No. 676,877. Patented June 25, 1901.

E. CURRAN.

LACING HOOK SETTING MACHINE.

(No Model.) (Application filed Mar. 23, 1901.)

3 Sheets—Sheet 1.

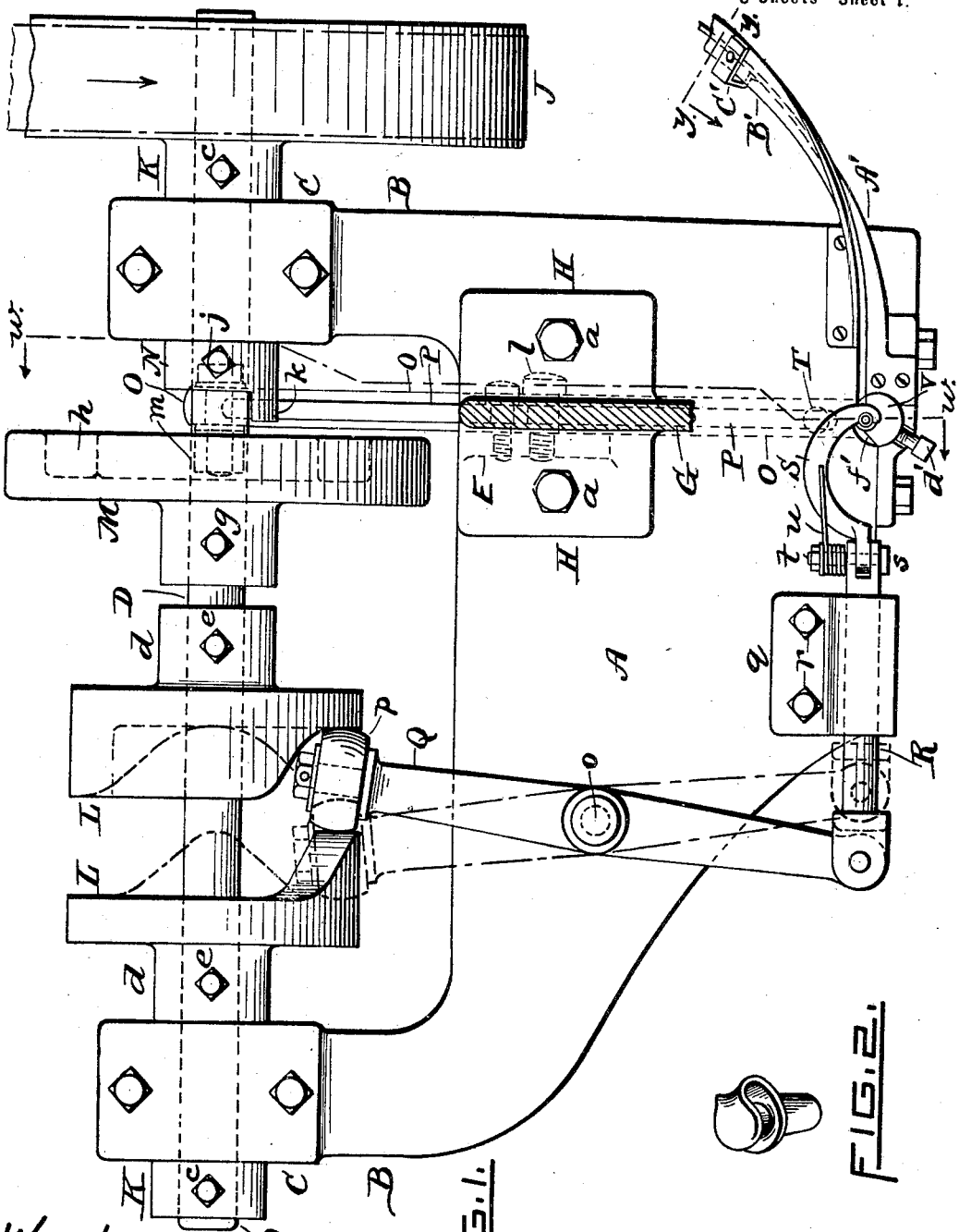

FIG. 1.

FIG. 2.

WITNESSES.

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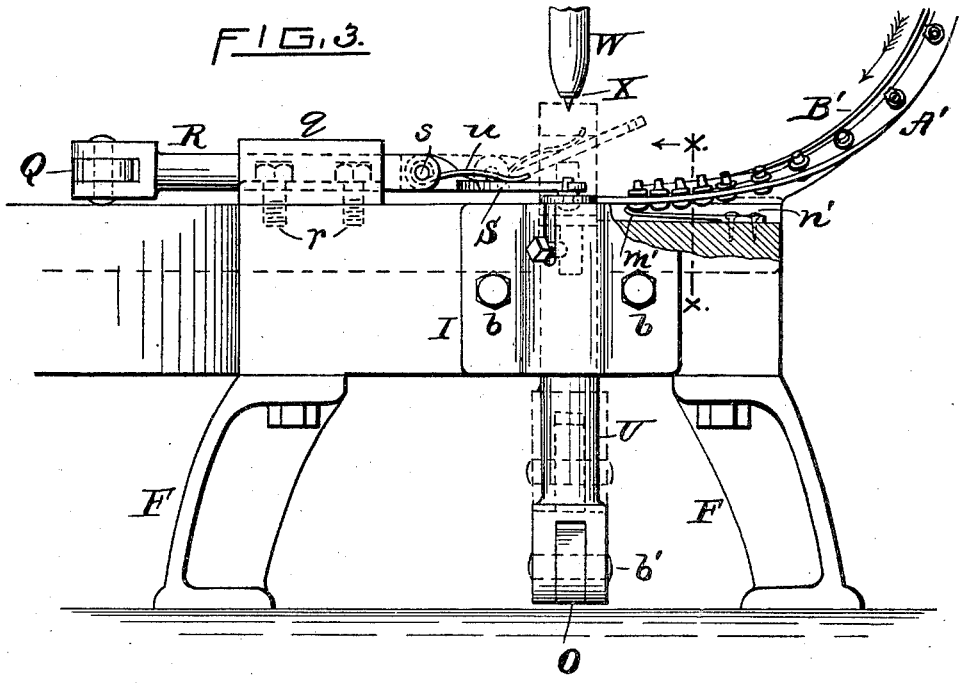
FIG. 3.



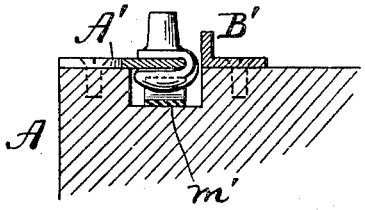


FIG. 4.

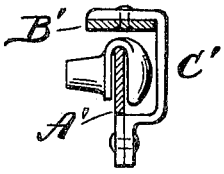


FIG. 5.

WITNESSES.

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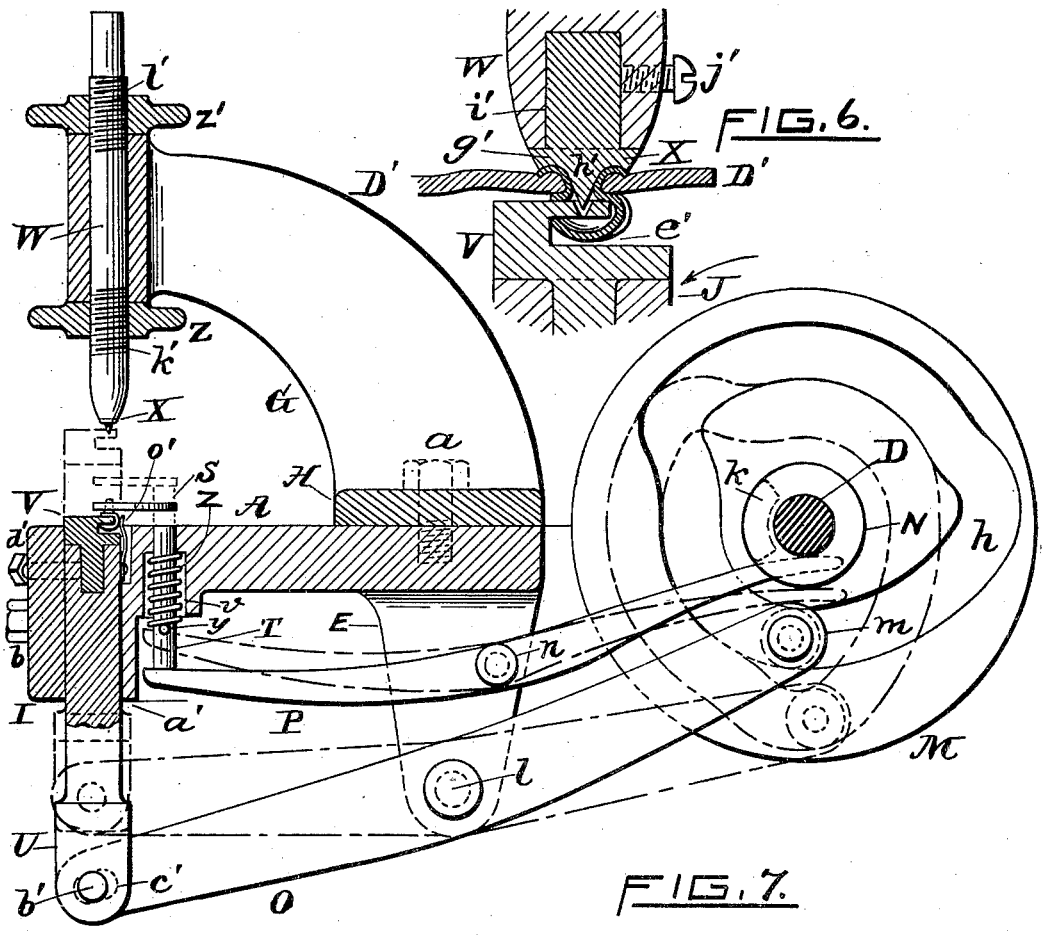

FIG. 6.

FIG. 7.

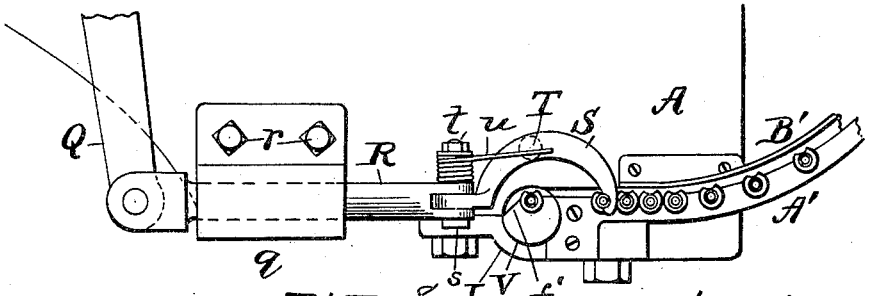

FIG. 8.

WITNESSES.

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UNITED STATES PATENT OFFICE.

EDWARD CURRAN, OF BOSTON, MASSACHUSETTS.

LACING-HOOK-SETTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 676,877, dated June 25, 1901.

Application filed March 23, 1901. Serial No. 52,556. (No model.)

To all whom it may concern:

Be it known that I, EDWARD CURRAN, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Machines for Setting and Clenching Lacing-Hooks in Shoe-Vamps, of which the following is a specification, reference being had therein to the accompanying drawings.

Like letters indicate like parts.

Figure 1 is a top plan view of my improved machine for setting shoe-lacing hooks. Fig. 2 is a perspective view of one of said hooks. Fig. 3 is a front elevation of said machine. Fig. 4 is a detail view as seen on line *x x* of Fig. 3. Fig. 5 is a detail view as seen on line *y y* of Fig. 1. Fig. 6 is a detail view, on an enlarged scale, showing the stationary post and die, the movable die, the vamp, and the lacing-hook therein, all as seen in vertical section on line *w w* of Fig. 1. Fig. 7 is a view of said machine as seen partly in side elevation and partly in vertical section on line *w w* of Fig. 1. Fig. 8 is a top plan of a portion of said machine.

My invention relates to machines for setting lacing-hooks in shoes; and it consists of the novel construction and combination of the several elements, as hereinafter particularly described, and as specifically set forth in the claims.

In the drawings, A is the bed of the machine.

B B are two rearwardly-projecting brackets, having journals C C, in which the main shaft D is rotatably mounted.

E is a downwardly-extending bracket beneath the bed A.

F F are the legs of the machine.

G is an upwardly-curved arm, whose upper end is provided with a vertical bore. The arm G has the flange H, which rests upon the bed A and is fastened in position by the screws *a a*.

I is a front plate attached to the bed A by screws *b b*.

J is the fly-wheel, mounted fast on the shaft D, and K K are collars fastened on the shaft D by the set-screws *c c*.

L L are two cam-disks, each bearing a hub *d*, by which it is mounted on the shaft D, and fastened thereto by the set-screws *e e*.

M is a cam-disk having a hub *f*, by which it is mounted upon the shaft D, and fastened thereon by the set-screw *g*. The cam-disk M has on the outer side the cam-groove *h*.

N is a cam-disk having a hub *i*, by which it is mounted on the shaft D, and is fastened thereon by the set-screw *j*. The cam-disk N has a wiper or projection *k* on its inner side.

O is a lever pivotally mounted on the stud *l* upon the bracket E. It has a friction-roller *m* mounted rotatably at its rear end and which fits in and travels in the cam groove or channel *h* of the cam-disk M.

P is a lever pivotally mounted on the stud *n* upon the bracket E and placed in the path of the wiper or projection *k* of the cam-disk N.

Q is a lever mounted horizontally on the bed A upon the stud *o*. On the rear end of the lever Q is rotatably mounted a friction-roller *p*, whose periphery is curved in the arc of a true circle. Said friction-roller diametrically fills the space between the cam-surfaces on the inner sides of the cam-disks L L.

In a bearing *q*, which is fastened to the bed A of the machine by the screws *r*, is mounted the sliding bar R, whose left-hand end is pivotally connected with the front end of the lever Q, as shown in Fig. 1. The right-hand end of the sliding bar R is vertically slotted and receives the right-hand end of a bent finger S, which is pivotally connected therewith by the headed bolt *s*, on the end of which bolt is the nut *t*. A spiral spring *u*, surrounding the bolt *s*, has one end fastened to the nut *t*, and its opposite end lies in contact with the bent finger S on the upper surface thereof. The free end of the finger S has a semicircular depression adapted to fit upon the shank of the lacing-hook. (Shown in Fig. 2.)

The bed A of the machine has a circular aperture and chamber, as seen at *v* in Fig. 7. T is a cylindrical post mounted loosely in said aperture. The lower end of the post T rests upon the forward end of the lever P. The post T has a pin *y* extending therefrom. A spiral spring *z* surrounds the post T in the chamber *v*, having its lower end bearing

against the pin y and its upper end bearing against the top of said chamber.

A post U is loosely mounted between the downwardly-extending bracket a' of the bed and the plate I in registering semicircular grooves thereof, and the lower part of the post U is mounted by the pivot b' in an elongated slot c' of the forward end of the lever O.

A die V is mounted on the top of the post U in a central circular socket thereof and is detachable therefrom. It is held in position by the set-screw d'. Said die V has the slot e' and is also cut away on its upper surface, as seen at f'. (See Figs. 1, 6, 7, and 8.) The die V has the central conical depression. (Shown in the enlarged detail view, Fig. 6.)

In the vertical bore in the upper end of the curved arm G is mounted the cylindrical post W, whose lower end has a concentric socket, Fig. 6. A die X, having an annular groove g' and a central conical point h', is provided with a shank i', which fits in the socket of the post W and is held in position by the set-screw j'. The post W has screw-threads k' l', and nuts Z Z', engaging with said post, enable the adjustment of the post in the bore of the arm G.

From a hopper (not shown) a raceway A' extends downward in a curve. It has a quarter-turn in its course. The raceway A' is provided with a guard-strip B', held by the screws m' to the bed A, as shown in Fig. 4, or to the clip C', as shown in Fig. 5. The raceway A' and guard B' extend down to the die V, as shown in the several figures. The lacing-hooks are mounted on the raceway A', as illustrated in Figs. 1, 3, 4, 5, and 7, and descend thereon by gravity.

The operation of my improved machine is as follows: As seen in Fig. 8, the lowest lacing-hook on the raceway A' is seized, as hereinafter described, by the recessed end of the bent finger S and carried by said finger S from the position shown in Fig. 8 to the position upon the top of the die V. (Shown in Fig. 1.) This movement of the finger S is caused by the sliding of the bar R to the left in its bearings q, thereby drawing in the same direction the finger S, connected with said bar, and the bar R slides in that direction, because of the oscillation of the lever Q upon its pivot-stud o, resulting from the rotation of the cam-disks L L upon the shaft D and the contact of said cam-disks with the friction-roller p. The finger S is normally kept in a horizontal position by the spring u resting thereon; but when the lever Q moves from the position shown in solid lines in Fig. 1 to the position shown in dotted lines in said figure the sliding bar R is moved to the right and its connected finger S is carried from the position shown in Fig. 1 to the position shown in Fig. 8 and in dotted lines in Fig. 3. In Fig. 3 it is seen, however, that the finger S assumes an angular direction upward. This upward movement of the finger S is caused by the rise of the post T, as illustrated in Figs. 3 and 7. In Fig. 7 the post T is shown in solid lines in its lowest position; but when the lever P is moved by the cam N k to the position shown in said figure in dotted lines the post T, resting, as it does, on the forward end of said lever, is raised to the position shown in dotted lines in said figure and elevates the finger S into the position shown in Fig. 3 in dotted lines. When the wiper or projection k of the cam N has passed beyond the inner end of the lever P, the spring z (which has been compressed by the upward movement of the post T) is free to act and presses the post T downward to its normal position, thereby returning the lever P to the position shown in Fig. 7 in solid lines. As soon as the post T so descends the finger S descends also, being pressed downward by the spring u, and its hooked end comes down and engages the lowermost lacing-hook on the raceway A', as illustrated in Fig. 8. The sliding bar R then moves to the left by reason of the oscillation of the lever Q, and the hooked end of the finger S brings the lacing-hook with which it is engaged, as shown in Fig. 8, to the position shown in Fig. 1 upon the top of the die V. The leather vamp D' of the shoe having been placed upon the tubular end of the lacing-hook, Fig. 2, and above the die V, as seen in Fig. 6, the die V is raised from the position shown in solid lines in Fig. 7 to the position shown in dotted lines in said figure. This rise of the die V is caused by the movement of the lever O, which is operated by the engagement of its roller m in the cam-groove h of the disk M. Said lever O in so moving from the position shown in Fig. 7 in solid lines to the position shown in said figure in dotted lines moves upward the post U, on which the die V is mounted. When the die V is in this manner moved forcibly upward toward and into the position shown in Fig. 6, the sharp conical point h' of the stationary die X upon the bottom of the post W perforates the leather D', and its continuing descent causes the tubular shank of the lacing-hook to penetrate the leather D' in the perforation thus made, and as the conical point h' enters the tubular shank of the lacing-hook it spreads said shank. As the spreading end of the lacing-hook comes to the annular groove g' in the die X said end is turned over and is clenched upon the leather D', as illustrated in Fig. 6, thus firmly setting and securing the lacing-hook in position in the leather.

In Fig. 3 is shown a spring m', fastened in a depression of the bed A by the screws n'. The free end of the spring m' is slightly bent up and serves to limit the movement of the lacing-hooks downward on the curved raceway A' by gravitation; but when the hooked end of the finger S has engaged the lowermost lacing-hook, as seen in Fig. 8, and moves to the left it draws with it said engaged lacing-hook and disengages said lacing-hook

from the end of the spring m'. At the same time the next lacing-hook of the descending series falls into position upon the raceway A′ and the end of the spring m' automatically returns to its normal position to limit the further descent of the lacing-hook.

The guard or strip B′, as will be seen in Fig. 3, prevents the lacing-hooks from leaving the raceway A′, while not interfering with the free sliding movement of said hooks thereon.

By means of the nuts Z Z′, engaging the post W, the die X may be adjusted in proper operative position in relation to the die V.

The cut-away surface f' of the top of the die V enables the proper manipulation of the shoe-vamp and its movement and clearance in the progress of the work.

The spring o' is fastened to the post U and automatically presses the lacing-hook to the front in operative position upon the die V. (See Fig. 7.) The conical depression in the die V is useful to accurately center the conical point h' of the die X during the setting and clenching operation, as illustrated in Fig. 6.

By means of the screw j the die X is detachable, thus allowing the use of interchangeable dies, and by means of the screw d' the die V is detachable for a like purpose.

The length of the traverse of the sliding bar R by the oscillation of the lever Q may be varied in any well-known manner, as also the reach of the finger S over the row of descending lacing-hooks.

I claim as a novel and useful invention and desire to secure by Letters Patent—

1. In a machine of the class described, the combination of a stationary die, a vertically-movable die arranged to coöperate with the stationary die, a properly-mounted sliding bar, a rotatable shaft having cam-disks thereon, an oscillating lever movable by said cam-disks, and pivotally connected with said sliding bar, a finger pivotally mounted upon one end of said sliding bar adapted to seize a lacing-hook and to place it upon said movable die, a spring normally bearing on the top of said finger, means adapted to periodically elevate said movable die to the stationary die, and means to periodically elevate said finger, all operating substantially as shown and for the purpose specified.

2. In a machine of the class described, the combination of a stationary die, a vertically-movable post, a die upon the top of said post adapted to coöperate with the stationary die, a properly-mounted sliding bar, a rotatable shaft having cam-disks thereon, an oscillating lever actuated by said cam-disks and pivotally connected with said sliding bar, a finger pivotally mounted upon one end of said sliding bar adapted to seize a lacing-hook and to place it on the second-named die, a spring normally bearing upon the top of said finger, means to periodically elevate said finger, a second cam-disk on said shaft and a lever pivotally mounted at its center to a proper support and having one end in operative contact with the last-named cam and its opposite end pivotally connected with said vertically-movable post, substantially as and for the purpose specified.

3. In a machine of the class described, the combination of a stationary die, a properly-mounted vertical post, means adapted to periodically elevate and lower said post alternately, a die upon said post adapted to coöperate with the stationary die, a properly-mounted sliding bar, a rotatable shaft having cam-disks, an oscillating lever actuated by said cam-disks and pivotally connected with said sliding bar, a finger pivotally mounted upon one end of said sliding bar, pressed by a spring, and adapted to seize a lacing-hook and to place it on the second-named die, a second cam-disk mounted upon said shaft, a lever pivotally mounted at its center upon a proper support, a post vertically movable in a proper support and having its lower end resting on the end of the last-named lever and its upper end beneath said finger and a spring surrounding said post, all operating substantially as and for the purpose specified.

4. The improved machine for setting and clenching lacing-hooks in shoe-vamps, consisting of the combination of a rotatable shaft, a properly-mounted sliding bar, a cam-disk upon said shaft, an oscillating lever adapted to receive motion from said cam-disks and pivotally connected with said sliding bar, a spring-pressed curved finger pivotally mounted upon one end of said sliding bar, a curved raceway having a quarter-twist and adapted to conduct said lacing-hooks by gravity, a spring underlying said raceway, a stationary die, a properly-mounted vertical post, a die upon said post adapted to coöperate with the first-named die, a cam-disk upon said shaft, a lever centrally pivoted upon a proper support and having one end in operative contact with the last-named cam-disk and its opposite end pivotally connected with said vertical post, a second properly-mounted vertical post surrounded by a spring and having its upper end beneath said finger, a cam-disk upon said shaft and a lever centrally pivoted upon a proper support and having one end in operative contact with the last-named cam-disk and its opposite end underlying the last-named post, substantially as specified.

In testimony whereof I affix my signature in presence of two witnesses.

EDWARD CURRAN.

Witnesses:

WARREN R. PERCE,

JOSEPH R. BULLOCK, Jr.