Dec. 9, 1952 M. DAVIES ET AL 2,620,541

MACHINE FOR MOLDING CONCRETE BLOCKS

Filed Nov. 25, 1949 3 Sheets-Sheet 1

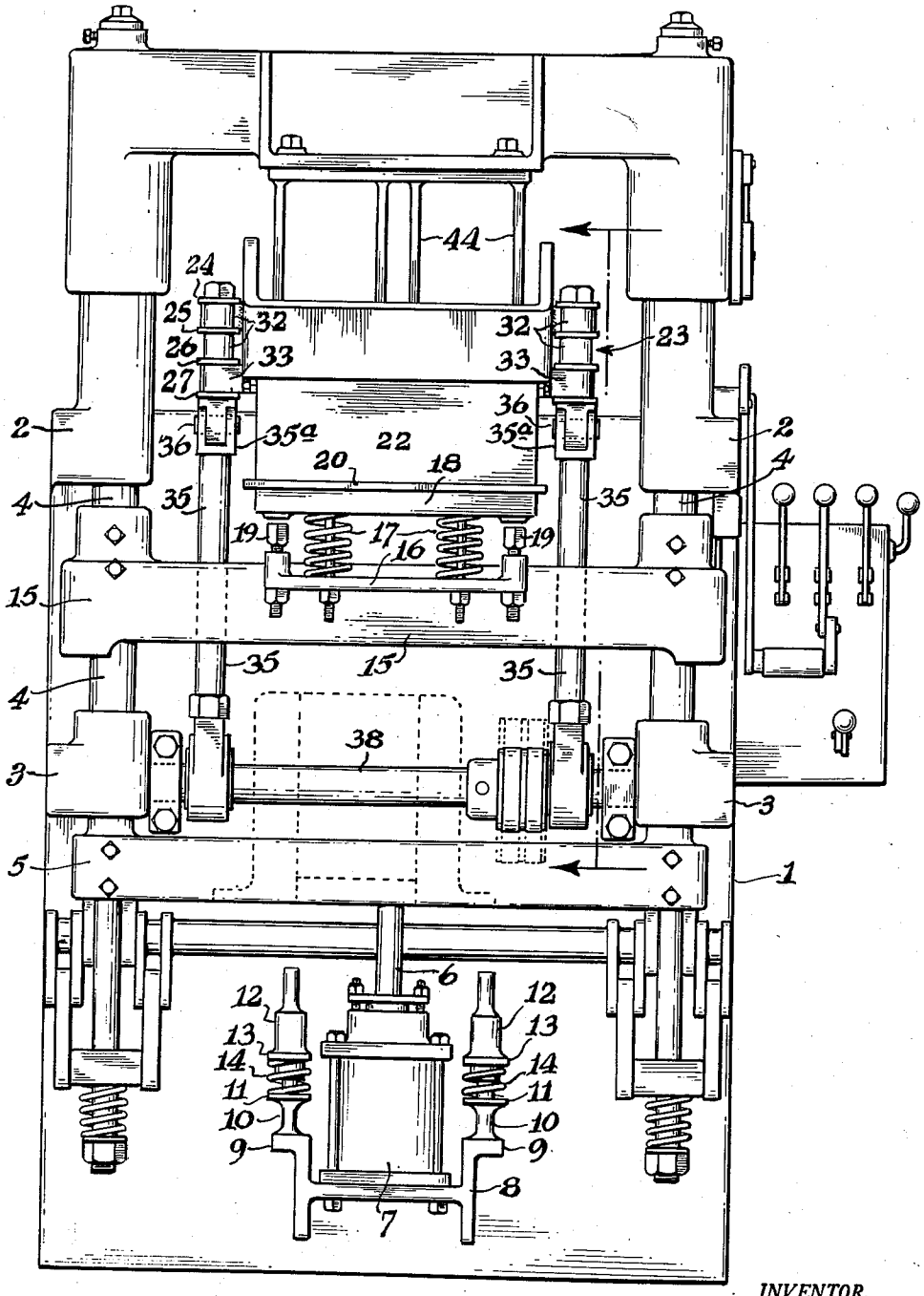


Fig. 1.

INVENTOR.
Miles Davies and
BY Fred Neth
Atty.

Dec. 9, 1952 M. DAVIES ET AL 2,620,541

MACHINE FOR MOLDING CONCRETE BLOCKS

Filed Nov. 25, 1949 3 Sheets-Sheet 2

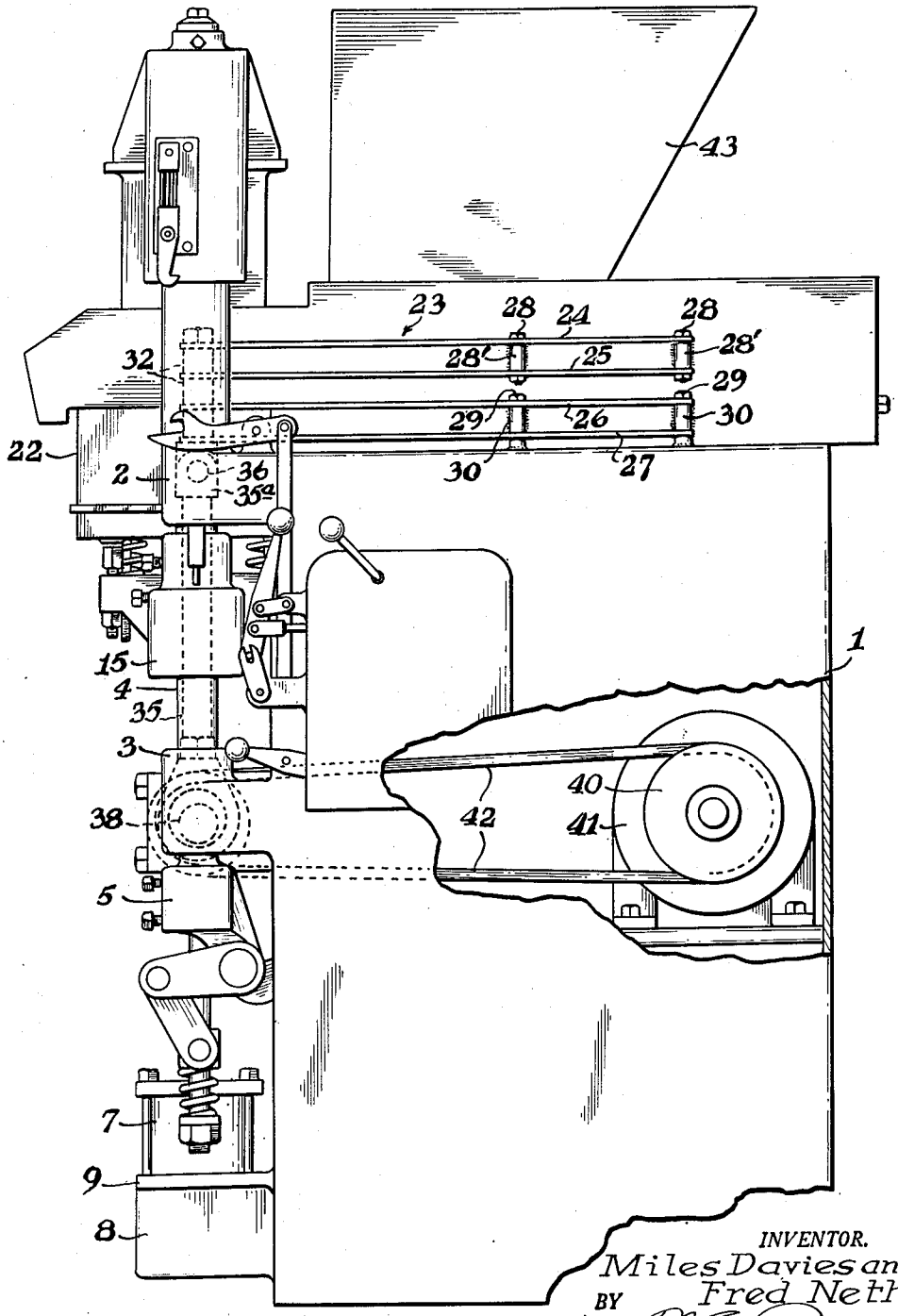


Fig. 2.

INVENTOR.
Miles Davies and
Fred Neth
BY
Atty.

Dec. 9, 1952 M. DAVIES ET AL 2,620,541

MACHINE FOR MOLDING CONCRETE BLOCKS

Filed Nov. 25, 1949 3 Sheets-Sheet 3

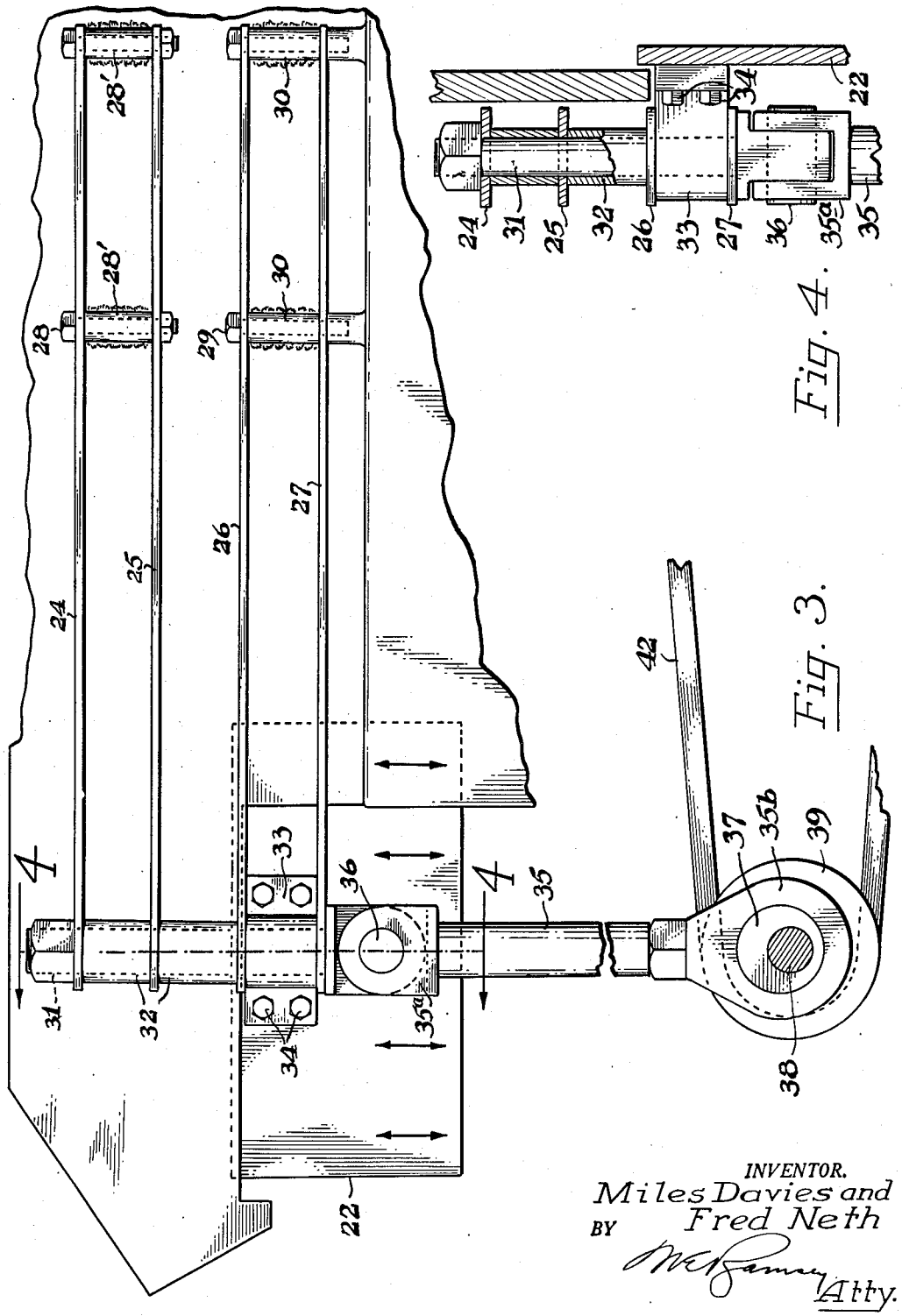


Fig. 3.

Fig. 4.

INVENTOR.
Miles Davies and
Fred Neth
BY
Atty.

Patented Dec. 9, 1952 2,620,541

UNITED STATES PATENT OFFICE

2,620,541

MACHINE FOR MOLDING CONCRETE BLOCKS

Miles Davies and Fred Neth, Vancouver, Wash.

Application November 25, 1949, Serial No. 129,388

3 Claims. (Cl. 25—41)

1

Our invention relates to concrete block forming machines and to an improvement in the art of troweling said blocks to produce a smooth finish thereon.

One of the principal objects of our invention is to provide a machine with a box-like mold having sides and ends but no bottom. A pallet underlies and seals the bottom of said mold. Said mold is carried at the ends of pairs of elongated spring elements which are subject to flexure along a path which is substantially vertical. Said mold is provided with vibrator means for partially supporting it and for shaking it rapidly. The vibrator means is provided with pivotal joints so that the movement of said mold is limited to the path defined by the flexure of said spring elements. Ejecting means is provided for said mold, which is operable to discharge formed blocks through the open bottom of said mold along a path substantially parallel with that defined by the flexure of said spring elements, and the vibration is continued while said blocks are being ejected so as to cause the sides and ends of said mold to trowel the abutting faces of said concrete blocks, previously formed in said mold, while they are being ejected therefrom, to produce a smooth finish thereon.

Further and other details of our invention are further described in connection with the accompanying drawings, in which:

Fig. 1 is a front elevation of a machine embodying our invention, with the motor drive therefor shown in dotted lines;

Fig. 2 is an end elevation of said machine, with portions shown broken away to disclose the driving means which would otherwise be concealed;

Fig. 3 is an enlarged detailed view of the mold box of said machine, its supporting springs and a portion of the power driven vibrating means, the movement of said mold box being diagrammatically depicted by double-ended arrows applied to said drawing; and

Fig. 4 is an enlarged sectional view taken on the line 4—4 in Fig. 3.

The general details of our machine are similar to the machine illustrated in the co-pending application for Letters Patent filed December 6, 1948, by Russell B. Nelson, Miles Davies, and Fred Neth, bearing Serial No. 63,812 and entitled "Method of and Machine for Making Concrete Blocks." Reference is made to said application for the general details of said machine and the method of operation thereof.

Suffice it to say that a concrete block making machine embodying the features of our invention

2

comprises a rectangular frame 1. Projecting from the front of said frame are two pairs of base members including an upper pair 2 and a lower pair 3. Said base members have vertically alined eyes formed therein for receiving the tubular sleeves 4 which reciprocate therein. The lower ends of said sleeves are joined together below the lower base member 3 by horizontal toggle beam 5, which is secured to said sleeves by bolts. The toggle beam is supported at its center upon the upper end of a piston rod 6, which is secured thereto, and at each end by a toggle mechanism as is shown in Figure 2. It is this toggle mechanism which actuates a pressure head 44 to compress the mold contents during casting as will hereinafter be described. The opposite end of the piston rod is connected to a piston which is movable vertically within a double-acting hydraulic stripper cylinder 7. The stripper cylinder is secured to an H-shaped bracket 8 which projects from the front of said frame.

The bracket 8 is formed with laterally projecting flanges 9 on its upper edge to provide support for the upstanding pedestals 10 which are secured thereto. A shoulder 11 is formed about each of said pedestals intermediate the ends thereof. Removable bumpers 12 each have a hollow end which slidably engages the upper end of the pedestals. A shoulder 13 is formed intermediate the ends of said bumpers. Coil springs 14 encircle the engaged portions of said pedestals and bumpers, and abut at their ends against the opposing faces of said shoulders. In the relaxed position of said springs the telescoping ends of the pedestals and bumpers are spaced apart, and may be moved together by compressing the coil springs 14. The upper ends of the bumpers are arranged to contact the toggle beam as the latter approaches its lowermost position.

A pallet beam 15 extends transversely between the sleeves 4 intermediate the upper and lower base members 2 and 3, respectively, and is secured thereto. Since the toggle beam 5 and pallet beam 15 are secured firmly to the sleeves 4, the units so formed is here referred to as the stripper assembly. This assembly reciprocates vertically as the double-acting cylinder 7 is actuated. A platform 16 projects forwardly and rearwardly from the center of said beam. Coil springs 17 rest at the lower ends of said platform, and support at their upper ends a pallet table 18. Bolts extend axially through said springs, and slidably through holes provided in the platform and table to secure said springs in place. Adjustment screws 19 rest at their lower ends upon

said platform, and support at their upper ends a pallet table 20. Adjustment screws 19 are provided upon the platform 16 for vertical adjustment, and are provided with lock nuts for securing said screws in any position desired. The adjustment screws are arranged to contact the pallet table 18 to prevent excessive rocking of the latter during vibration. The pallet table is proportioned and arranged to support a pallet 20 upon which the concrete blocks are carried from the machine after manufacture. Accordingly, as the stripper assembly reciprocates vertically, the pallet 20 reciprocates vertically.

A concrete block mold 22 is held suspended above the pallet table 18 by the free ends of pairs of elongated spring members 23. Said spring members preferably comprise a plurality of leaves 24, 25, 26, and 27. The spring leaves 24 and 25 are joined together by bolts 28 passing through tubular eyes 28' welded to the sides of the frame 1. Similar bolts 29 pass through tubular eyes 30 welded to the sides of said frame, and join spring leaves 26 and 27. Thus at each side of the frame are spring elements, each comprising plural leaves which carry the mold 22. Said spring elements are elongated flat strips of spring material, and are held in substantial parallelism by means of said bolts and said tubular eyes. Said spring elements and the leaves thereof constitute cantilever members, supported at one end and with their free ends joined together by a screw element 31 which passes through the ends of each of said leaves. Said leaves are spaced apart by spacers 32 encircling said screw element and lying intermediate certain of the leaves of the spring elements. That is to say, said spacers lie between the leaves 24 and 25, and between the leaves 25 and 26. Spacing the leaves 26 and 27 apart is a pad eye 33, joined by capscrews 34 to the side of the concrete block mold 22 at each side of the latter. The screw element 31 at each side of the concrete block mold 22 is joined by a connecting rod 35. The upper end of said connecting rod is bifuracted as at 35*a*, straddling an eye 31*a* at the lower end of screw element 31, and being joined thereto by a pin 36. The lower end of each of said connecting rods is flattened and has an eye 35*b* formed thereon. In the bore of said eye is an eccentric cam 37 fixed to drive shaft 38. Thus said drive shaft rotates the eccentric cam, and the connecting rod is reciprocated back and forth. The movement of its upper bifurcated end 35*a* transmits motion to the screw element 31 and therewith to the concrete block mold which is joined thereto by the pad eye 33. The eccentric movement of the lower end of the connecting rod is not transmitted to said concrete block mold, due to the fact that the pin 36 journals in the bifurcated end 35*a* and thus movement of the mold box is limited to the path defined by the free end of the spring elements 23. Because said spring elements are relatively long and are secured at one end and are free at the end at which they carry the concrete block mold, said mold is limited to more or less pure vertical movement as is indicated by the double headed arrows in Fig. 3 of the drawings. This is one of the important features of our invention.

Said shaft 38 is driven by a pulley 39 joined to the drive pulley 40 of the motor 41 by belt 42.

The material of which said concrete blocks are made in our machine is deposited from hopper 43 by feeding means which are not particularly pertinent to an understanding of our present invention, and which are described in detail in the application for patent heretofore identified. We preferably provide a substantially dry mixture, and this flows into the concrete block mold and is supported by the pallet 20 which underlies and seals the bottom thereof. That is to say, said concrete block mold comprises ends and sides, is open at the top and bottom, and the pallet 20 seals said bottom. When concrete blocks are being formed within said mold, the pressure head 44 enters through the top of the mold and compresses the contents thereof between the head of said pressure head and said pallet. Pressure is applied to the material of which said concrete blocks are made while said mold is being subjected to vibration produced by the rotation of the drive shaft 38 acting through the connecting rods 35 to flex the elongated spring members as has been commented upon.

Thereafter the pallet 20 is lowered by the stripper assembly and the blocks have been compressed and vibrated so that they are firm and will not crumble and collapse. The retraction of the pallet is in a vertical plane, and thus is parallel to the vibrational path effected by the movement of the connecting rods. The pallet is relatively slowly moved downwardly, and the vibrational rate is quite high. Thus, while said blocks are being ejected on the pallet the sides and ends of the concrete block mold move rapidly over them to trowel them and to give them a smooth surface. The truly linear vertical vibration of the concrete block mold tends to produce excellent compaction of the material making up said concrete blocks while said blocks are within the mold and are subject to vibration and pressure. The relatively slow withdrawal of the pallets and therewith the concrete blocks supported thereby, while said vertical vibration continues, tends to smooth and trowel the sides of said concrete blocks without subjecting them to any disruptive forces.

We claim:

1. In a machine for making concrete blocks, the combination of a frame, spring elements joined to said frame and subject to flexure only along a path which is substantially vertical, a box-like mold having sides and ends but no bottom partially supported by said spring elements, vibrator means for shaking said mold rapidly, means for limiting the movement of said mold to the path defined by the flexure of said spring elements, and ejecting means for said mold, which ejecting means is operable to discharge formed blocks through the open bottom of said mold along a path substantially parallel with that defined by the flexure of said spring elements, said ejecting and vibrator means being operable at one and the same time so the block is vibrated during ejection, said spring elements each comprising a plurality of leaves, spaced apart and joined at spaced points along their length to cause them to flex together and in parallelism.

2. In combination with a casting machine having a frame, a plurality of elongated parallel leaf springs, each said spring having a first end secured to said frame and a second end free to flex with respect thereto, said springs being secured in substantially horizontal planes to limit the flex of said second ends to a substantially vertical direction, an open bottomed mold box partially supported by said second ends, vibrator means for vibrating said mold in a substantially vertical direction as constrained by

said second ends, said vibrator means including a pair of connecting rods joined to said mold to limit the movement thereof to said substantially vertical direction, and ejecting means operable while said mold box is being vibrated to eject formed blocks through the open bottom of said mold box.

3. In combination with a casting machine having a frame, a plurality of parallel leaf springs each having a first end secured to the frame and a second end free to flex with respect thereto, an open bottomed mold box partially supported upon said second ends, for movement therewith, a movable pallet underlying said mold box and defining a removable bottom therefore, vibrator means for vibrating the mold box in a direction guided by the flex of said leaf springs, and ejecting means joined to said pallet to lower the same and eject a formed block through the

open bottom of the mold while said vibrator means continues to vibrate the mold, thereby to trowel the surfaces of the block by vibrational and sliding contact with the mold box.

MILES DAVIES.
FRED NETH.

REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
1,921,003	Romie	Aug. 8, 1933
2,235,440	Mackert	Mar. 18, 1941
2,298,446	White	Oct. 13, 1942
2,397,695	Schutt	Apr. 2, 1946
2,541,734	Akers	Feb. 13, 1951