No. 618,364. Patented Jan. 24, 1899.

J. & J. H. NORTHROP.

WARP STOP MOTION FOR LOOMS.

(Application filed Jan. 26, 1898.)

(No Model.)

Fig. 1

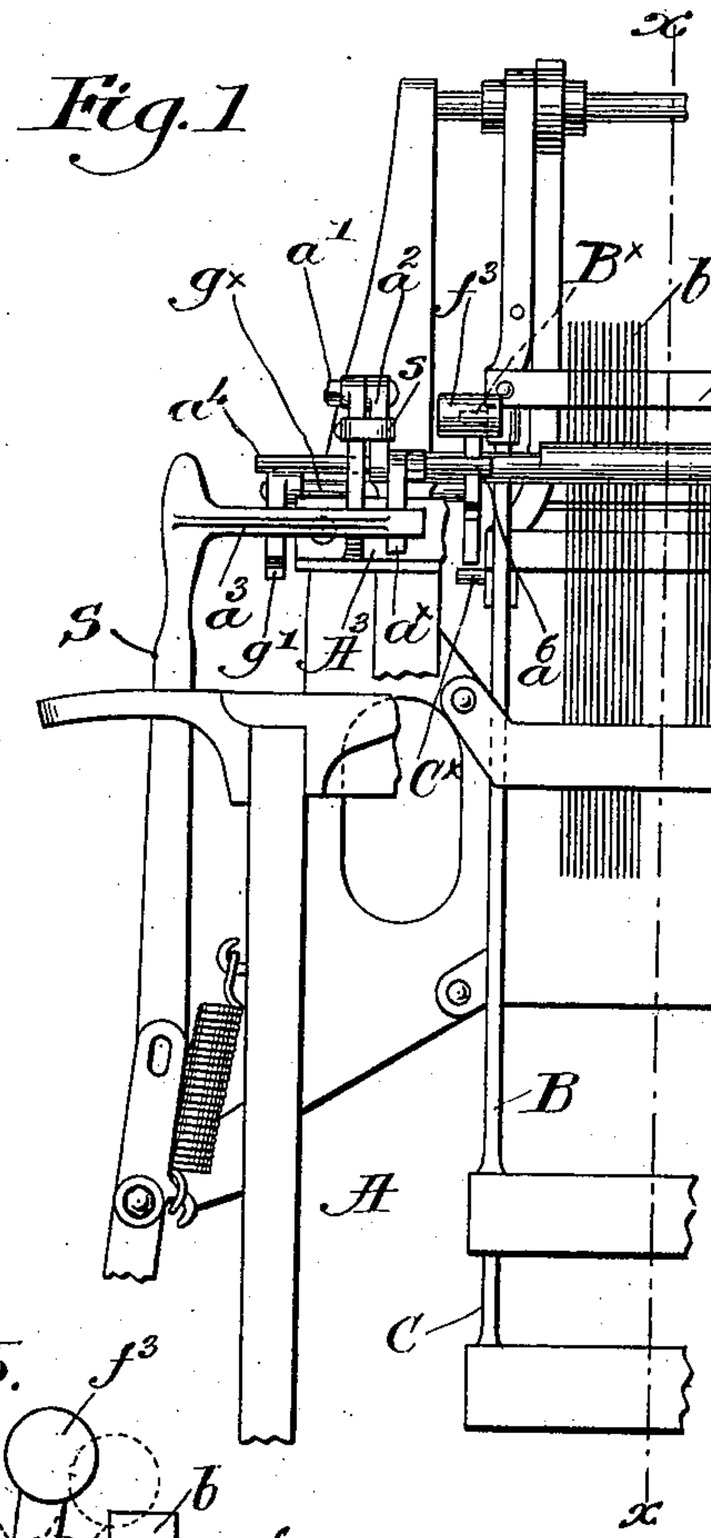


Fig. 2

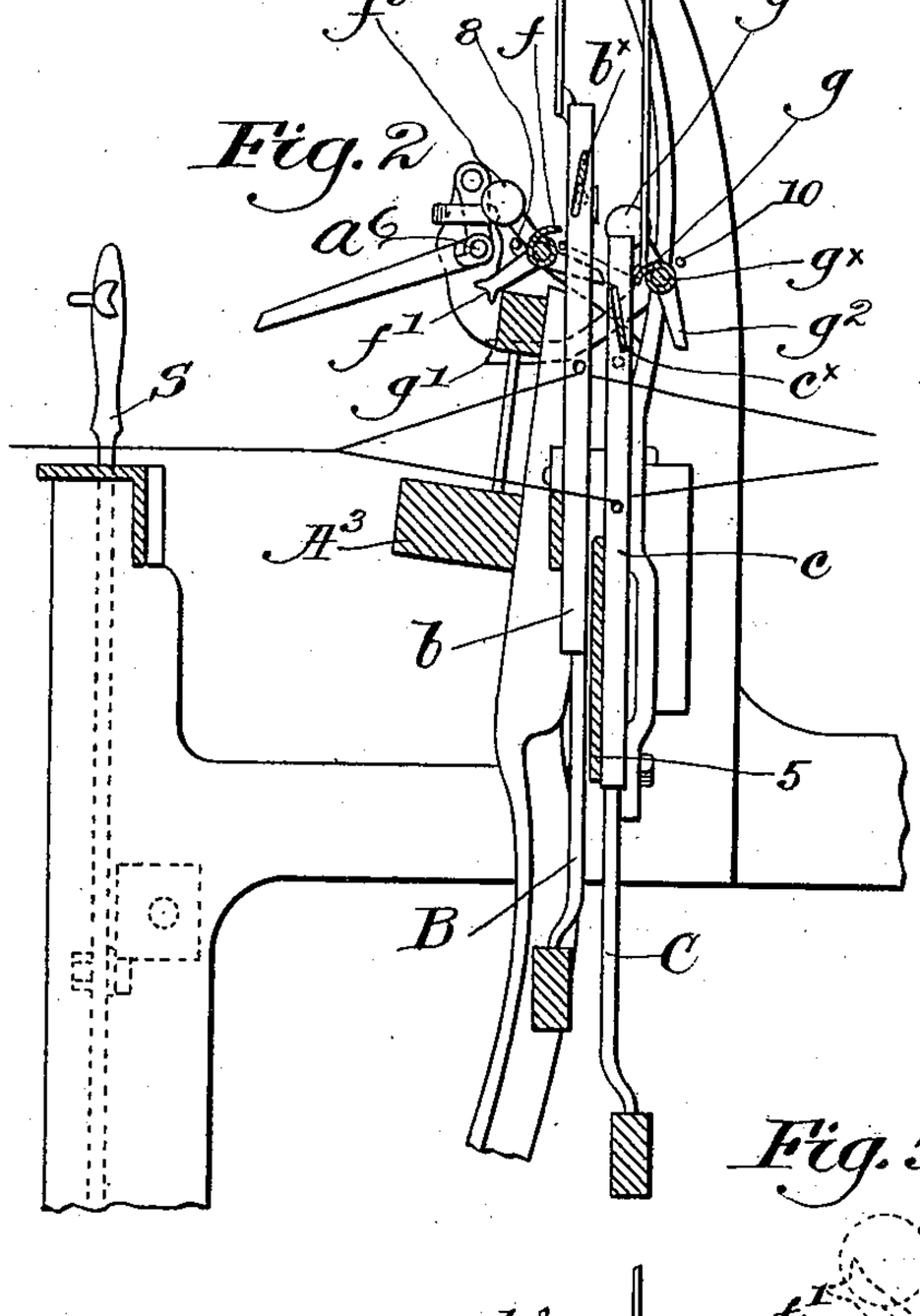


Fig. 5.

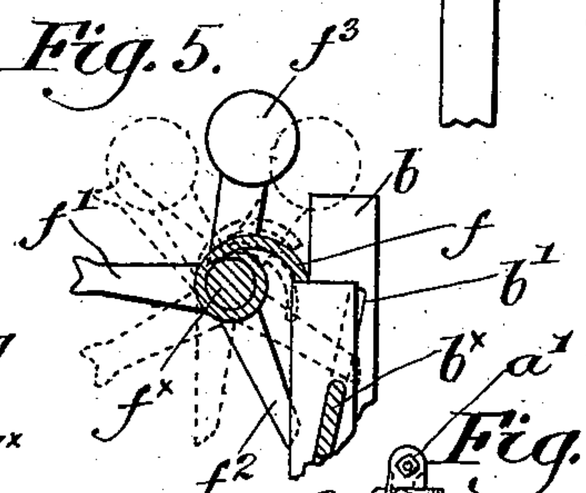


Fig. 3.

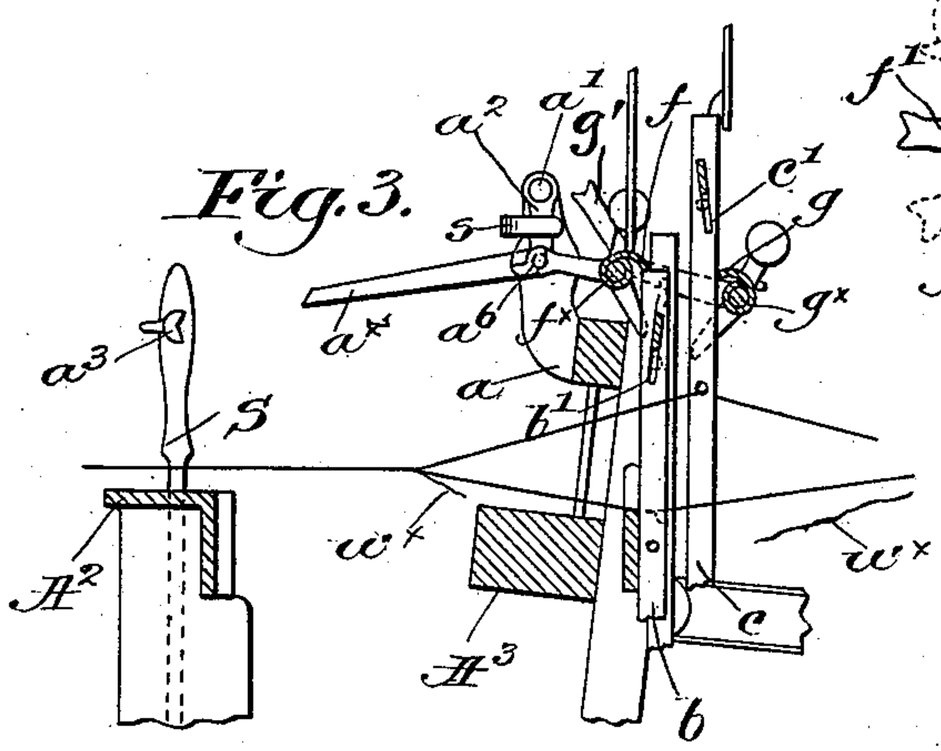


Fig. 4.

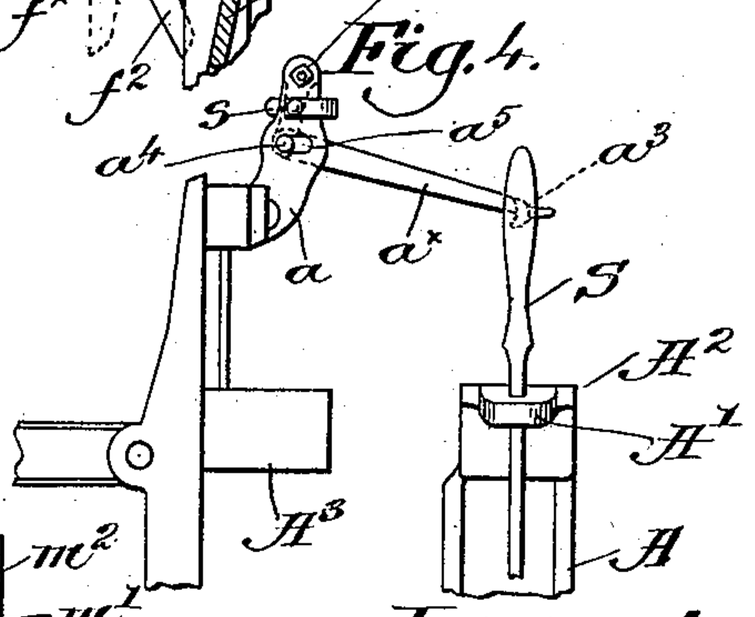
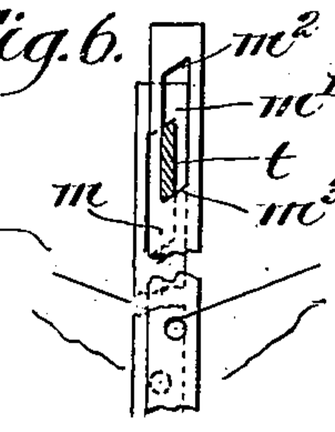


Fig. 6.



Witnesses:

A. C. Harmon.

Fred A. Gunther.

Inventors:

Jonas Northrop.

James H. Northrop.

by Crosby & Gregory, attys.

UNITED STATES PATENT OFFICE.

JONAS NORTHROP AND JAMES H. NORTHROP, OF HOPEDALE, MASSACHUSETTS, ASSIGNORS TO THE DRAPER COMPANY, OF SAME PLACE AND PORTLAND, MAINE.

WARP STOP-MOTION FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 618,364, dated January 24, 1899.

Application filed January 26, 1898. Serial No. 667,962. (No model.)

To all whom it may concern:

Be it known that we, JONAS NORTHROP, a subject of the Queen of Great Britain, and JAMES H. NORTHROP, a citizen of the United States, both residents of Hopedale, county of Worcester, State of Massachusetts, have invented an Improvement in Warp Stop-Motions for Looms, of which the following description, in connection with the accompanying drawings, is a specification, like letters and numerals on the drawings representing like parts.

This invention relates to warp stop-motions for looms of that class wherein the stoppage of the normal movement of a feeler by engagement with an abnormally-positioned actuating-detector is made effective to automatically stop the loom upon the breakage or undue slackness of a warp-thread.

In our present invention we have located the controlling means above the warp, where it is easily set and adjusted and where it is practically free from deposits of lint.

The operation of the feeler, which forms a part of the controlling means, is effected, preferably, by the reciprocating motion of the harness-frames, but is not connected directly therewith, so that it is easier to adjust the feeler and coöperating devices.

We are also enabled in our invention to obviate the usual serrated edge of the feeler, and in addition to its vertical movement a detector uncontrolled by its warp-thread has also a substantially horizontal movement in the direction of the length of the warp when it moves into position to engage the feeler.

Various other novel features of our invention will be hereinafter described, and particularly pointed out in the claims.

Figure 1 is a partial front elevation of a loom with one embodiment of our invention applied thereto. Fig. 2 is a vertical sectional view thereof on the line $x\,x$, Fig. 1, looking toward the left. Fig. 3 is a like view, but showing the parts in operative position ready to effect stoppage of the loom. Fig. 4 is a detail in elevation, looking to the right, Fig. 1. Fig. 5 is an enlarged detail, partly in section, showing the movement of the feeler; and Fig. 6 is a detail view of a modified form of detector.

The loom-frame A, lay A^3, shipper S, connected in usual manner with belt-shifting devices, (not shown,) the holding-plate A′, and the breast-beam A^2 may be and are all, as usual, in looms. The lay has mounted thereon at the end adjacent the shipper a bracket a, on which is pivoted at a' an arm a^2, having an attached dagger $a^\times$, adapted to be moved into position to engage a lateral extension a^3 on the shipper, said extension being preferably concaved on its inner face. (See Fig. 3 and dotted lines, Fig. 4.) A spring s on the bracket bears frictionally on the arm a^2 and retains the dagger in operative or inoperative position, while a stud or pin a^4 on the arm passes through a slot a^5 in the bracket, said stud extending laterally beyond the outer side of the arm at a^6.

We have herein shown the detectors also serving as heddles, though our invention is not restricted thereto, two series of such detectors b c being shown as thin, flat sheet-metal strips having warp-receiving eyes and inclined slots b' c', respectively, correspondingly-inclined supporting-bars $b^\times$ $c^\times$ extending through the slots and being secured to the frames B C, which are reciprocated in usual manner.

The lower ends of the detectors are free, and the two series are separated by a transverse plate 5, attached to the loom-frame.

The slots in the detectors are longer than the width of the cross-bars extended therethrough, so that the detectors have a limited vertical movement relative to the bars, and by virtue of the inclination of the latter the detectors have also a horizontal movement edgewise or in the direction of the length of the warp.

As shown, the slots in the detectors b are inclined oppositely to those in the detectors c, for a purpose to be described.

We have shown transverse rock-shafts $f^\times$ $g^\times$ mounted on the loom back and front of the detectors and adjacent thereto, and the feelers f and g are attached to said shafts, the feelers being shown as plates of metal bent

around the shafts and carried beyond them in a curve toward the adjacent edges of the detectors. The feelers are normally moved back and forth or rocked by means to be described, and if the warp-threads are intact the detectors will not be moved into the path of movement of the adjacent feeler. Now when the detector-supporting bar descends the inclination of the slots in the detectors and the inclination of the bar will cause the detectors to move edgewise away from the adjacent feeler-shaft. If a warp-thread breaks or unduly slackens, however, its detector will drop in advance of the descent of the supporting-bar and will move edgewise toward the path of the feeler, so that the edge of the latter will engage the extreme end of and be stopped by the thus abnormally-positioned detector, such condition of affairs being shown in Figs. 3 and 5, the support resisting the pressure on the detector in the direction of its length. A finger f', having a preferably-notched end, is vibratable with the feeler f, and when the movement of the latter is stopped, as described, the finger is brought into position to engage the projecting end a^6 of the pin as the lay moves back and thereby swing the dagger $a^\times$ into operative position to release the shipper at the next forward stroke of the lay.

It will be noticed that the spring s acts as a detent to hold the dagger in position when set, and when the dagger engages the extension a^3 the dagger will be moved by the impact into normal position before the final movement of the lay releases the shipper, so that the dagger is automatically reset after each operation thereof.

A suitably-shaped finger g', movable with the feeler g, is located to operate on the projecting end of the pin a^4 when said feeler is stopped to set the dagger, as described.

By inclining the slots in the detectors outwardly and correspondingly inclining their supporting-bars the two series of detectors move properly to coöperate with their respective feelers, as described, and it will be noticed that the feelers and the devices between them and the shipper to release the latter upon stoppage of a feeler are all located above the warp, so that they are accessible, readily adjustable, and not in position to catch and become clogged with lint.

The vibration of the feelers is effected initially in a positive manner, the movement being completed by momentum of the feeler, and we have shown rocker-arms f^2 g^2, movable with the feelers and projecting, respectively, into the paths of pins or projections $B^\times$ $C^\times$ on the two harness-frames. Each feeler is also provided with an upturned arm carrying a weight, as f^3 g^3, the relative angular positions of the finger, weight, and rocker-arm being clearly shown in Fig. 5, the weight tending to carry the feeler to its extreme position when it has been moved past the center in either direction.

Referring to Fig. 2, the feeder f is shown in one extreme position, and as the frame B descends the projection $B^\times$ hits the rocker-arm f^2 and throws the weight f^3 over the center, so that the movement of the feeler to its other extreme position or toward the detectors is completed by gravity after the harness has reached its lowest position. The upstroke of the harness-frame causes the projection $B^\times$ to hit the weight f^3, throwing the feeler in the direction away from the detectors, and the operation of feeder g is similarly effected through the projection $C^\times$. The parts are so timed that an abnormally-positioned detector will present its end into the path of the feeler on its inward stroke, so that the movement of the feeler will be stopped with the finger in position to effect the operation of the dagger $a^\times$. Suitable stops 8 and 10 are provided to limit the outward throw or movement of the feelers f and g, respectively.

In Figs. 3 and 5 we have shown the feeler f as stopped by engagement with the end of an abnormally-positioned detector whose warp-thread $w^\times$ has broken. (See Fig. 3.)

Our invention is not restricted to the precise construction or arrangement of parts herein shown and described, as the same may be varied or rearranged in various particulars without departing from the spirit and scope of our invention.

In Fig. 6 a modification of the detector is shown, the detectors m having wide slots m' therein with parallel inclined upper and lower ends m^2 m^3, respectively. The supporting-bar t is parallel to the sides of the slot, which is wider than the said bar. When the bar is lowered and a warp-thread breaks, the detector will drop and will be moved horizontally by the sliding of the inclined upper end m^2 of the slot on the bar into the position shown by the farther detector, Fig. 6. The nearer detector is shown in the position assumed when the warp-thread is unbroken.

Having fully described our invention, what we claim, and desire to secure by Letters Patent, is—

1. In a warp stop-motion for looms, a series of thin sheet-metal stop-motion-actuating detectors controlled by the warp-threads, a reciprocating support for said detectors, means to permit a limited vertical and horizontal movement of the detectors on said support, a normally-vibrating feeler adapted to be engaged by the extreme end of and stopped by a detector moved vertically and horizontally into abnormal position by breakage or undue slackness of its warp-thread, stopping mechanism for the loom, and controlling means therefor operated by or through stoppage of the feeler.

2. In a warp stop-motion for looms, stop-motion-actuating detectors controlled by the warp-threads, a reciprocating support for said detectors, means for permitting a limited vertical and horizontal movement on said

support, a feeler adapted to normally vibrate in a path adjacent the longitudinal edges of the detectors, stopping mechanism for the loom, and controlling means therefor operated by or through stoppage of the feeler, a detector moving into position to bring its end into the path of movement of and to stop the feeler upon breakage or undue slackness of its warp-thread.

3. In a warp stop-motion for looms, stop-motion-actuating detectors controlled by the warp-threads, a feeler adapted to vibrate in a path adjacent the longitudinal edges of the detectors, when the latter are normally positioned, means to effect movement of a detector horizontally upon breakage or undue slackness of its warp-thread, to bring its end into the path of the feeler and stop the movement of the latter, and stopping means for the loom, operated by or through stoppage of the feeler.

4. In a warp stop-motion for looms, stop-motion-actuating detectors having eyes through which the warp-threads pass and provided each with a slot near one end, a movable support for said detectors, extended through the slots thereof and adapted to resist pressure upon the detectors in the direction of their length, a normally-vibrating feeler adapted to be engaged by the end of a detector in abnormal position, and stopping means for the loom operated by or through stoppage of the feeler.

5. In a warp stop-motion for looms, a series of stop-motion-actuating detectors, a coöperating, vibratable feeler, a weight movable with the feeler and tending to maintain it in either extreme position, means to impart initial movement to said feeler alternately in opposite directions, to carry the weight past its dead-center, the momentum of the feeler completing its movement, stopping mechanism for the loom, and controlling means therefor operative upon stoppage of the feeler due to abnormal position of a detector.

6. In a warp stop-motion for looms, a series of stop-motion-actuating detectors, having inclined slots therein, a reciprocating supporting-bar extended through said slots, to move the detectors horizontally in their reciprocations, a feeler normally vibratable adjacent the detectors, and stopping means for the loom operative by or through stoppage of the feeler, the breakage of a warp-thread permitting its detector to move in the direction of the length of the warp into position to engage and stop the movement of the feeler.

7. In a loom, the lay, a dagger pivotally mounted thereon above the warp, a friction device to hold the dagger in operative or inoperative position, a shipper, stop-motion-actuating detectors controlled by the warp-threads, a vibratable feeler to coöperate therewith, a rock-shaft upon which the feeler is mounted, located above the warp and having an attached dagger-controller, to move the dagger into position to directly engage the shipper, and means to vibrate the feeler and normally maintain the said controller inoperative, stoppage of the feeler by a detector uncontrolled by its warp-thread bringing the dagger-controller into operative position.

8. In a loom, a reciprocating heddle-frame, a series of detector-heddles carried thereby, means for permitting a limited vertical movement of the detector-heddles relative to the frame and also in the direction of the length of the warp upon breakage of a warp-thread, a vibratable feeler having a normally-unobstructed path of movement, and stopping means for the loom, operative by or through stoppage of the feeler, breakage of a warp-thread permitting movement of its detector in the direction of the warp into the path of and to stop the feeler.

9. In a warp stop-motion for looms, a series of stop-motion-actuating detectors, having slots therein, a reciprocating supporting-bar extended through said slots, the detectors having a limited vertical and horizontal movement relative to said bar, a feeler normally vibratable adjacent the detectors, and stopping means for the loom operative by or through stoppage of the feeler, breakage of a warp-thread permitting its detector to move in the direction of the warp into position to engage and stop the movement of the feeler.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

JONAS NORTHROP.
JAMES H. NORTHROP.

Witnesses:
HERBERT S. MANLEY,
GEO. OTIS DRAPER.