J. M. DALY.

COMPUTING MACHINE.

APPLICATION FILED APR. 11, 1904.

956,687.

Patented May 3, 1910.

2 SHEETS—SHEET 1.

FIG. 1

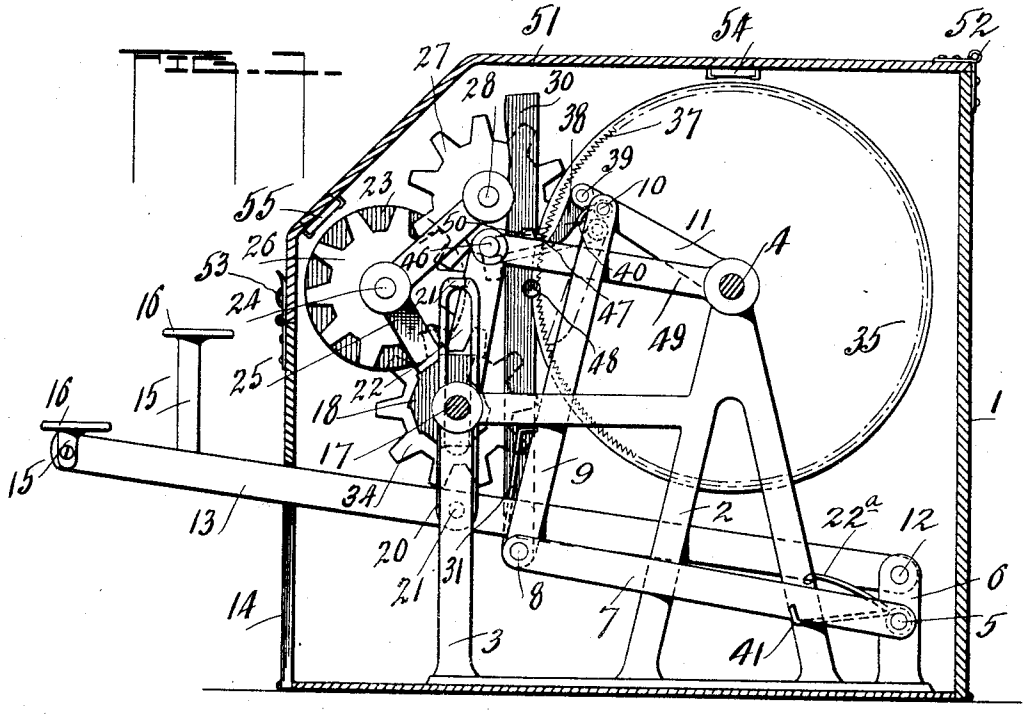
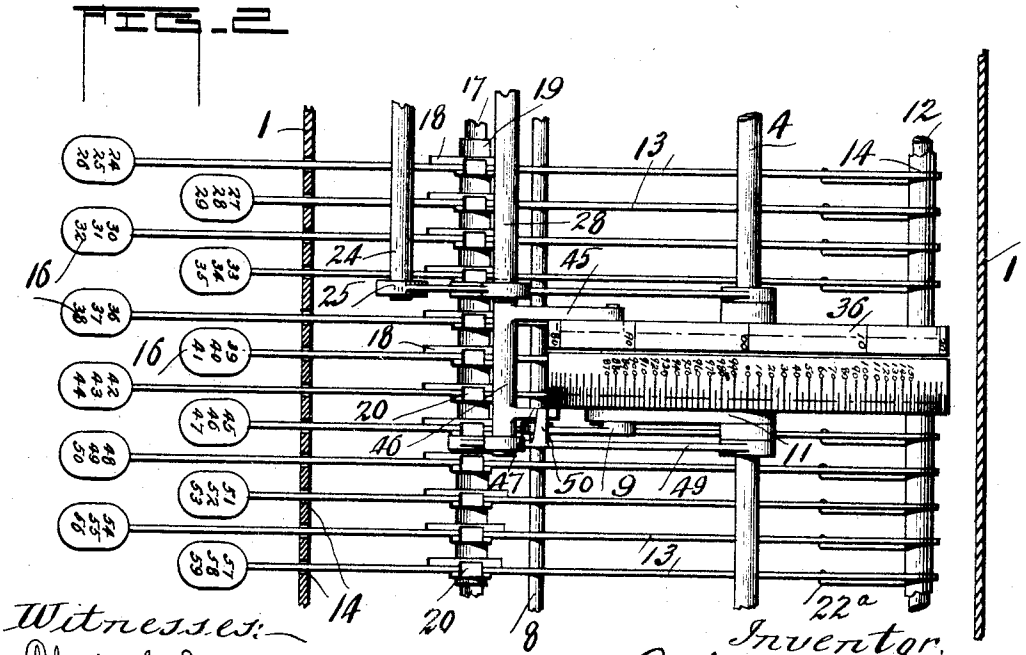


FIG. 2



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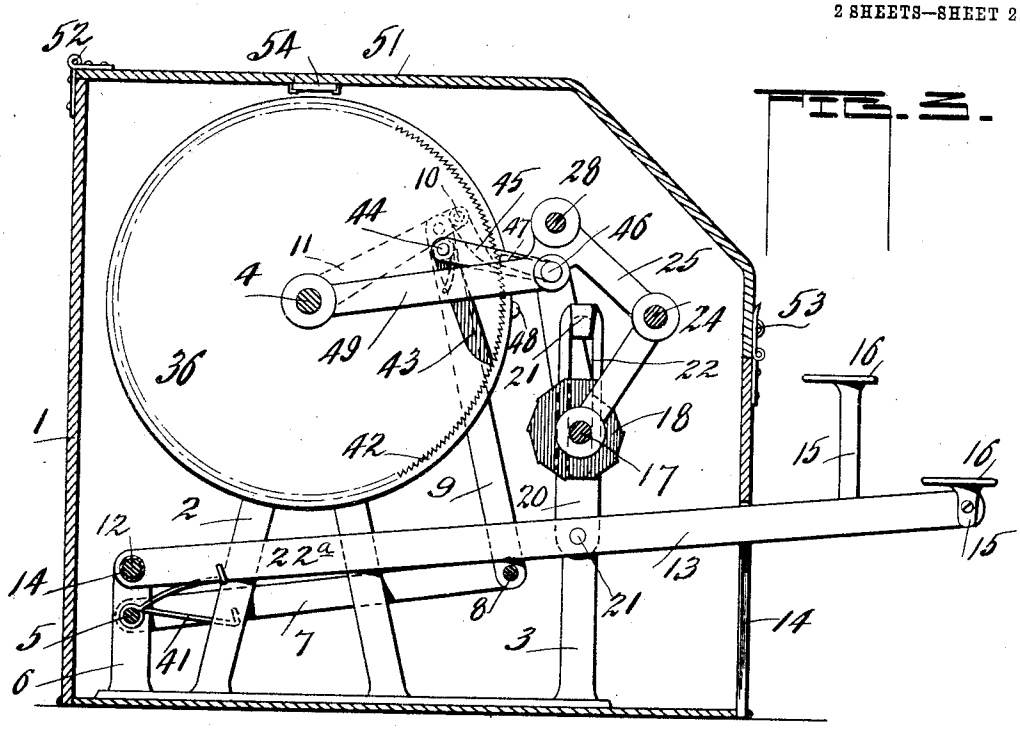

FIG. 2.

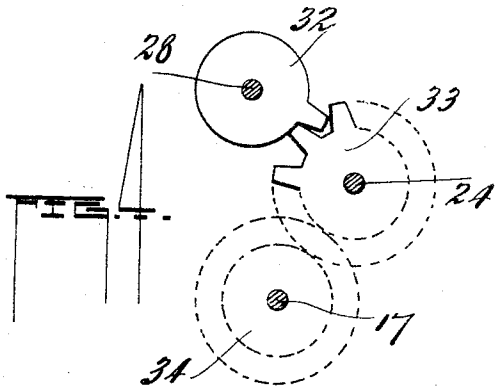

FIG. 4.

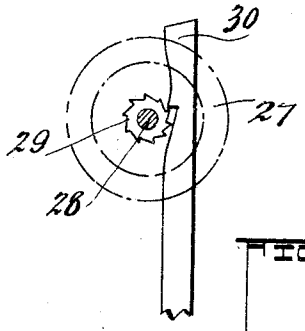

FIG. 5.

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COMPUTING-MACHINE.

956,687. Specification of Letters Patent. Patented May 3, 1910.

Application filed April 11, 1904. Serial No. 202,552.

To all whom it may concern:

Be it known, that I, JOHN M. DALY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Computing-Machines; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

This invention has reference to a computing machine, and has for its object the equation of train tonnage or for computing the tonnage resistance in railway trains. The object being to reduce or adjust the loading of engines from an actual weight to a draw-bar pull.

That the invention may be more fully understood, reference is had to the accompanying drawings forming a part of this specification, in which:—

Figure 1 is an elevation of one end of my improved machine, with the casing shown in section; Fig. 2 is a plan view of so much of the machine as will illustrate my improvements, and showing the casing in section; Fig. 3 is a vertical sectional elevation taken adjacent to the tonnage recording mechanism, and looking into the machine just opposite to that shown in Fig. 1; Fig. 4 is a view in outline to show certain gearing of the tallying device, and being opposite to that shown in Fig. 1; Fig. 5 is a detail showing the means of operating the tallying device.

Like numerals of reference indicate corresponding parts throughout the figures.

In the drawings, 1 indicates a casing which may be of suitable form and in which the operative parts of my device are contained. The device may be portable as shown in the drawings or otherwise as may be desired, and of a size most convenient. In the casing are carried the standards 2 and 3, supported upon the base of the casing and suitably connected together, the parts which are shown in Fig. 1 being arranged in series to support certain operative parts in the length of the machine. In the standards 2 there is journaled a shaft 4 and on this shaft are carried certain recording wheels which will be hereinafter referred to and described more in detail. There is provided in this machine, as in the machine in the application referred to, a link-frame adapted to be actuated by any one of a series of key-bars for the purpose of registering on the recording wheels the tonnage resistance of cars called for by any one of the key-bars which may be actuated, the link-frame being suitably connected with the recording wheels for this purpose. The link-frame comprises a shaft 5 extending longitudinally in the frame and journaled in the standard 6 at opposite ends thereof, and attached to the ends of the shaft 5, are shown the bars 7 extending forwardly, and connecting the free ends of the bars 7 is shown a rod 8. Extending up from and attached to the opposite ends of the rod 8 are link-bars 9, the upper end of which is pivotally connected at 10 to an arm 11 carried by and extending forwardly from the shaft 4, the purpose of which will be further described.

12 denotes a rod, its opposite ends journaled in the upper ends of the standards 6, and 13 denote a series of key-bars having their inner ends pivoted on the shaft 12 and the bars 13 are separated by the spacing collars 14 carried on the shaft 12; the bars 13 extend forwardly inclined slightly upwardly and pass over the rod 8 with the lower edges of the bars 13 lying in close proximity to the upper face of the rod 8. The bars 13 pass out of the casing 1 through slots 14 arranged in the front wall of the casing in which the key-bars 13 are adapted to have vertical movement, and the key-bars are alternately long and short to economize in space, and are provided on their outer extremities with the short arms 15 to which is attached a key or button 16, upon the face of which are adapted to be placed certain numerals representing cars of certain tons as called for by the way bills or manifest, substantially as in the application referred to.

17 indicates a longitudinally disposed shaft which is journaled in the upper ends of the standards 3, and upon said shaft is carried a series of stop members 18, in practice one to co-act with each of the key-bars 13. The said stop members are provided with peripheries which have graduated depressed portions extending from a point remote from the center of the stop member shaft and terminating adjacent thereto, and the said stop members have the extended hub

portions 19 to provide a suitable bearing therefor on the shaft 17. The stop members are so arranged on the shaft that they are alternately disposed with vertically movable bars or arms 20, which at their lower ends are pivotally attached to the key-bars as at 21, and are further provided with the elongated slots 22 in their body through which the shaft 17 extends and to adapt the bars 20 to have an extended movement across the axis of the shaft which is occasioned by the depression of the key-bars 13 to which the bars 20 are attached. Each of the bars 20 are provided with the depending ears or lips 21, which overlie the peripheral edges of the stop members 18 and are adapted to engage or abut with the stop members 18 when the keys are depressed, serving to limit the stroke of the keys. The arms 20 are adapted to be and are preferably uniform in length, while the lips or depending ears 21 of the succeeding arms are shorter than those on the preceding bars 20, and while it is preferable to construct the bars 20 as just described, it is to be understood that no limitation is to be put upon the length of the bars or their lips. The key-bars are adapted to be normally held in a raised position, with the lips of the bars 20 in their extreme upper position raised above the stop members described, accomplished by means of springs 22^a bearing upwardly against the lower edge of the key-bars 13, with a coil of the spring wound around the shaft 5. These springs serve also, to return the key-bars to their normal position after each depression when the hand or finger of the operator is released therefrom. Any number of key-bars may be employed, and they may be disposed as shown in Fig. 2 of the drawings, each of the keys representing cars of a specified tonnage and on the button 16 of said keys is adapted to be placed one or more numerals indicating to the operator the tons represented by the keys, substantially as is disclosed in the application referred to and as herein shown. In this application, the stop members have ten graduated portions with which the lips 21 of the bars 20 are adapted to co-act, and in Fig. 1, the stop member there shown in elevation, may be taken as representing a seventy (70) ton stop member, while in Fig. 3, the stop member there shown may be taken as representing a forty (40) ton stop member. As in the application referred to, the machine here shown may also be taken as based on a sixteen hundred (1600) ton rating, the unit of which is a forty (40) ton car; therefore, all of the stop members would be adjusted to this rating and the depending lips or ears 21 of the bars 20 would be made in lengths to correspond to the stop members with which they co-act. This would necessitate making the stop members which represent the unit of rating with a series of uniform portions on their peripheries to admit of placing a given number of cars in a train without showing any increased resistance until after reaching a certain length in the train.

It is to be understood in this as well as in the application referred to, that the machines may be constructed to represent engines of any rating which may vary from eight hundred to twenty-five hundred tons, more or less, and that the stop members and bars 20 would be made to suit this rating. It is also understood that in making up a train of cars, it is adapted to compute the increased resistance after a series of cars have been put in the train, and it was shown in the application referred to that it was adjusted to cars in series of eight, while in this case, the stop members are adjusted to compute them in series of ten and devices are provided so that after ten cars have been assembled in series, the stop member shaft will be caused to make a partial rotation which will increase the length of stroke of the bars 20 during the placing of the next ten cars, and simultaneous with the next ten strokes the stop members will be again automatically adjusted to give additional movement to the bars 20 and such movement is carried on throughout the operation of the machine which is clearly apparent.

The mechanism which operates the stop member shaft is also adapted to actuate a tallying device, in all respects similar to that shown in the application referred to for registering the number of cars placed in a train. A detail description of the tallying device is unnecessary except to say that units wheels 23 are carried on a shaft 24 which is journaled in a bracket 25, and the shaft 24 is actuated by means of a gear wheel 26 meshing with a gear wheel 27, the latter being carried on a shaft 28 also journaled in the bracket 25 and the shaft 28 has an intermittent movement through a ratchet 29 actuated by a ratchet arm 30, the lower end of which is carried by the shaft 8 and the upper end thereof held for engagement with the teeth of the ratchet wheel by means of the spring 31. Thus it will be seen that upon the actuation of a key-bar, the shaft 8 is depressed and through the ratchet arm 30 the shaft 28 receives a partial rotation sufficient to move the wheel 27 the distance of one tooth and also the wheel 26 which meshes therewith. Upon every complete revolution of the shaft 28, a segmental toothed wheel 32 is brought into play for actuating one of the units wheels 23, which is accomplished by providing a gear wheel 33 on the shaft 24 with which the single tooth of the segmental gear intermeshes, substantially as in the application referred

to. And upon every complete revolution of the shaft 24, the shaft 17 is caused to make a partial revolution which is accomplished by means of a gear wheel 34 carried by the shaft 17 which meshes with the gear wheel 33.

Referring now to the tonnage recording mechanism, the same comprises a wheel 35 carried on the shaft 4. On the face of this wheel is provided a series of suitable signs and numerals indicating tons. In this instance, the signs are transverse lines accompanied by numerals indicating from "00" to "990" tons, so that in the actuation of the key-bars in one complete revolution of the wheel 35, the operator may record from "00" to "990" or "1000" tons. There is associated with the wheel 35 a supplemental wheel 36, which is also carried on the shaft 4 and adjacent to the wheel 35. On the face of this wheel, is arranged a series of signs and numerals for the purpose of registering during the continued rotation of the recording wheel 35, from "1000" to "10000" tons. I accomplish this by ruling the face of the wheel 36 at stated intervals and providing numerals such as "00", "10", "20", etc. Mechanism is provided operating synchronously with the movement of the key-bars and when a complete revolution is made by the wheel 35 for registering tonnage from "1000" and upward. In other words, with every complete revolution of the wheel 35, the wheel 36 will make one tenth of a revolution. The movement of the wheels 35 and 36 is caused primarily by the actuation of the key-bars 13 and with the assistance of the link-frame described, The wheel 35 is provided with a flange having the internally arranged ratchet face 37, the ratchet teeth of which may be spaced the distance of a one ton mark appearing on the surface of the wheel, five, ten, more or less; in this instance, the teeth are arranged at every five ton mark.

38 is a pawl co-acting with the ratchet teeth of the wheel 35 and is pivotally supported at 39 on the outer end of the arm 11, and the pawl is held under the tension of a spring 40 to insure its contact at all times with the ratchet teeth. Thus it will be seen, upon the depression of a key-bar, the link 9 will move downwardly bringing with it the bar 11 and the engagement of the pawl 38 with the ratchet teeth of the wheel 35 will impart a partial revolution thereto, which is pre-determined by the length of the key-bar which is depressed and the position of the stop member with which it co-acts. Upon the release of the key-bar, the same will return to its normal position in the manner specified, and the link-frame will be returned to its normal or raised position carrying with it the arm 11 and the pawl 38 by means of a spring arm 41 bearing against the lower face of the bar 7 and having a portion coiled around the shaft 5.

The wheel 36 has a flange similar to the wheel 35 which is provided with the internally arranged ratchet ring 42 corresponding to the ratchet 37 of the wheel 35. Co-acting with the ratchet teeth 42, is a spring held pawl 43, which is pivotally connected at 44 to the outer end of a bar 45 which is attached to or is integral with a stem 46 journaled in the bracket 25. To obtain the desired movement of the wheel 36 with every complete revolution of the wheel 35, I have provided a short arm 47 carried upon the opposite end of the stem 46, which projects into the path of a pin 48 extending radially from the side of the wheel 35, and the stem 48 at the proper time during the rotation of the wheel 35, engages with the arm 47, and by such engagement imparts a partial rotation to the stem 46, which will oscillate the arm 45 and through the pawl 43 attached thereto, partially rotate the wheel 36, the stem 46 and the arms 45 and 47 being held under the tension of a suitable spring, not shown, as soon as the pin 48 passes beyond the end of the stem 47, the spindle 46 will return the parts to the position as shown in the figures. A frame 49 is provided which serves as a support for the spindle 46 and from such frame extends a lug or lip 50 with which the arm 47 abuts when in its normal position and insures the same being always in position for engagement with the pin or stem 48 as the wheel 35 is revolved.

With a recording device for computing the tons of resistance in a train of cars, such as illustrated herein, there is obviated any complication in the construction of the machine as the parts are reduced to a minimum and taken as a whole, very much simplified. By recording with a wheel such as 35, where the rating does not extend over one thousand tons, the machine may be again simplified by the omission of the wheel 36 and the mechanism referred to as coöperating with the wheel 35 for actuating the said wheel 36.

The casing 1 is provided with a cover 51, hinged at 52 and adapted to be locked at 53. The same may be swung backward to expose to view the operative parts of the apparatus and give access thereto. There is also provided in the cover 51, a sight opening 54 suitably located above the tonnage recording wheels to enable the operator to note the number of tons as recorded by such tonnage wheels; and 55 denotes a sight opening which is also arranged in the cover 51 and is to enable the operator to note the number of cars in the train as recorded by the tallying device, all of which, it is believed, is readily understood.

Having thus fully described my inven-

tion, what I claim and desire to secure by Letters Patent of the United States, is:

1. Mechanism for computing the tonnage resistance in trains of cars, comprising one or more registering wheels, keys for operating said wheels, each bearing one or more numerals, a stop-member for each key, having irregular acting portions and arranged to limit the stroke of said keys as they are depressed, means operated by said keys after a predetermined number of strokes thereof for automatically changing the position of said stop-members and thereby the stroke of the keys, the operation of the keys causing the registering wheels to add and to display amounts at variance to the amounts appearing on said keys, and with each change of position of the stop-members to cause the registering wheels to add an increased or decreased amount according as the stroke of said keys are changed.

2. Mechanism for computing the tonnage resistance in trains of cars, comprising one or more registering wheels, a link-frame, a plurality of key-bars either one of which will operate the link frame, connections between the link-frame and the registering wheels, means for limiting the stroke of each key-bar as it is depressed, and means operated by the key-bars for changing the position of the limiting means after a predetermined number of strokes of said key-bars, the stroke of said keys if fully depressed, being invariable between each change of the limiting means, and variable with each change of said limiting means.

3. Mechanism for computing the tonnage resistance in trains of cars, comprising a pair of registering wheels, one of said wheels adapted to make one tenth of a revolution with every revolution of the second wheel, key-bars adapted to operate said last mentioned wheel, means operated by said last mentioned wheel for imparting movement to said first mentioned wheel, means for limiting the stroke of each key-bar as it is depressed, and means operated by the key-bars for changing the position of the limiting means after a predetermined number of strokes of said key-bars, the stroke of said keys if fully depressed being invariable between each change of the limiting means, and variable with each change of said limiting means.

4. In combination, a plurality of key-bars, a registering wheel adapted to register up to one thousand tons, connections between the registering wheel and the key-bars, means for limiting the stroke of each key-bar as it is depressed, and means operated by the key-bars for changing the position of the limiting means after a predetermined number of strokes of said key-bars, the stroke of said keys if fully depressed being invariable between each change of the limiting means, and variable with each change of said limiting means.

5. In combination, a plurality of key-bars, mechanism for limiting the length of stroke of said key-bars, means operated by said key-bars for automatically changing the position of the limiting mechanism and thereby change the distance which the key-bars may be moved, a pair of registering wheels, one adapted to register up to one thousand tons and the two wheels combined adapted to register up to ten thousand tons, connections between the key-bars and first mentioned wheel, and means operated by the first mentioned wheel for actuating its mate at pre-determined intervals.

6. In combination, a plurality of key-bars, mechanism for limiting the length of stroke of said key-bars, means operated by said key-bars for automatically changing the position of the limiting mechanism and thereby change the distance which the key-bars may be moved, a pair of registering wheels, one of which registers with each movement of the key, and the other wheel adapted to register with each revolution of the first mentioned wheel.

7. A machine of the character specified, comprising a plurality of key-bars, succeeding bars in the series adapted to have a longer movement than its preceding key, means for limiting the movement of each key, one or more registering wheels, means for actuating one of said wheels upon each movement of a key-bar, a car-tallying mechanism, and means for actuating such tallying mechanism with each stroke of a key-bar.

8. The combination of a plurality of key-bars, means for limiting the key stroke, so that for a predetermined number of strokes said keys will have an invariable movement, means operated after a predetermined number of strokes of each key-bar for automatically changing the position of the limiting means for the purpose of varying the stroke of such key-bars, the registering wheel 35 having on its periphery suitable characters and provided with an internal ratchet face, a link frame, a pawl adapted to have engagement with the ratchet teeth of the wheel and actuated by the link frame, and means for actuating the link frame upon the movement of any one key-bar.

9. In combination, a plurality of key-bars, the registering wheels 35 and 36 having on their peripheries suitable characters and each of said wheels provided with an internally arranged ratchet face, pawls adapted to have engagement with the teeth of each of said wheels, a link-frame, connections between the link-frame and pawl of the wheel 35, means actuated by the wheel 35 when it has made a complete revolution for actuating the pawl engaging the teeth of

the wheel 36 and thereby impart a partial revolution to said wheel 36, means for actuating the link-frame upon the movement of any one key-bar, means for limiting the key stroke, and means for automatically changing the position of the limiting means and thereby increase the length of stroke of said key-bars after a predetermined number of strokes thereof.

10. In a machine of the character specified, the combination of a plurality of key-bars, mechanism for limiting the key stroke, means for automatically changing the position of the limiting mechanism and thereby increase the length of stroke of said key-bars, after a predetermined number of strokes thereof, the wheel 35 having an internal ratchet ring, a pawl having engagement with said ratchet ring, and oscillatory support for said pawl, the wheel 36 having an internal ratchet ring, the spindle 46, a pawl engaging the teeth of the wheel 36 and pivotally connected with the spindle 46, the arm 47 connected with said spindle and means on the wheel 35 adapted to engage and oscillate the arm 47 and thereby impart a partial revolution to the wheel 36, in manner and for the purpose described.

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

JOHN M. DALY.

Witnesses:

JULIUS I. IVERSON,

G. M. WOOD.