect the tables B B' consist of a horizontally-swinging bar, C, and slides $c c'$, fitted thereto and pivotally connected with brackets $c^2 c^3$, projecting from the tables, as shown best in Fig. 2.

In Fig. 3 I have shown a sectional view of the slides $c c'$ on the bar C, and in Fig. 4 I have shown an end view of the slide c' and its bracket c^2 , including a part of the table B, to which the bracket is attached. The brackets $c^2 c^3$ are dovetailed to fit dovetailed guides c^4 on the tables B B', and may be secured by set-screws c^5 after adjustment transversely to the width of the tables.

I have shown on each of the arms or frame portions A' a hub or boss, c^6 , and the bar C may be pivoted at either of these points and on either side of the machine. When the bar C is pivoted at the left hand of Fig. 2, as shown, the table B' for the pattern will receive a longer movement than the work-table B, and the work performed will be correspondingly reduced from the pattern; but if the bar C be pivoted at the right hand of Fig. 2 the table B will receive a greater movement than the table B', and the work will be enlarged from the pattern.

As here represented, the brackets $c^2 c^3$ are so formed that they may be cast from the same pattern and simply reversed in position, the bracket c^2 being pivoted to the top of the slide c and the bracket c^3 being pivoted to the bottom of the slide c' . Each slide $c c'$ has a semi-circular projection, c^7 , to which the bracket is pivoted, and each has at the side opposite said projection a semi-circular recess, c^8 , which receives the projection c^7 of the other side when they are brought close together on the bar C. When the slides are thus constructed and pivoted to the brackets $c^2 c^3$, the slides can be brought close together on the bar, so that the pivotal points of the two will be in line, and then the tables will receive equal movement, and the work will be produced of the same size as the pattern.

The arms or frame portions A' are constructed with dovetailed guides d , to which are fitted slides D, constructed with nuts which receive screws D', and the screws D' at opposite sides of the machine are turned simultaneously by means of a cross-shaft, D², provided with a hand-wheel, d' , and connected by bevel-gears d^2 with the screws.

Extending above the tables B B' is a cross-head, E, which is pivoted at e to the slides D, so that it may swing in a plane transverse to its length. This cross-head is constructed with hoods or housings E', in which are pivoted vertically, by screws e' , a pair of arms, E² E³, and these arms are connected near their outer ends by a spindle-frame, E⁴, which is yoked to receive them and pivoted vertically to them by screws e^2 . The arms E² E³ extend horizontally, and their vertical pivots, which connect them with the cross-head E and spindle-frame E⁴, permit them to swing simultaneously in a horizontal direction, while the whole upper frame, composed of the parts E E² E³ E⁴, may be swung up and down on the pivots e as centers. The upper frame may be balanced and have its weight sustained by a spring, F, attached at one end to a screw, s , which is adjustable in an arm, E⁵, extending from the cross-head E and attached at its other end to a cord or other flexible connection, e^3 , which is carried around pulleys e^4 and attached to one of the slides D or to some other part movable by the screws D'. The tension of the spring F may be varied by the screw s , and whenever the slides D are adjusted to raise or lower the cross-head E and upper frame the upper end of the spring F will, through the cord e^3 , be correspondingly raised or lowered. The upper frame carries a carving tool or cutter, f , secured by a suitable chuck on a rotary spindle, f' , journaled in the frame E⁴, and this spindle f' has upon it a pulley, f^2 , and may be driven by a belt (not here shown) from a pulley, f^3 , on the cross-head E. Below the pulley f^3 and rotating as one therewith is a pulley, f^4 , which may receive motion through a belt from a suitable outside shaft, and it will be understood that the cutter f operates on the work, which is to be secured on the table B.

The arm E³ is constructed with a dovetailed guide, e^6 , to which is fitted a sliding hanger, e^6 , having a set-screw, e^7 , whereby it may be fixed in position after adjustment; and to the hanger e^6 is secured, by a dovetailed tongue-and-groove connection, e^8 , and a set-screw, e^9 , a bracket, e^{10} , in which is fitted a tubular screw, e^{11} , carrying the forming-pin e^{12} . The bracket e^{10} is split at the nut which receives the screw e^{11} , and is there provided with a clamping-screw, f^5 , for holding the screw e^{11} against movement; and the screw e^{11} is also split in its lower portion, and provided with a clamping-screw, f^6 , for holding the pin e^{12} against slipping therein. The pin e^{12} may be approximately adjusted in position by slipping it up or down in the screw e^{11} , and then tightening the clamping-screw f^6 , and the exact adjustment may then be obtained by turning the screw e^{11} up or down in the bracket e^{10} , and then tightening the clamping-screw f^5 . The bracket e^{10} is shown in Fig. 5 in plan view, and the screw e^{11} is most clearly shown in Fig. 6.

When the work is of small size, and is to

be produced of the same size as the pattern, the bracket e^{10} , carrying the pin e^{12} , may be detached from the slide or hanger e^6 and secured on a dovetailed guide or tongue, e^{13} , on the bottom of the frame E^4 , as shown by dotted lines in Fig. 1, and then the work and pattern may both be secured to the table B, and the table B' not moved at all.

When the work is of large size, and is to be produced without enlargement or reduction, the work and pattern may be secured to the two tables B B', and the slides e e' adjusted, as before described, so that their pivots will be concentric, and the tables will receive the same movement. The hanger e^6 may then be adjusted so that the forming-pin e^{12} will be in line with the cutter f and in the plane of the frame E^4 . When the forming-pin e^{12} is secured on the frame E^4 , the portion of the arm E^3 which projects beyond that frame, adds needless weight to the upper frame comprising said parts, and said arm may have its outer portion made separate from its main portion, as shown in Fig. 2. The end portion of the arm E^3 may have a neck to be slid into a socket in the main portion and there secured by a set-screw, f^7 .

As before described, the difference in the movement of the tables B B' provides for reducing or enlarging the work from the pattern in the direction of its length, and by shifting the hanger e^6 along the guide e^5 it may be set to a greater or less distance than the cutter f from the centers of motion e' , and thereby the work may be reduced or enlarged in its width relatively to the pattern. Consequently it will be understood that the pivoted system of arms in the upper frames provides for the reduction or enlargement of the work in its width in the same or a different proportion relatively to the reduction or enlargement in length, and this is a feature of considerable importance. For example, in the same piece of cabinet-work there may be panels twelve by sixteen inches and twelve by fifteen inches in size, which difference is not enough to affect the proportion of the figures if made from the same pattern. By this machine both may be made from the same pattern, and the saving of the cost of the extra pattern is often considerable. The bed or fixed frame A also has dovetailed bearers or seats h , which are used in connection with the attachment for round work, which I will now describe, reference being had to Figs. 7 and 8. This work and pattern support or holder comprises end frames, G, which are fitted to slide on the tracks or ways b b' of the bed A, and are connected by rods G' G^2 , the frames being held on the rods by split clamping-collars h' and nuts h^2 . In this case there is also employed a slide, H, which is fitted to the dovetailed seats or bearers h , and is constructed with a rack, b^3 ; with which engages a pinion, b^3 , on the inclined shaft b^4 , before described. The slide has an arm, h^3 , which engages the lower rod, G^2 , of the mov-

able frame between two clamping-collars, adjustable thereon.

In the end frames, G, are journaled spindles I I', carrying chucks i i' , provided with spurs, which are adapted to enter the ends of the work and pattern, and impart rotary motion to them when the spindles are turned simultaneously by means of a single shaft, I², operating on the spindles through worms or screws and worm-wheels i^2 i^3 . Opposite the spindles I I' and their chucks are arranged centering-screws J J' for the work and pattern. This attachment may be successfully employed for long or short work, and when the frames G are placed on the bed A the cutter f will operate on the work held by the spindle and screw I J, while the forming-pin e^{12} will follow the pattern held by the spindle and screw I' J'. In operating on long work a portion of the length might be completed, and then, by altering the relation of the slide H and the frames G, by shifting the collars h^4 on the rod G^2 , another portion of the length may be presented to the cutter and forming-pin.

The split collars h' provide for setting the frames G at different distances apart for work and patterns of different length, and the end frames, G, will then be approximately parallel; but to avoid any binding of the end frames, G, on the dovetailed track or way b of the bed or fixed frame A, the nuts h^2 may be adjusted to bring the end frames, G, into a truly parallel position.

Instead of employing wheel-gearing for moving the table B, a nut and screw constituting screw-gearing might be used.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, with a bed having parallel tracks or ways and a table or work-holder movable lengthwise thereon, and having connected with it a rack which is parallel with the tracks or ways, of a shaft arranged transversely to the tracks or ways, carrying a pinion engaging said rack and inclined downward away from the pinion, and a hand-wheel at the lower end of the shaft, whereby it may be turned, substantially as herein described.

2. The combination, with a bed having parallel tracks or ways and a table or work-holder movable thereon, and having a rack connected with it, of a shaft journaled on the bed transversely to the tracks or ways and carrying a pinion engaging with the rack, and also carrying an internal gear-wheel, and a second shaft provided with a pinion engaging said internal gear-wheel, and also provided with a hand-wheel for turning it, whereby the top of the hand-wheel is caused to move in the same direction as the table or work-holder, substantially as herein described.

3. The combination, with a bed having a central dovetailed track or way, b , and plain side tracks or ways, b' , of work and pattern holders fitting said tracks or ways, and gearing whereby said work and pattern holders may be moved

along the bed, substantially as herein described.

4. The combination, with a fixed frame and work and pattern tables movable thereon side by side, of a bar pivoted to the fixed frame at one side of the tables and slides fitting the bar and pivotally connected with the tables, substantially as herein described.

5. The combination, with a fixed frame and work and pattern tables movable thereon side by side, of a bar pivoted to the fixed frame at one side of the tables, slides fitting said bar, and brackets upon the tables, pivoted to said slides and adjustable on the tables transversely to their direction of movement, substantially as herein described.

6. The combination, with a fixed frame and tables B B', movable thereon, of the bar C, pivoted at one end to the frame at the side of the tables, slides *c c'*, fitting said bar, brackets *c'' c'''*, adjustable on the tables transversely to their direction of movement, and pivoted one to the top of the slide *c* and the other to the bottom of the slide *c'*, each slide having on one side a projection to receive the pivot for the bracket, and on the other side a recess to receive the projection on the other slide, substantially as and for the purpose herein described.

7. The combination, with a fixed frame and work and pattern tables movable thereon side by side, of a horizontally-swinging bar having provision for pivoting it at either end to the fixed frame at one or other side of the tables, slides fitting the bar and pivotally connected with the tables, and gearing connected with one table for moving both of them, substantially as herein described.

8. The combination, with a fixed frame and work and pattern tables or supports movable thereon, of a cross-head extending across above the tables or supports and pivoted at its ends so as to swing in a vertical plane transverse to its length, arms pivotally connected near their outer ends and connected by vertical pivots with the cross-head so as to swing in a horizontal plane, and a forming-pin and cutter-spindle carried by said arms, substantially as herein described.

9. The combination, with a fixed frame and work and pattern tables or supports movable thereon, of a movable upper frame above the tables or supports, vertically-movable slides supporting said movable upper frame, and a balancing-spring whereby the weight of the movable upper frame is sustained, and a support for the spring movable upward and downward simultaneously with the adjustment of the upper frame upward and downward, substantially as herein described.

10. The combination, with the fixed frame and the movable tables or supports for the pattern and work, of the vertically-movable slides D, and their adjusting-screws D', the movable upper frame supported on said slides and carrying a cutter and a forming-pin, and a spring, F, the lower end of which is connect-

ed with the movable upper frame, and which is suspended by a cord, *e'*, passing over sheaves *e''*, and connected with a part movable by said screws, substantially as herein described.

11. The combination, with the fixed frame and the movable tables or supports for the pattern and work, of the slides D, and adjusting-screws D', the movable upper frame carried by the slides, the spring F, the screw *s* at the lower end of the spring, adjustable in the movable upper frame, and the cord *e'*, suspending the spring and passing over sheaves *e''* and attached to a part movable by said screws D', substantially as herein described.

12. The combination, with the cross-head E, pivoted at the ends to swing in a vertical plane transversely to its length, of the arms E¹ E², connected by vertical pivots with the cross-head, the frame *e'*, pivotally connected with the arms at their outer ends and carrying a cutter-spindle, and a forming-pin movable on the arm E² lengthwise thereof, substantially as herein described.

13. The combination, with the cross-head E and spindle-frame E¹, provided with a slideway or guide, *e''*, and the arms *e'' e'''*, the latter having a guide or slideway, *e''*, and all pivotally connected as described, of a cutter-spindle on the frame *e'*, a forming-pin, *e''*, and a bracket carrying the same and adjustably secured on the guide *e''* or the guide *e'''*, substantially as herein set forth.

14. The combination, with the cross-head E, the frame E¹, and the arms E¹ E², all pivotally connected as described, the frame *e'* having the guide or slideway *e''*, and the arm *e''* having the guide or slideway E², and having its outer portion removable, of the cutter-spindle in the frame *e'*, the forming-pin *e''*, and a bracket carrying the same and adjustably secured on the guide *e''* or the guide *e'''*, substantially as herein set forth.

15. The combination, with a fixed frame and work and pattern tables or supports movable thereon, of a cross-head extending across above the tables or supports and pivoted at the ends to swing in a vertical plane transverse to its length, arms pivotally connected at their outer ends and connected with the cross-head by vertical pivots, so as to swing in a horizontal plane, a cutter-spindle carried by said arms, a bracket, *e''*, also carried by said arms and forming a split nut provided with a clamping-screw, the tubular screw *e''*, receiving the forming-pin *e''*, and split at its lower portion and provided with a clamping-screw, whereby provision is afforded for the approximate and exact adjustment of said pin, substantially as herein described.

16. The combination, with a fixed frame, two tables or work and pattern supports movable thereon, and connections whereby the length of movement of said tables or supports may be varied one relatively to the other, of a movable upper frame consisting of a cross-head pivoted to swing in a plane transverse to its length, arms connected by vertical piv-

ots with said cross-head, and a frame pivotally connecting the outer end of said arms and carrying a cutter-spindle, and a forming-pin adjustable on said frame to vary its length of movement relatively to the cutter-spindle in a direction transverse to the line of movement of the said tables or supports, substantially as herein described.

17. The combination, with the bed or fixed frame A, having parallel tracks or ways, of the work and pattern supports movable thereon, and consisting of end frames, G, arranged transversely across and movable on the tracks or ways, and rods G', connecting the end frames, G, and extending parallel with the tracks or ways, pairs of spindles provided with chucks, and centering-screws in the opposite end frames, and having their axes parallel with the tracks or ways for holding the work and pattern, and an upper cross-head, E, and arms E² E³, pivoted as described, and carrying a cutter-spindle and a forming-pin, substantially as herein set forth.

18. The combination, with the bed or frame A and the slide H, fitted thereto, and having an arm, h³, of the end frames, G, and rods G' G², connecting them, the rod G² having an adjustable connection with the arm h³, pairs of spindles and centering-screws in the opposite end frames, for holding the work and

pattern, and the upper cross-head, E, and arms E² E³, pivoted as described, and carrying a cutter-spindle and forming-pin, substantially as herein set forth.

19. The combination, with the bed or fixed frame A and the end frames, G, movable thereon, of the rods G', connected by nuts h² and clamping-collars h' with the end frames, pairs of spindles and centering-screws in the opposite ends, frames for holding the work and pattern, and the upper cross-head, E, and arms E² E³, pivoted as described, and carrying a cutter-spindle and forming-pin, substantially as herein set forth.

20. The combination, with the bed or fixed frame A and the end frames, G, movable thereon and connected by rods G', of the pairs of spindles and centering-screws in the opposite end frames for holding the work and pattern, a shaft connected by worm-gearing with the two spindles, whereby they, with the work and pattern, may be turned simultaneously, and the upper cross-head, E, and arms E² E³, pivoted as described, and carrying a cutter-spindle and a forming-pin, substantially as herein set forth.

EDWARD D. MACKINTOSH.

Witnesses:

CHANDLER HALL,
MINERT LINDEMAN.

It is hereby certified that in Letters Patent No. 346,596, granted August 3, 1886, upon the application of Edward D. Mackintosh, of Brooklyn, New York, for an improvement in "Carving Machines," errors appear in the printed specification requiring correction, as follows: On page 4, in lines 86, 96 and 106, the reference letters and figures "e⁴" should read *E⁴*, and on page 5, line 40, the word "ends" should read *end*, and the comma thereafter should be stricken out; and that the Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 17th day of August, A. D. 1886.

[SEAL.]

H. L. MULDROW,
Acting Secretary of the Interior.

Countersigned:

R. B. VANCE,
Acting Commissioner of Patents.