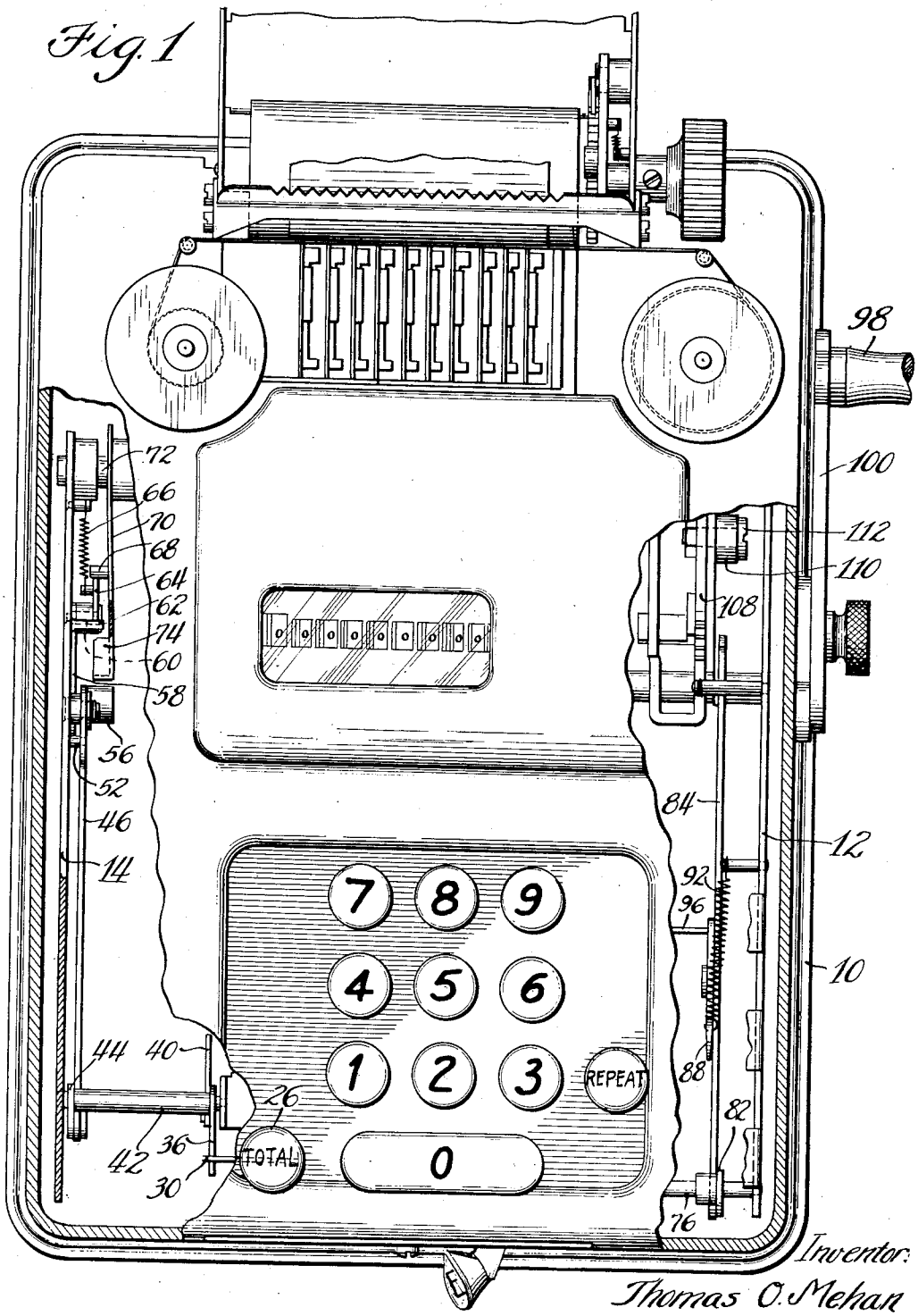
Dec. 8, 1931. T. O. MEHAN 1,835,170

TOTAL KEY MECHANISM

Filed Feb. 20, 1930 3 Sheets-Sheet 1

Fig. 1



Inventor:
Thomas O. Mehan
By Williams, Bradbury, McCabe & Hinkle.
Attys.

Dec. 8, 1931. T. O. MEHAN 1,835,170

TOTAL KEY MECHANISM

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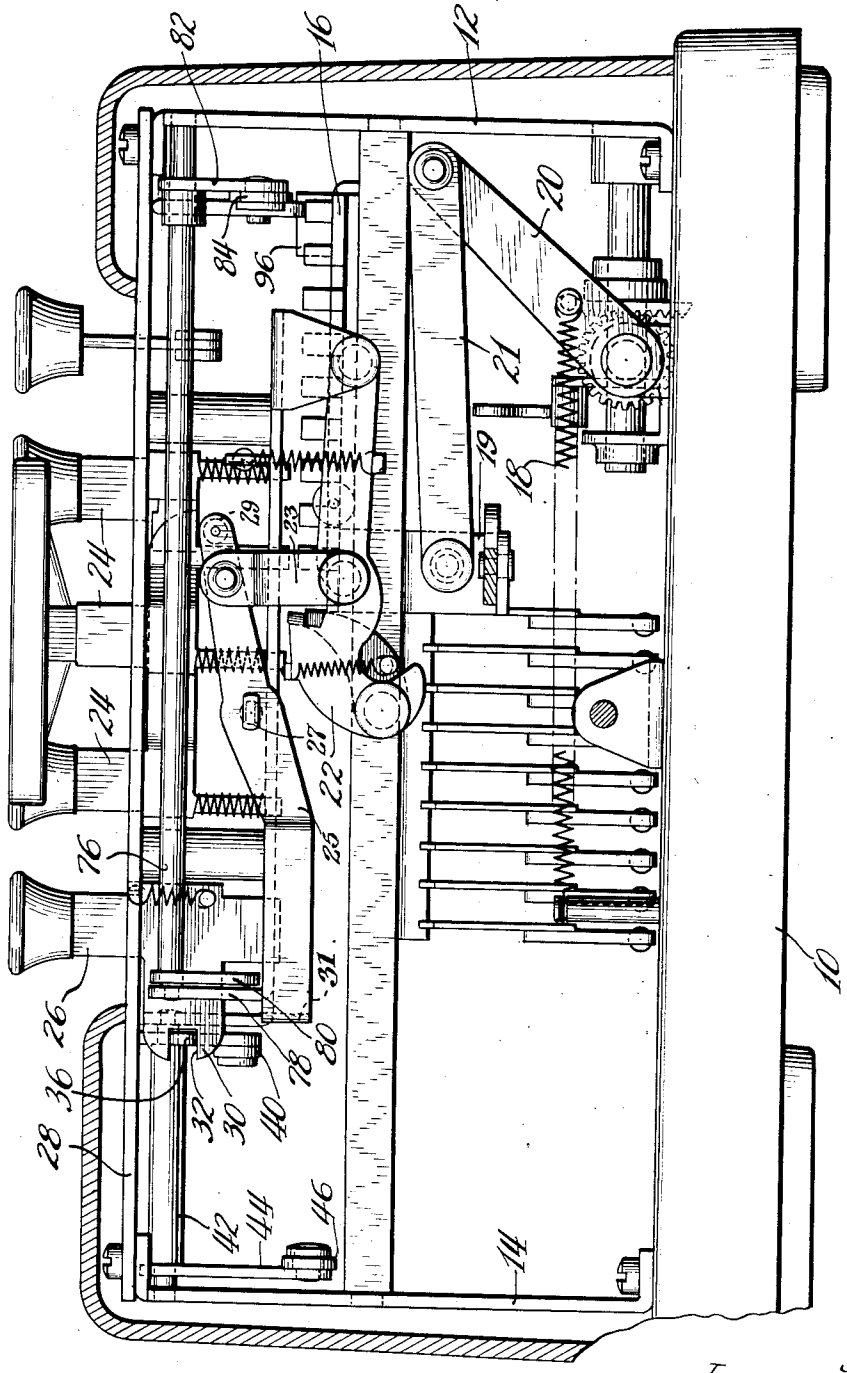


Fig. 2

Inventor.
Thomas O. Mehan

By Williams, Bradbury, McCaleb & Hinkle.
Attys.

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Fig. 3

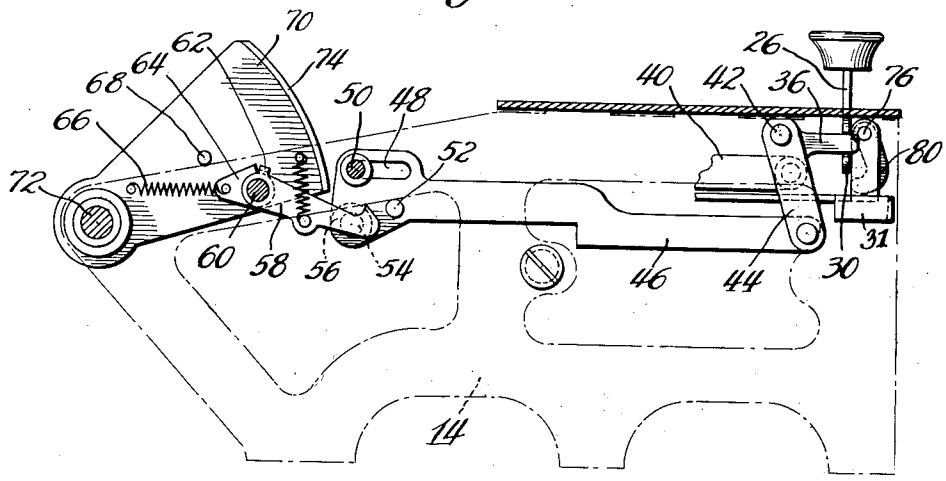
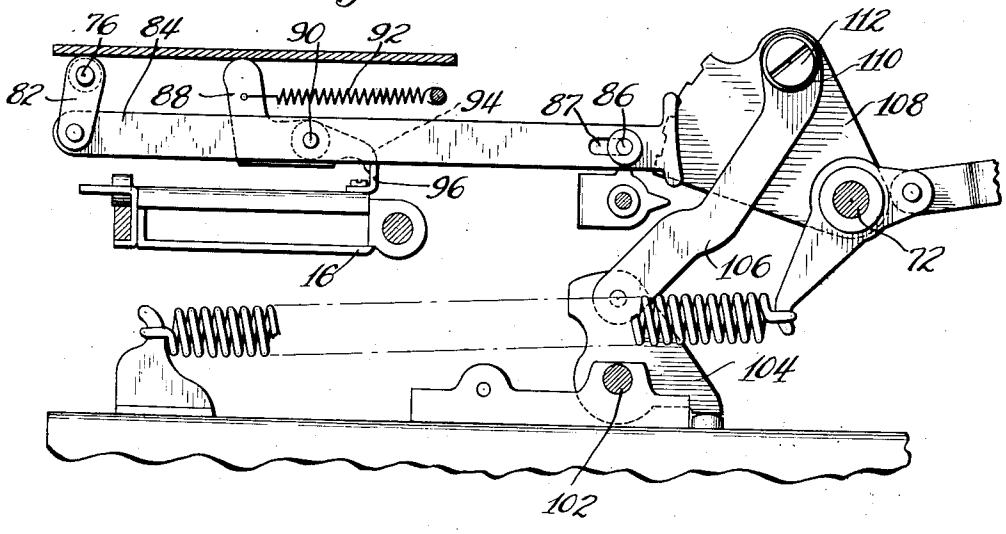


Fig. 4



Inventor:
Thomas O. Mehan

By Williams, Bradbury, McCaleb & Hinkle.
Attys.

Patented Dec. 8, 1931 1,835,170

UNITED STATES PATENT OFFICE

THOMAS O. MEHAN, OF CHICAGO, ILLINOIS

TOTAL KEY MECHANISM

Application filed February 20, 1930. Serial No. 429,921.

My invention relates generally to adding machines and more particularly to improved total key controlling mechanisms.

It is an object of my invention to provide an improved means for preventing operation of the total key of a ten-key adding machine when the pin carriage thereof is displaced from normal position.

A further object is to provide an improved means for maintaining the total key depressed throughout substantially a complete operating cycle of the machine.

A further object is to provide improved means for immediately locking the total key upon actuation of a numeral key.

A further object is to provide improved means for forcing the operator to take a "blank stroke" before taking a total.

A further object is to provide a total key control mechanism which will prevent improper operation of the total key and thus eliminate the possibility of rendering the machine inoperative by attempts to take totals when the machine is not in condition for a total-taking operation.

Other objects will appear from the following description, reference being had to the accompanying drawings, in which:

Fig. 1 is a plan view of my improved machine, portions of the casing being broken away to show the operative parts;

Fig. 2 is a front elevational view thereof with the casing removed;

Fig. 3 is a left-side elevation of the means used to hold the total key depressed during the operation of the machine; and

Fig. 4 is a right-side elevation of the portion of the mechanism used to control the total key.

It is well-known that in most types of adding machines the transfer is effected by an excess movement of the actuations and before an accurate total can be taken the actuations must be restored to normal position. This operation usually requires an additional "blank stroke" of the operating handle before the total-taking operation can be initiated. The mechanism of my invention is designed to accomplish this result and at the same time to control the total-taking operation in such a manner that improper operation of the machine is impossible.

Fig. 1 illustrates a ten-key adding machine of the type more fully disclosed in my copending application Serial No. 73,393, filed December 5, 1925, and comprises a base 10 upon which are mounted front side frames 12 and 14. A pin stop carriage 16 is mounted for transverse reciprocable movement on guides supported by the frames 12 and 14, being normally urged to the left by a tension spring 18 which is connected to a depending arm 19 of the carriage by a lever 20 and link 21. A suitable escapement mechanism designated generally 22 is operated upon depression of any one of the numeral keys 24 and permits the carriage to move step by step to the left (Fig. 2). This mechanism is operated through a link 23 pivotally connected to a lever 25 having a fixed pivot 27. The lever 25 forms part of a bail, the cross rod of which lies beneath extensions formed on the key stems 24. The lever 25 has a rearwardly extending lug 31, as shown in Fig. 3.

The total key 26 is vertically slidable in the top plate 28 and has a sideward projection 30 formed thereon which lies above the lug 31. The projection 30 is provided with an open end slot 32 for the reception of the end of one arm of a bell crank lever 36, the other arm of which is connected to a link 40. Link 40 operates to shift the accumulator engaging and disengaging mechanism so that the latter will operate to take a total and clear the accumulator when the link 40 is moved toward the rear of the machine (to the left as shown in Fig. 3).

The bell crank lever 36 is secured to a shaft 42, at the left-hand (Fig. 2) end of which is fixed an arm 44. The lower end of arm 44 is pivotally connected to a longitudinal link 46. The rear end of link 46 has a slot 48 formed therein which received a stud 50 carried in the side frame 14. The link 46 has an outwardly projecting pin 52 near its rearward end and an inwardly projecting stud 54 carrying a roller 56. A latch 58 is pivoted on a pin 60 secured to the side frame 14 and has a bent-over lug 62 which is adapted to be engaged by a tooth formed on a pawl 64.

The latter is normally held in the position shown by a spring 66 but is adapted to be engaged by a pin 68 formed on a keeper plate 70. The plate 70 is secured to a main shaft 72 which, upon operation of the machine, oscillates through an angle of about 45° clockwise of the position shown in Fig. 3 and has an outwardly projecting flange 74 which, when the link 46 is in its rearward position engages in front of the roller 56 and prevents said link from again moving forward until just prior to the completion of the operating cycle.

A shaft 76 is rotatably mounted in the frame 12 and in an upwardly struck lug 78 and has a hook 80 secured near its left-hand end. The toe of this hook is adapted to lie beneath the sideward projection 30 and thereby prevent depression of the total key 26 under certain conditions.

An arm 82, secured to the shaft 76 adjacent its right-hand end, is pivotally connected to the forward end of a link 84, the rearward end of which is guided by a pin 86 which projects through a slot 87 formed in the link. A latch 88 is pivoted to the link 84 at 90 and has a spring 92 connected thereto so as normally to rotate the latch clockwise (Fig. 4). The latch 88 has a toe portion 94 adapted to engage the vertical portion of an angle clip 96 which is secured to the pin carriage 16.

The machine is operated by a handle 98 secured to an operating lever 100 which, in turn, is non-rotatably secured to the operating stub shaft 102. The latter has an arm 104 secured thereto, the arm having suitable stop portions to limit the degree of oscillation of the shaft. A link 106 pivotally connects the arm 104 with a full stroke sector 108 which is secured to a main shaft 72. A roller 110 is rotatably secured on a stud 112 which also serves as a pivotal connection between the link 106 and the sector 108. This roller is adapted to contact with the rear end of link 84 and move the latter forwardly to the position in which it is shown in Fig. 4 should the link have been permitted to move rearwardly under the influence of spring 92 and should the clip 96 have been moved away from the position in which it engages the toe portion 94 of the latch 88.

The machine is operated in the usual manner by depression of selected numeral keys 24 which operate to set up the pin stops in the carriage 16. Depression of any one of the numeral keys causes the escapement mechanism 22 to permit the carriage to move to the left (Fig. 2) under the influence of spring 18. As soon as the carriage moves one step to the left from its normal position the latch 88 is no longer restrained by the clip 96 and the spring 92 moves the link 84 rearwardly until it is arrested by the engagement of the pin 86 with the forward end of the slot 87.

Rearward movement of the link 84 swings the shaft 76 counter-clockwise (Fig. 4) or clockwise (Fig. 3), causing the hook 80 to engage beneath the sideward projection 30 of the total key stem. The total key will thus remain locked against depression by the hook 80 during two complete operations of the machine. During the first operation the hook is temporarily released since the link 84 is moved forwardly by the roller 110 but when this takes place the roller 56 will lie in front of the flange 54 and thus prevent depression of the total key.

Since the carriage is returned to normal position just prior to the completion of the operating stroke, the toe 94 of the latch 88 will have passed rearwardly of the position normally taken by the clip 96 before the carriage is in normal position. Thus, upon the completion of the first operation of the machine, the link 84 wil be in its rearward position and the total key locked. Thus, an additional operation of the machine is necessitated to condition it for total taking. During this blank stroke the carriage 16 will, of course, remain in normal position and when the link 84 is moved forwardly by the roller 110 the toe 94 will engage the clip 96 and the link thereby held in forward position. With the link in this position, the hook 80 is removed from beneath the sideward projection 30 of the total key stem and the total may therefore be taken upon the third operation.

Upon depression of the total key the bell crank lever 36 is swung clockwise (Fig. 3) and, through link 40, conditions the accumulator shifting mechanism to take a total. The clockwise movement of the bell crank lever 36 is imparted through lever 42 to the arm 44 and link 46 and the latter moved rearwardly, whereupon it wil be held in its rearward position by the latch 58 engaging with the pin 52. It will be apparent that upon depression of the total key the numeral keys will be held against depression since the lever 25 is prevented from pivoting clockwise because of the engagement of its lug 31 with the projection 30 of the total key stem.

Upon operation of the machine the keeper plate 70 will be swung clockwise and its flange 74 positioned in front of the roller 56. During the clockwise oscillation of the plate its pin 68 contacts with the pawl 64 and wipes past it without effect. Upon the return stroke during the counter-clockwise movement of the keeper plate 78, the pin 68 will however, engage beneath the pawl 64, and, through the engagement of the latter with the lug 62, swing the latch 58 clockwise a sufficient distance to release the pin 52 and permit forward movement of the link 56.

The invention is capable of wide variation within equivalent limits and I contemplate such variation as may be desirable or useful in the particular adaptation of the invention shown, or in its adaptation to other

mechanisms, I do not restrict myself in any unessential particulars, but what I claim and desire to secure by Letters Patent is:

1. In a ten-key adding machine having a stop pin carriage, a total key, means for locking said total key against depression, a spring normally moving said means to locking position, a stop member on said pin carriage, a latch engageable with said stop when the pin carriage is in normal position, operating means, and an element connected to said operating means for moving said locking means against the tension of said spring once during each operation of the machine at a time in the operating cycle of said machine when said carriage is adapted to be shifted from normal position.

2. In a ten-key adding machine, the combination of a movable stop pin carriage, a total key, an element for locking said total key against operation, a link operatively connected to said element, a latch pivotally secured to said link, a spring operably connected to said latch, a stop on said pin carriage engageable by said latch, operating means for the machine, and a member moved by said operating means and adapted to move said link and said latch past said stop whereby said link will be held against return movement by the engagement of said latch with said stop when said carriage is in normal position.

3. In a ten-key adding machine, the combination of operating means, a stop carriage, a stop element secured to said carriage, a total key, means for locking said total key against operation, and mechanism conjointly controlled by said stop and said operating means for rendering said locking means inoperative, said stop being ineffective to control said mechanism except when the latter is conditioned for such control by said operating means.

4. In a ten-key adding machine, the combination of a slidable stop carriage having a stop member secured thereto, a total key, a locking element for preventing operation of said total key, additional means for preventing depression of said total key during the major portion of the operating cycle of said machine, and mechanism controlled by said stop member for operating said locking element upon completion of an operating cycle in which said stop carriage has been moved from normal position and been returned thereto.

5. In an adding machine having a stop pin carriage, a total key, a total key lock, a spring normally moving said lock to locking position, a stop on said carriage, a latch engageable with said stop when the pin carriage is in normal position, operating mechanism, and means actuated by said operating mechanism for moving said locking means against the tension of said spring once during each operation of the machine at a time when said carriage is shifted from normal position.

6. In an adding machine, the combination of a movable stop carriage having a lug secured thereto, a total key, a lock for said total key, additional means for preventing depression of said total key during the operation of the machine, and mechanism including said lug for preventing operation of said lock upon completion of an operation in which said stop carriage has not been moved from normal position but rendering said locking means operative upon completion of an operation in which said carriage has moved from its normal position.

7. In a ten-key adding machine, the combination of a stop carriage movable from normal position in adding operations, a total key, means for locking said total key against operation, and means controlled by said carriage for rendering said locking means inoperative upon completion of an operation in which said carriage has remained in normal position and for rendering said locking means operative upon completion of an operation in which said carriage has moved from its normal position.

8. In a ten-key adding machine, the combination of a stop pin carirage movable from normal position during an adding operation, a total key, an element for locking said total key against operation, a link operatively connected to said element, a latch pivotally secured to said link, a spring secured to said latch, operating means for the machine, and a member moved by said operating means and adapted to move said link and said latch past said stop whereby said link will be held against return movement by the engagement of said latch with said stop if the carriage is in normal position, said member being thus moved during the period of the operating cycle of the machine when carriage is displaced from normal position in an adding operation.

9. In an adding machine, the combination of a stop carriage movable from normal position during adding operations, a total key, an operating shaft, means controlled by said operating shaft to prevent depression of said key when said operating shaft is displaced from normal position a predetermined extent during a normal adding operation and to hold said key depressed during a total-taking operation, a lock for said total key, a spring normally holding said lock in locking position, mechanism actuated from said operating shaft while the latter is displaced from normal position to move said lock against the tension of said spring, and a stop on said carriage engageable with said mechanism to prevent said lock from moving to locking position when said carriage is in normal position.

10. In combination with the usual elements

of a ten-key adding machine, a stop pin carriage movable from normal position, a total key, a transversely extending rock shaft, a lock secured to said shaft for preventing operation of said total key, a longitudinally extending link having its rearward end guided for longitudinal movement, an arm fixed to said rock shaft and pivotally connected to the forward end of said link, a latch pivotally conected to said link and resiliently stressed to engage a portion of said carriage, operating means having a forward and a return stroke, and an element connected to said operating means and engageable with the rearward end of said link to move the latter forwardly near the end of the forward stroke of said operating means.

In witness whereof, I hereunto subscribe my name this 17th day of February, 1930.

THOMAS O. MEHAN.