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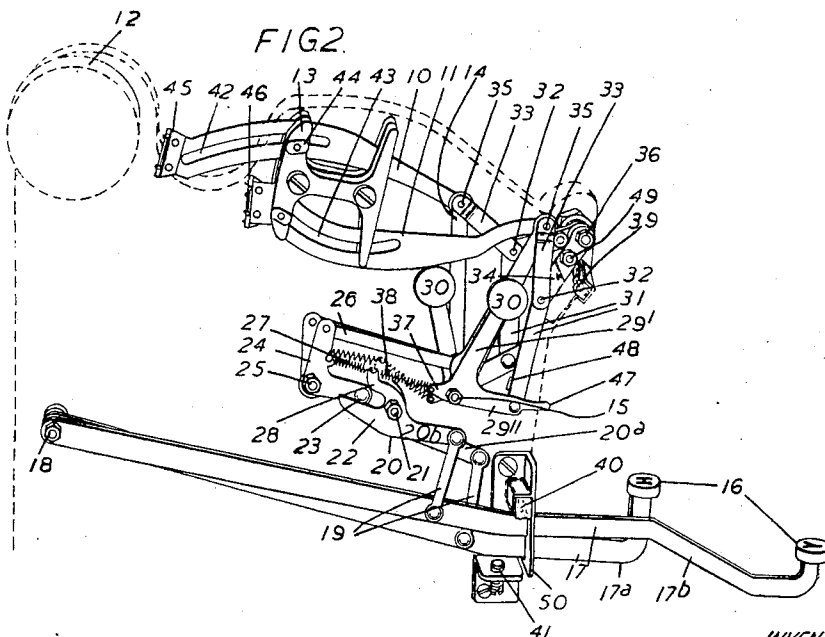
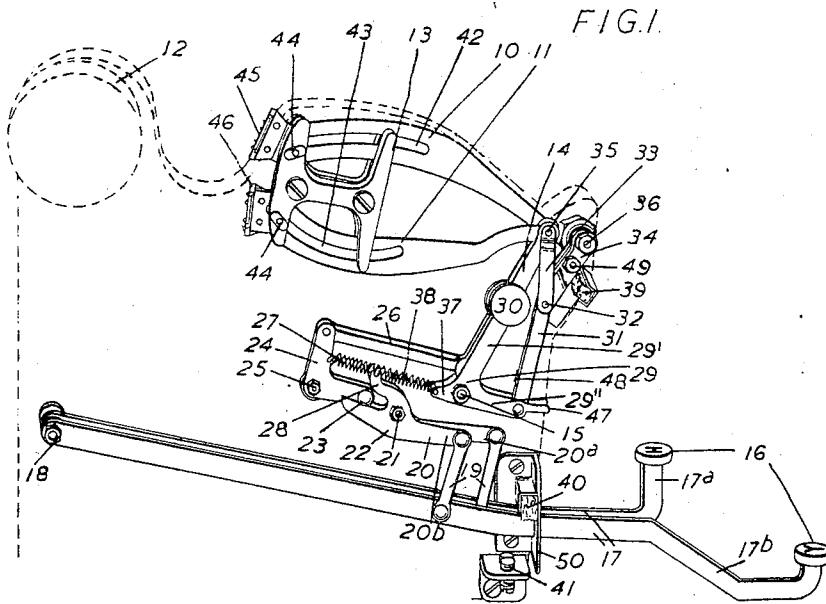
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2,437,804

END THRUST TYPE BAR ACTION FOR TYPEWRITING MACHINES

Filed Sept. 7, 1945

5 Sheets-Sheet 1



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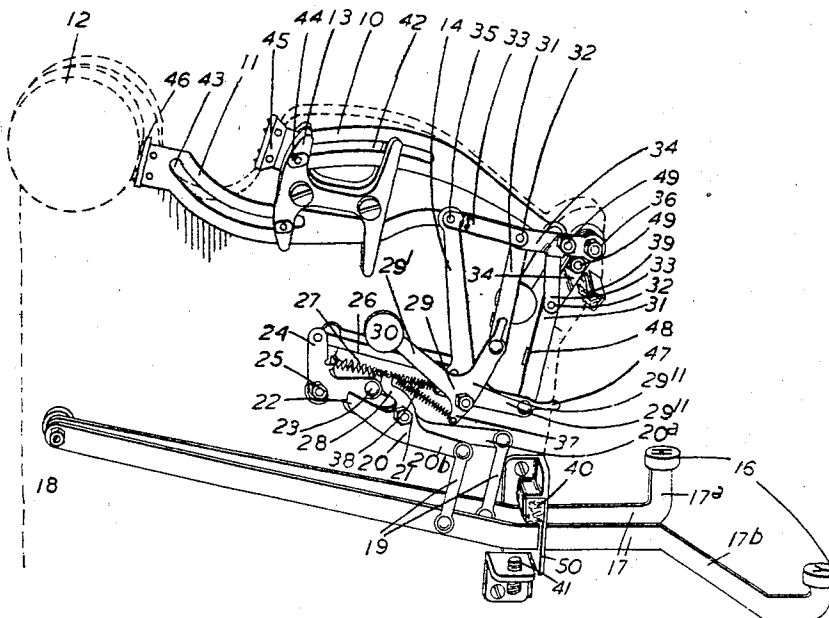
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FIG. 5.



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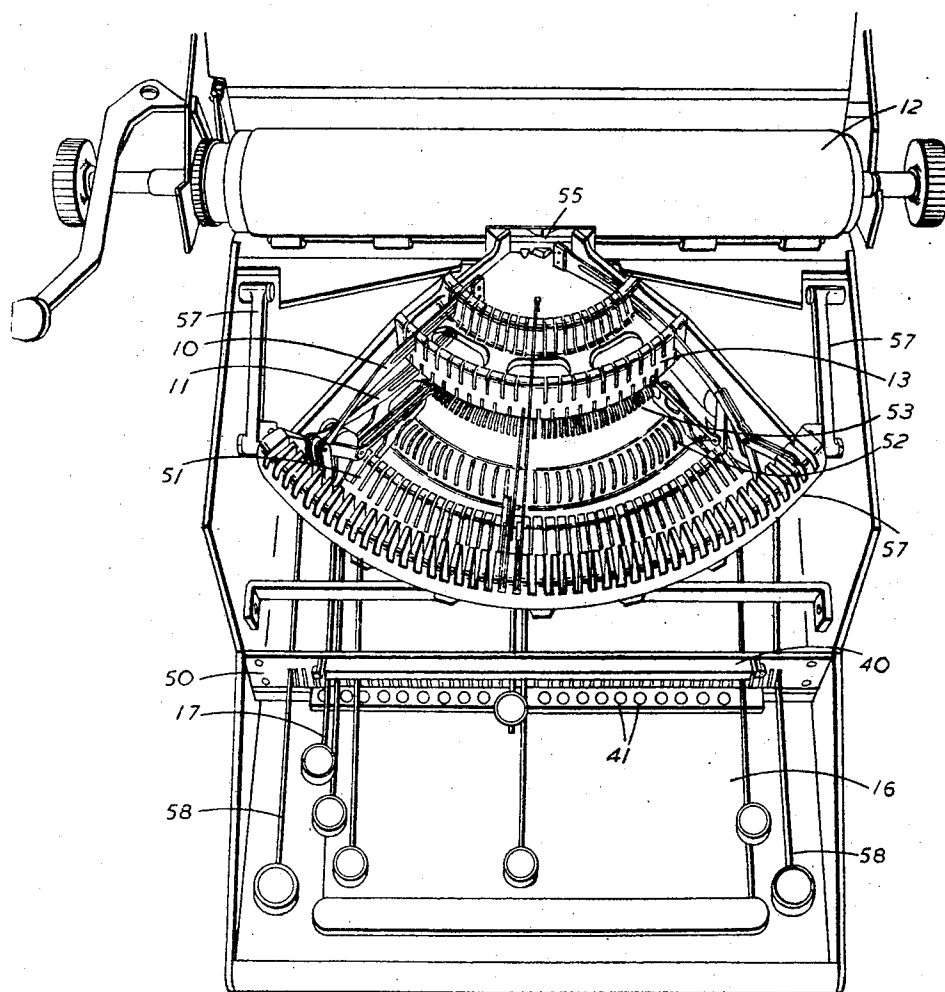
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FIG. 6.



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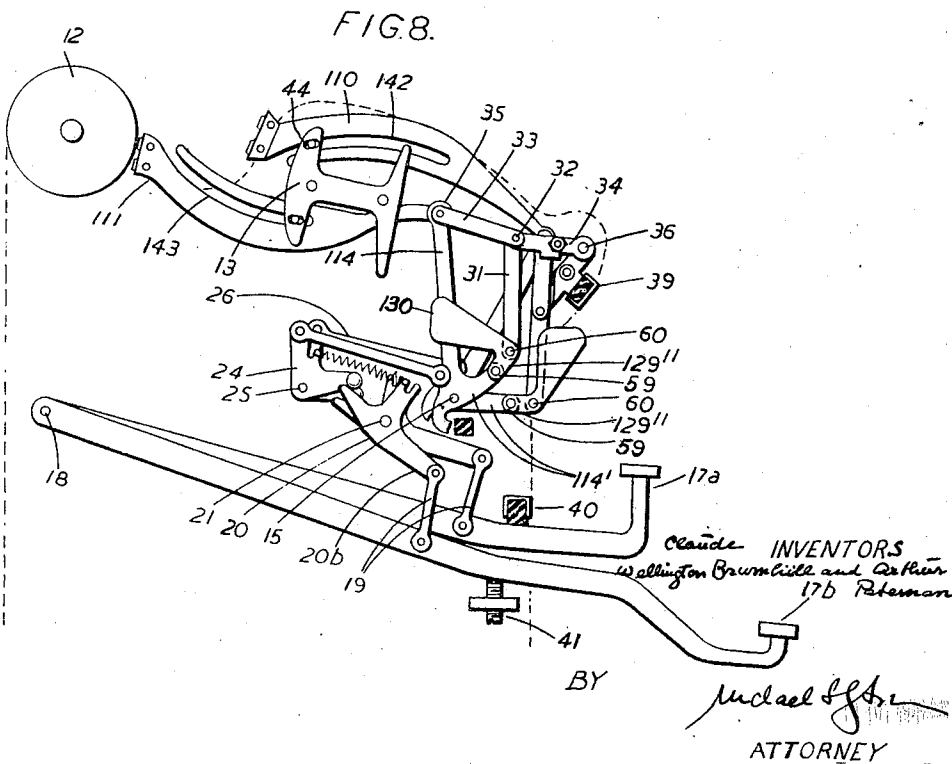
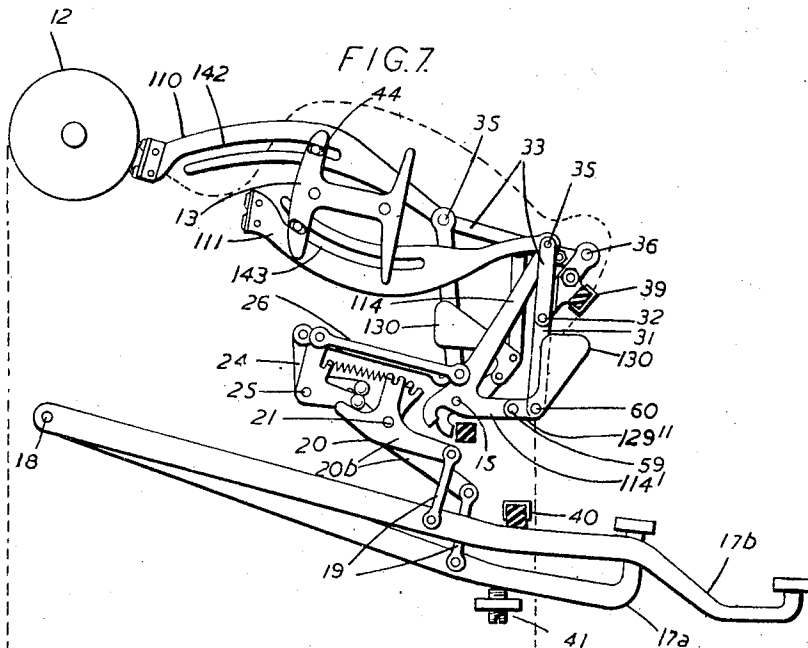
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END THRUST TYPE BAR ACTION FOR TYPEWRITING MACHINES

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UNITED STATES PATENT OFFICE

2,437,804

END THRUST TYPE BAR ACTION FOR
TYPEWRITING MACHINES

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to The Imperial Typewriter Company Limited,
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Application September 7, 1945, Serial No. 614,898
In Great Britain September 14, 1944

9 Claims. (Cl. 197—25)

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This invention concerns the action of typewriters and like machines. One object is to produce an action that is relatively quiet; another is the production of a relatively quiet action that is compact so that the dimensions of the machine may be reduced or the space employed for other purposes; and a further object is a relatively quiet action giving a clear impression.

In typewriters the action is commonly so constructed that the various type heads or blocks, disposed when at rest in an arc, move in along substantially radial planes towards the platen to strike at a central spot, so that the movement of the majority of them is oblique to the platen. Therefore, in order to prevent an oblique type impact and a blurred impression, a type guide is provided at the centre which guide engages each type head near the extremity of the travel thereof and deflects the obliquely moving ones so that they exert a normal pressure on the platen. It is not possible to secure a satisfactory arrangement of each type head with the guide unless during the latter part of its travel it moves in a substantially rectilinear path, but this desideratum is difficult to achieve when compactness and quiet operation are also desired.

The present invention provides a typewriter or like machine, having end thrust type bars, weights associated with said bars for completing the stroke of the type blocks or heads by momentum, and cam tracks associated with said bars for guiding them to produce a substantially rectilinear final movement of the type blocks. The invention further includes a typewriter or like machine, having lever-operated end thrust type bars, cam tracks associated with said type bars for producing a substantially rectilinear movement of the type blocks into engagement with the type guide, and a pivoted weight connected to each type bar by a toggle mechanism to effect said engagement by momentum.

These and other features of the invention set out in the appended claims are incorporated in the construction now to be described with reference to the accompanying drawings in which:

Figures 1-5 are perspective views of a representative portion of the action; and

Figure 1 shows upper and lower type bars at rest;

Figure 2 shows the upper type bar at the moment of extreme depression of its key;

Figure 3 shows the movement of the upper type bar completed by its weight; while

Figures 4 and 5 are views similar to Figs. 2 and 3 but relating to the lower type bar;

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Figure 6 is a perspective view, looking from the front, of a typewriter incorporating the action (the majority of the keys and type bars having been removed for the sake of clarity);

Figures 7 and 8 are views of a representative portion of a slightly modified action.

Referring primarily to Figs. 1-6, the machine is provided with a series of upper type bars 10 and lower type bars 11 arranged in an arc and guided for movement towards the platen 12 in an arcuate guide 13. An operating lever 14 pivoted at 15 in comb 51, Fig. 6, is connected to the rear end of each bar, so that the latter are of the end thrust type.

The type bars are operated by a key board 16 preferably consisting of four tiers of keys of which, for convenience, only the upper and lower tiers are shown. The keys are mounted on a series of levers 17 pivoted at 18 and move in a guide comb 50. These levers vary in length, all the levers for a given tier being equal; two representative levers 17a, 17b are shown, operating the respective type bars 10, 11. They are connected by links 19 each to one of an arcuate series of levers 20 pivoted at 21 in comb 52; two representative levers 20a, 20b are shown and it will be seen that their length differs. Each last-mentioned lever has a nose 22 (constituting a driving member) engaging under a pin or roller 23 (constituting a driven member) of one of a series of bell-crank levers 24 pivoted at 25 on comb 53 (integral with comb 52), and levers 24 are connected to levers 14 by links 26. A type return spring 27 extends between each bell-crank lever 24 and a projection 28 on its associated lever 20.

Also pivoted at 15 on comb 51 there is a series of two-armed levers 29 each having an upstanding arm 29' carrying a weight 30 and a substantially horizontal lever-arm 29'' connected by link 31 to the common hinge 32 of a pair of toggle arms 33, 34. Arm 33 is pivoted at 35, with lever 14, to the associated type bar and arm 34 has a fixed pivot 36 being in an arcuate series on comb 54 which is integral with comb 51 these fixed pivots constituting fixed abutments. A forward projection 37 on each lever 29 is connected by a tension spring 38 to the projection 28 before mentioned.

A felt back stop 39 (removed in Fig. 6) is provided for toggle levers 34, a felt top stop 40 for key levers 17, and for each of the latter an adjustable resilient bottom stop 41. A stop is also provided to prevent the toggle 33, 34 from moving over dead centre and locking, as it might

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were the carriage removed. This stop consists of a tail 47 on the arm 29' of lever 29 and a laterally projecting lug 48 on link 31.

The type bars 10, 11 are respectively provided with arcuate slots or cam tracks 42, 43 in which pivoted followers 44 in the arcuate guide 13 engage.

By way of example, the operations of the mechanism will be described with reference to the upper type bar 10. As the key lever 17a is depressed as far as its stop 41, as shown in Fig. 2, the projection 22 of the appropriate lever 20 raises pin or roller 23 and rocks the associated bell crank lever 24 which in turn pulls lever 14 forward and propels type bar 10 towards platen 12 but not into contact therewith. In this movement the toggle arms 33, 34 start to straighten and through link 31, start weight 30 swinging forward.

It may here be pointed out that so far the spring 38, attached to the weight 30, has only been slightly tensioned so that the weight, gathering momentum, is well able to continue its swing and, operating through the link 31 and toggle arms 33, 34, to urge the type bar forward to the platen (Fig. 3). In this movement the return spring 27 is further tensioned and the pin or roller 23 moves up away from the projection 22 and, since the toggle 33, 34, is gradually straightened the type bar is decelerated so that a comparatively quiet impact results.

According to this invention, the final travel of the type block 45 and 46 under the momentum of weight 30, which carries said block into engagement with the type guide indicated at 55 on Fig. 6, is substantially rectilinear and is substantially free from any rocking of the block about a transverse horizontal axis. The radii of the tracks 42, 43 and the location of the centres thereof are carefully chosen to give this effect and to ensure that the upper and lower blocks strike at the same location.

Immediately the impact has been made, the type block and type bar are returned by springs 27, 38. Spring 27 is the stronger of the two, so that it is capable of raising the key lever.

Each type block 45, 46, carries two characters, and while the case shift may be of the rising platen type it is preferably of the basket shift type. For this purpose the combs 51 and 54 (respectively carrying the pivots 15 of the operating levers 14 and of weights 30, and the pivots 36 of the toggles) together with the guide 13 and the type guide 55 are movable vertically (e. g. being mounted on arms 57), so that the movement of a case shift lever 58 moves said pivots and type guide to cause either character to operate.

In order to provide an adjustment of the individual type bars so as to obtain, as far as possible, an equal impression when contact is made with the paper, each toggle arm 34 is adjusted for length. It consist of two parts that are adjustable by an eccentric indicated generally at 49.

It is an important feature of the invention that the weights 30 are arranged below the type bars 10, 11, for thereby space is economised.

Figs. 7 and 8 show a modified action, which is designed to give a somewhat greater leverage for the swinging weights and in these figures parts which are substantially identical with parts in Figs. 1-6 have the same reference numbers while equivalent parts are given a reference number larger by one hundred: thus weights 130 of Figs. 7 and 8 are the equivalent of weights 30 of Figs.

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1-6. It will be seen that instead of each weight 130 pivoting about the axis 15 of the associated operating lever 114, its lever arm 129' is pivoted at 59 to an arm 114' of the operating lever (link 31 being pivoted to lever arm 129' at 60). In the retracted or rest portion of the associated type bar, arm 114' and lever arm 129' are aligned while the latter and the link 31 are disposed at an angle, but in movement to the forward position of the type bar (111, Fig. 8) the link 31 and lever arm 129' approach alignment as the toggle straightens and the lever arm is disposed at an angle to the arm 114'. In effect, then, link 31 and lever arm 129' form a toggle which straightens as the weight 130 swings about moving pivot 59 and the leverage exerted by the weight on the toggle 33, 34 is increased.

It will further be observed that in Figs. 7 and 8 in the front ends of the cam tracks 142, 143, in the type bars 110, 111, are open. This permits the type bars to be withdrawn readily (after disengaging them at the pivot 35 which for this purpose is of a readily releasable construction), the followers 44 passing out from the ends of the slots.

We claim:

1. A typewriting machine having end thrust type bars having type blocks, an upstanding supporting and operating lever for each bar movable about a fixed pivot lower than the bar, curvilinear cam tracks associated with the type bars for producing a substantially rectilinear final movement of the type blocks, a toggle interposed between each type bar and a fixed pivot to straighten as said bar moves forward on its support lever and track, a swinging weight for each toggle, a lever arm for each weight, and a link between said lever arm and the associated toggle.

2. A machine according to claim 1, wherein the lever arm and link approach substantial alignment as the toggle straightens.

3. A machine according to claim 1, having the lever arm movable about a fixed pivot.

4. A machine according to claim 1, having the lever arm movable about a pivot displaceable with the operating lever.

5. A typewriter or like machine, having end thrust type bars having type blocks, and for each bar, an upstanding operating lever supporting said bar and movable about a fixed pivot, a curvilinear cam track on the bar for producing substantially rectilinear final movement of the type block, a support follower engaging said track, a fixed toggle pivot, a toggle interposed between the bar and said toggle pivot to straighten as the bar moves forward, a swinging weight, movable as the type bar advances, and a link connecting the weight and toggle for applying the momentum of the weight to the straightening toggle.

6. A machine according to claim 5, having the weights below the type bars.

7. In a typewriting machine wherein the final advance of type blocks is effected under the control of swinging weights operating through straightening toggles, the combination of end thrust type bars carrying the blocks, upstanding support-and-operating levers for said bars movable about fixed pivots below the bars, curvilinear cam tracks associated with said type bars for producing a substantially rectilinear final movement of the blocks, swinging weights located below the bars, toggles connected to said bars to straighten as the bars move forward, fixed parts between which and said bars the toggles extend and which constitute fixed thrust abutments for

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the toggles, and links connecting said weights with the toggles for swinging the weights during the initial advance of the bars and for applying the momentum of the swinging weights to control the subsequent straightening of the toggles and the final advance of the type blocks.

8. In a typewriting machine, the combination of end thrust type bars disposed in an arc to move in along radial lines towards a typing station, type heads on said bars, upstanding support and operating levers located beneath and connected directly to said bars and movable about fixed pivots to advance the bars endwise, curvilinear cam tracks for guiding said bars and for producing substantially rectilinear final movement of the type heads, operating means for swinging the levers to advance the type bars which means includes a driving member and a driven member separable therefrom in said final movement, a fixed abutment, toggles connected between said abutment and the type bars to straighten as the latter advance, swinging weights, means pivotally mounting them to swing

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below the bars, a lever arm for each weight, and a link, connecting each toggle with a lever arm, for swinging the weight as the toggle straightens and for causing the swinging weight to control the final advance of the associated type head.

9. A machine according to claim 8, having means for adjusting individual toggles for length.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,312,821	Anderson	Aug. 12, 1919
1,491,475	Going	Apr. 22, 1924
1,561,450	Going	Nov. 10, 1925
1,713,010	Stickney	May 14, 1929
1,932,914	Shelton et al.	Oct. 31, 1933
2,037,690	Baier	Apr. 21, 1936