

(No Model.)

2 Sheets—Sheet 2.

C. HENZEL & W. WOOD.

ELECTRICAL DOOR OPENER.

No. 351,600.

Patented Oct. 26, 1886.

Fig. 4.

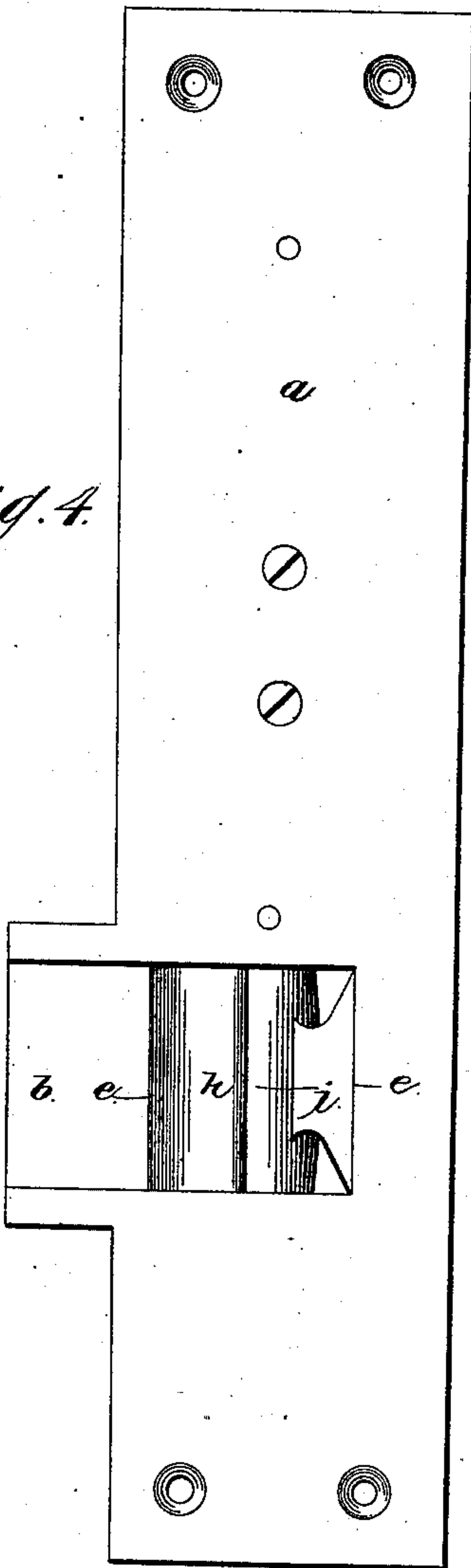


Fig. 5.

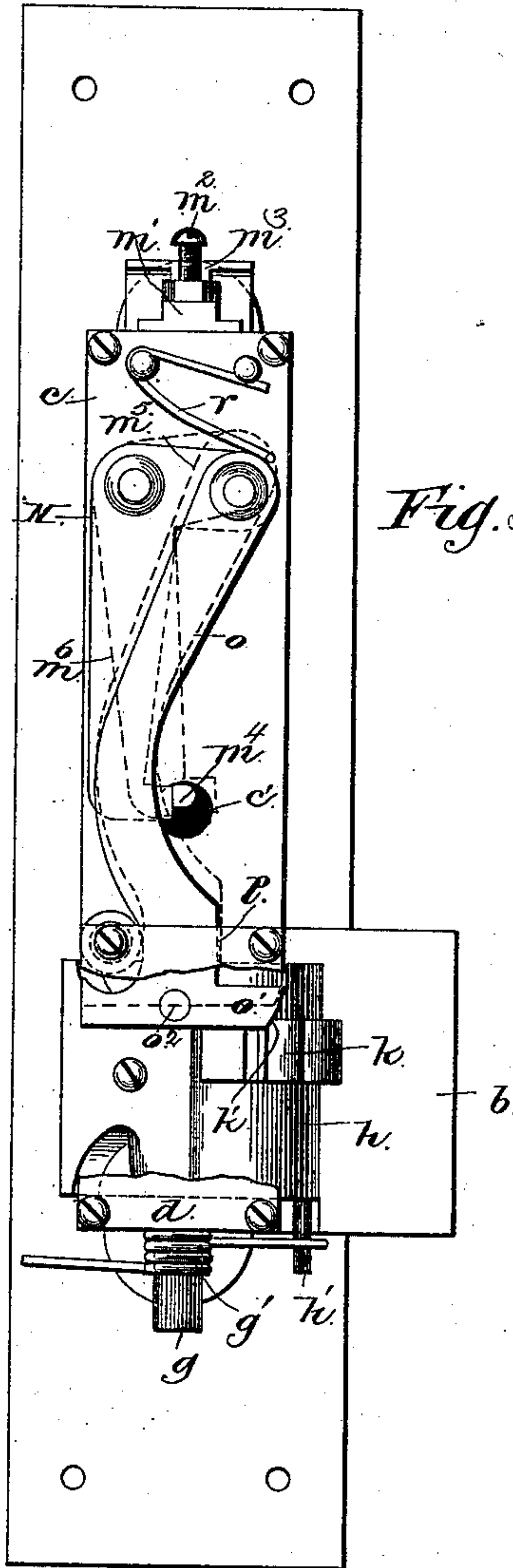
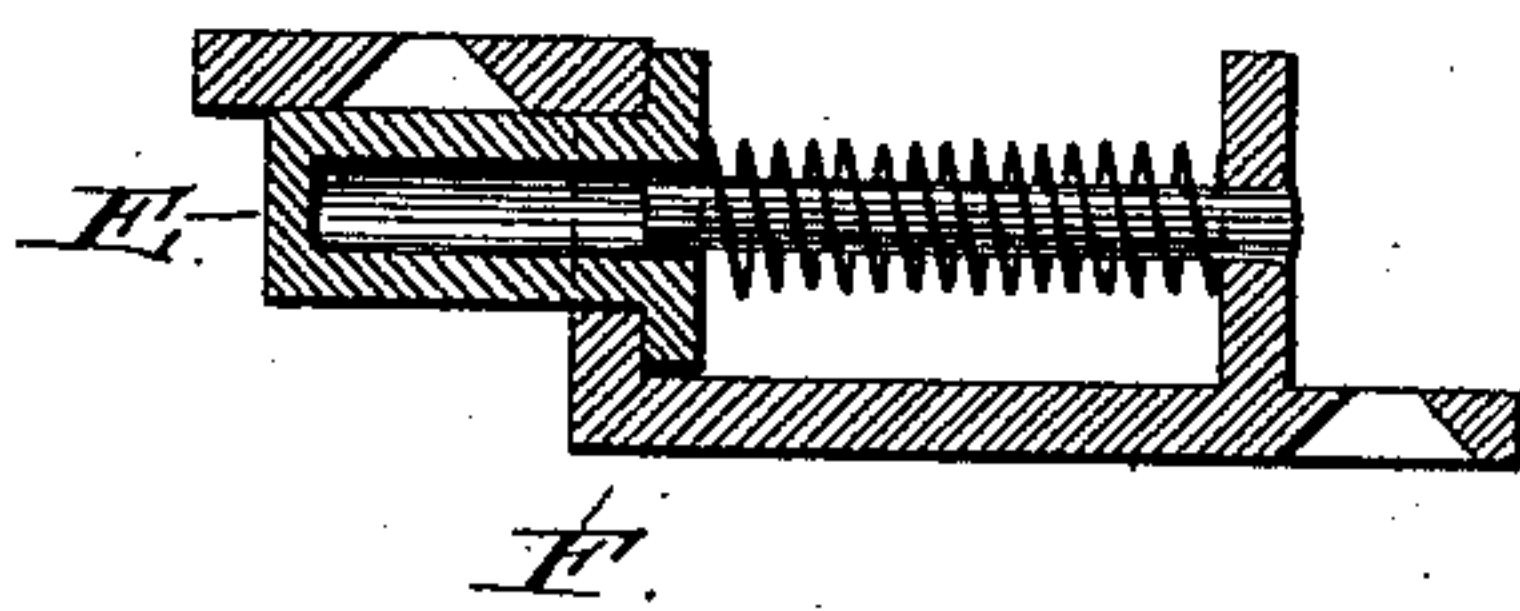


Fig. 6.



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UNITED STATES PATENT OFFICE.

CHARLES HENZEL AND WILLIAM WOOD, OF NEW YORK, N. Y.

ELECTRICAL DOOR-OPENER.

SPECIFICATION forming part of Letters Patent No. 351,600, dated October 26, 1886.

Application filed March 19, 1886. Serial No 195,845. (No model.)

To all whom it may concern:

Be it known that we, CHARLES HENZEL and WILLIAM WOOD, citizens of the United States, residing at New York, in the county of New York and State of New York, have invented a new and useful Improvement in Electrical Door-Openers, of which the following is a specification, reference being had to the accompanying drawings.

Our invention relates to an improvement in electrical door-openers; and it consists in the peculiar construction and combination of devices, that will be more fully set forth hereinafter, and particularly pointed out in the claims.

In the drawings, Figure 1 is an elevation of our improved apparatus applied to a door. Fig. 2 is a top plan view of the same, partly in section through the door-casing. Fig. 3 is a horizontal section taken on the line x of Fig. 1. Fig. 4 is a front elevation of the apparatus detached from the door-casing. Fig. 5 is a rear elevation of the same. Fig. 6 is a detailed elevation, partly in section, of one of the spring-actuated bolts for opening the door when the latter is released.

A represents the door, which is provided with a lock having the usual spring-actuated latching-bolt, B, provided with a knob, C, for moving the said bolt, the said knob being located on the inner side of the door, and a knob, D, on the outer side of the door, which does not affect the spring-actuated latching bolt, and is not connected thereto.

E represents spring-actuated bolts, which are secured in frames F, that are mortised in the sides of the door-casing, the said spring-actuated bolts having their outer ends bearing against the free edge of the door, on the outer side thereof, whereby when the locking devices of the door are released the pressure of the springs on the bolts E will cause the latter to move outwardly with considerable force and partly open the door by swinging it on its hinges.

a represents a plate which is mortised in the jamb of the door, and is provided on one edge, near its lower side, with a grooved offset, b, which is adapted to receive the beveled outer end of the spring-actuated latching-bolt when the door is closed. On the rear side of the

plate a is secured a frame, c, and at the lower side of the frame c, on a line with the offset b, is a rearward-projecting frame, d.

e represents an opening which is made in the plate a in a line with the offset b, and communicating with the groove therein.

f represents a rotary detent, which is secured on a shaft, g, that is journaled vertically in the frame d, and the said detent is provided with a segmental shoulder, h, which projects out through the opening e and works on the inner side of the offset b. The outer edge of the shoulder h comes flush with the face of the plate a.

i represents a vertical notch which is made in the rotary detent on one side of the shoulder h, the said notch communicating with the opening e in the plate a. From the rear side of the detent f extends an actuating-arm, k, the outer end of which is beveled or rounded at its upper side, as at k'. From the lower side of the segmental shoulder h projects a vertically-depending stud, h', and on the lower end of the shaft g, to which the detent f is secured, is placed a coiled spring, g', one arm of which bears against the rear side of the plate a, and the other arm of which bears against the stud h', the pressure of this spring serving to keep the detent normally in the position shown in Fig. 3, with the shoulder of the said detent closing the inner end of the groove in the offset b. On the rear side of the plate a is secured an electro-magnet, l, which is located in the frame c.

m represents an armature, which is pivoted in the upper end of the frame c, and is presented to the poles of the core of the electro-magnet, the said armature having a right-angled arm, m', at its upper end, which extends inwardly over the upper side of the frame c, and through which passes a vertical set-screw, m², the function of which is to regulate the play of the armature. A spring, m³, bears against the outer end of the arm m' of the armature, on the upperside thereof, so as to move the armature normally from the poles of the electro-magnet. The lower end of the armature is provided with an outwardly-extending stud, m⁴, which normally projects through an opening, c', in the rear side of the frame c, and beyond the face of the rear side of the said frame.

N represents a bell-crank lever, which is pivoted on the rear side of the frame *c*, near the upper end thereof, and has a short horizontal upper arm, *m*⁵, and a long depending arm, *m*⁶, which latter bears against the stud *m*⁴ of the armature when the said stud projects through the rear side of the frame *c*, as hereinbefore described.

o represents the locking-bar, the upper end of which is pivoted to the outer end of the arm *m*⁵ of the bell-crank lever, and the lower end of which extends through an opening, *p*, made in the upper side of the frame *d*, at the rear end of the said frame, the lower end of the said bar having a horizontal foot, *o'*, which extends transversely across the rear side of the frame *b*, and normally bears against the outer end of the arm *k* of the rotary detent. A spring, *r*, bears downwardly against the outer end of the arm *m*⁵ of the bell-crank lever and against the upper end of the locking-bar *o*.

The coils of the electro-magnet are connected in voltaic circuit with a push-button or other suitable circuit-closer.

The operation of our invention is as follows: When the door is closed, the latching-bolt thereof engages with the notch *i* in the rotary detent, so as to secure the door in a closed position, and the free edge of the door, by bearing against the outer ends of the spring-actuated bolts *E*, forces the said bolts rearwardly in their frames or cases against the tension of their springs. As the knob on the outer side of the door is not connected with the spring-actuated latching-bolt thereof, the latter cannot be released from the detent by a person on the outside by turning the knob. While the door is closed, the stud *m*⁴ of the armature projects beyond the rear side of the frame *c* across the path of the depending arm of the bell-crank lever *N*, whereby the said lever is prevented from being turned on its pivot, and thus keeps the locking-bar *o* depressed and bearing against the outer end of the locking-arm *k* of the rotary detent, thereby securing the said detent firmly in position with its shoulder *h* bearing against the outer end of the spring-actuated latching-bolt on the door. When the electrical circuit is closed, the core of the electro-magnet becomes magnetized and attracts the armature, causing the latter to move inwardly, and thereby withdrawing its stud *m*⁴ from the path of the depending arm of the bell-crank lever. The pressure of the spring-actuated bolts *E* against the free side of the door causes the door to move or swing on its hinges. As the door is opened its latching-bolt, which bears against the shoulder of the detent, partly rotates the latter, and the locking-bar *o*, being no longer maintained rigidly at the lower limit of its movement, is free to rise to release the arm *k* and move the depending arm of the bell-crank lever *N* past the opening *c'*, as shown in dotted lines in Fig. 5. The lower end of the locking-bar *o* has a horizontally-extending arm, *o*², which bears on the upper side of the arm *k* of the detent, thereby

preventing the spring *r* from moving the locking-bar downwardly when the arm *k* of the detent sweeps past the foot on the lower end of the said locking-bar.

From the foregoing specification and by reference to the accompanying drawings it will be readily understood that when the door is closed it cannot be opened by a person on the outside unless he is provided with a key for tripping the latching-bolt, but that it may be readily opened by any person on the inside by simply turning the knob *C*, and that the door may be readily caused to open by a person at a distant point by simply closing the electric circuit.

Having thus described our invention, we claim—

1. The combination, in an electric door-opener, of the rotary detent, the electro-magnet, the movable locking-bar engaging with the detent, and the armature having the stud for locking the said bar, whereby when the armature is attracted the locking-bar is released and caused to release the detent, substantially as described.

2. The combination, in an electric door-opener, of the rotary detent, the electro-magnet, the armature having the stud *m*⁴, the lever *N*, bearing against the said stud when the armature is in its normal position, and the locking-bar *o*, connected to the lever *N* and engaging with the detent, whereby when the armature is attracted the lever *N* is released, thereby causing the locking-bar to release the detent, substantially as described.

3. The combination, in an electric door-opener, of the rotary detent having the arm *k*, the armature having the stud *m*⁴, the lever *N*, bearing against the said stud when the armature is in its normal position, and the locking-bar *o*, connected to the lever *N* and engaging the detent, and having the arm *o*², bearing on the arm *k*, substantially as described.

4. In an electric door-opener, the combination of the rotary detent, the armature, the lever *N*, bearing against the armature when it is in its normal position, and the locking-bar *o*, connected to the lever *N* and engaging with the detent, substantially as described.

5. The combination, with the latching-bolt of a door, of the spring actuated bolts *E*, bearing against the free edge of the door to normally force it open, the detent engaging with the latching-bolt, the electro-magnet, the armature, and means connecting the armature with the detent for locking the latter, whereby the door is opened by the bolts *E* when the armature is attracted and caused to release the detent, substantially as described.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in presence of two witnesses.

CHARLES HENZEL.
WILLIAM WOOD.

Witnesses:

GEORGE LANDER,
CHR. SCHULDT.