

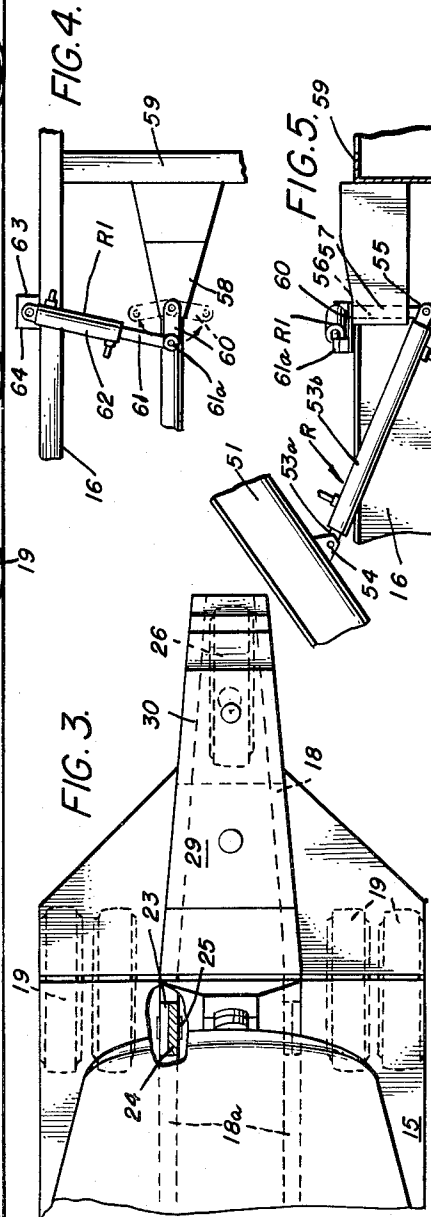
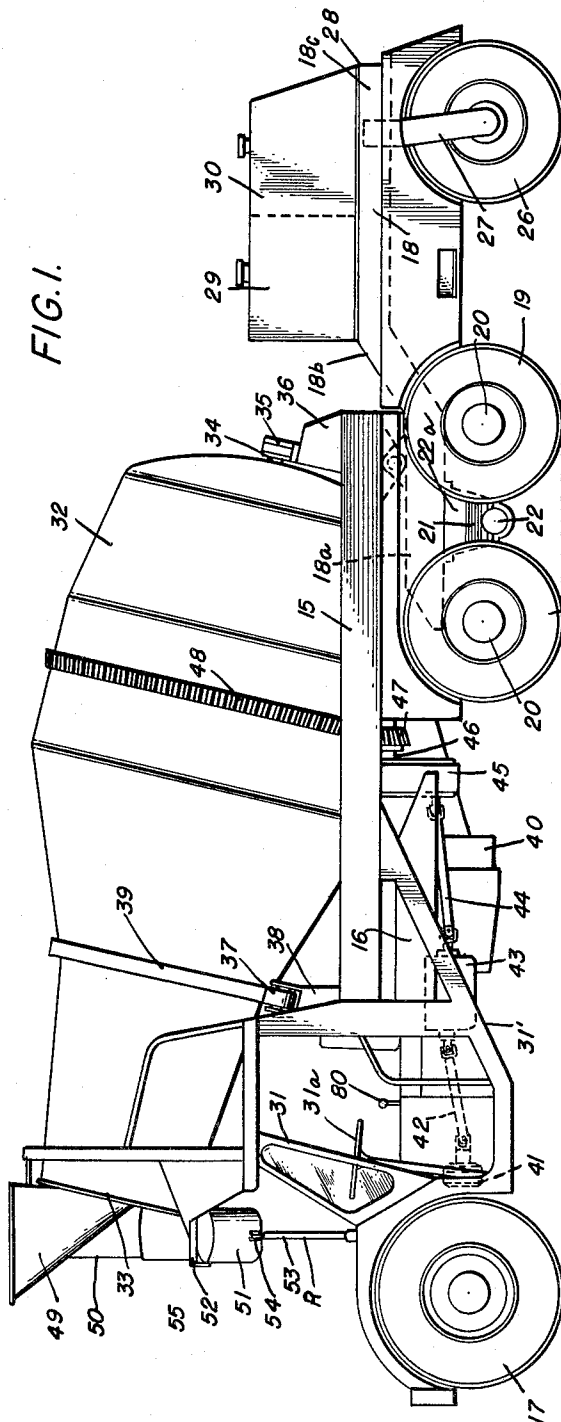
Jan. 30, 1962

E. S. PRICHARD
TRANSIT CONCRETE MIXERS

3,019,002

Filed Nov. 14, 1955

2 Sheets-Sheet 1



EVAN S. PRICHARD
INVENTOR.

BY *Evan S. Prichard*
Attorney

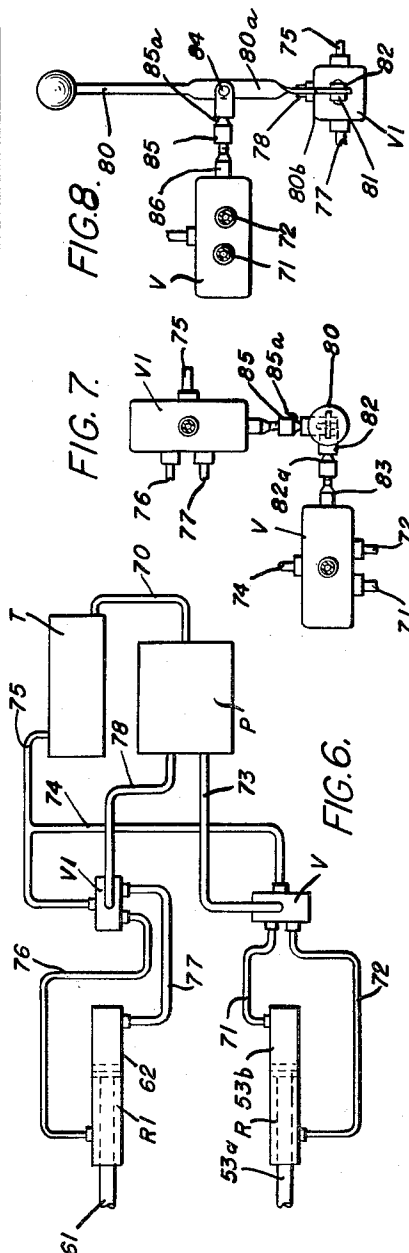
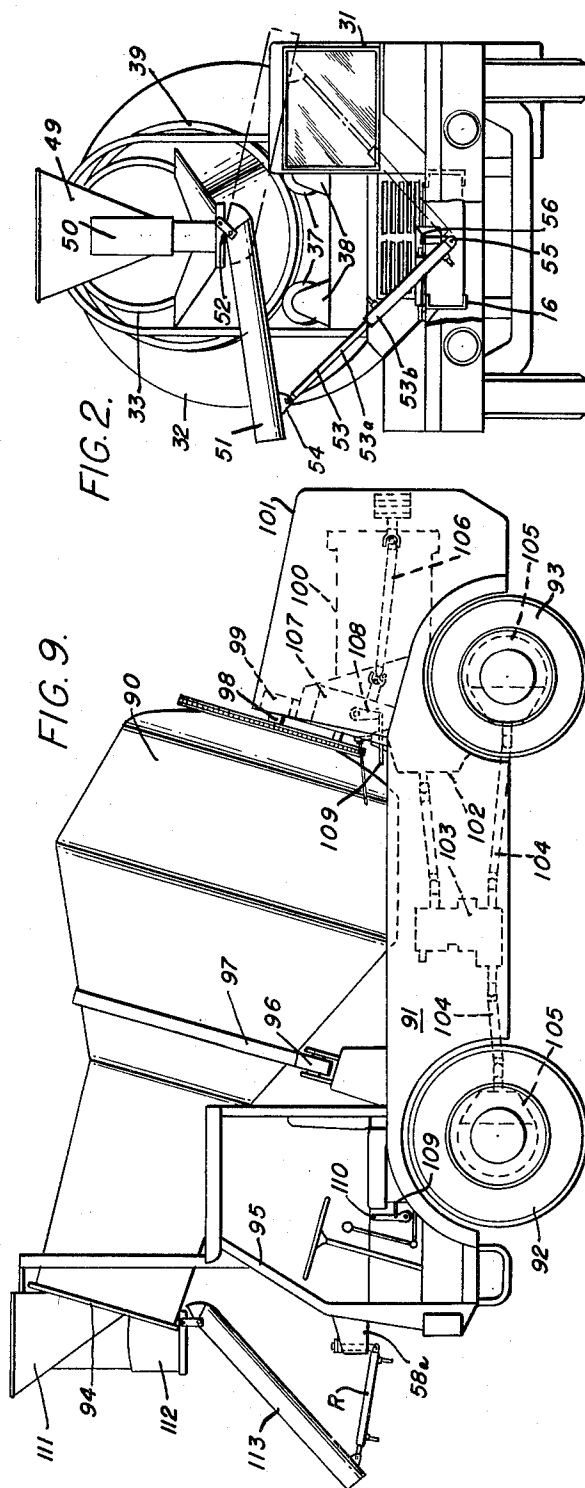
Jan. 30, 1962

E. S. PRICHARD
TRANSIT CONCRETE MIXERS

3,019,002

Filed Nov. 14, 1955

2 Sheets-Sheet 2



EVAN S. PRICHARD
INVENTOR.

BY *Evan S. Prichard*
Attorney

1

3,019,002

TRANSIT CONCRETE MIXERS

Evan S. Prichard, La Canada, Calif., assignor, by mesne assignments, to Challenge-Cook Bros., Incorporated, Los Angeles, Calif., a corporation of California

Filed Nov. 14, 1955, Ser. No. 546,566

2 Claims. (Cl. 259-169)

My invention has to do with transit concrete mixers which in the past have the rotary mixing drum arranged on the motor truck so that the loading and discharge end thereof as well as the adjustable concrete distributing chute are positioned to the rear end of the truck. Resultant of this arrangement there is the ever present and time-consuming difficulty of having to back the truck into a precise position for loading of the mixing drum from a concrete aggregate supply thereabove, and upon reaching the job to again back the truck into a precise position to bring the chute into proximity of that area where it is desired that the mixed concrete be distributed.

It is a purpose of my invention to provide a transit concrete mixer which is characterized by arranging the mixing drum on the truck so that its loading and discharge end is positioned to the forward end of the truck, with the distributing chute below such end, and whereby the maneuverability of the truck to orient the mixing drum into precise positions for the aggregate loading and for distribution of the mixed concrete at the job can be accomplished with accuracy and dispatch and without the driver leaving the cab of the truck.

It is also a purpose of my invention to provide a transit concrete mixer of this character having a mechanism for adjusting the distributing chute which is controllable by the driver from the cab of the truck to distribute the concrete at the front end of the truck to any particular and preselected location on a job.

A further purpose of my invention is to provide a transit concrete mixer characterized as above described which, in its adaptation to a large capacity mixing drum requiring it to be supported on a correspondingly large truck, and the two totaling a weight which, when supported on six wheels, cannot be distributed individually thereto so as to comply with the highway laws of most states relative thereto, provides the requisite load distribution by having incorporated therein a supplemental wheeled vehicle which supports a part of the load, and in so doing reduces the individual wheel loadings of the truck sufficiently to meet the legal requirements.

I will describe only two forms of transit concrete mixers, each embodying my invention, and will then point out the novel features thereof in claims.

In the accompanying drawings:

FIG. 1 is a view showing in side elevation one form of transit concrete mixer embodying my invention.

FIG. 2 is a view showing the mixer of FIG. 1 in front end elevation.

FIG. 3 is a fragmentary top plan view of the mixer shown in FIG. 1 with a portion thereof broken away.

FIG. 4 is a fragmentary top plan view showing a part of the mechanism for actuating the chute of the mixer.

FIG. 5 is a fragmentary side elevational view of that part of the chute-actuating mechanism shown in FIG. 4, but with the chute added thereto.

FIG. 6 is a view showing schematically the hydraulic mechanism for adjusting the chute.

FIG. 7 is a top plan view partly in section of the control valves and the actuating means therefor of the hydraulic mechanism shown in FIG. 6.

FIG. 8 is a side elevational view, partly in section, of the elements shown in FIG. 7.

2

FIG. 9 is a view showing in side elevation another form of transit concrete mixer embodying my invention.

With specific reference to the drawings and to the form of transit concrete mixer shown in FIGS. 1 and 2, it is illustrated as comprising a main frame 15, and a sub-frame 16 made up of a pair of spaced longitudinal beams secured to the underside of the main frame and extending forwardly therefrom. The forward end of the sub-frame 16 is supported by dirigible front wheels 17, while the rear end of the main frame is attached to and supported on a supplemental frame 18, the latter, in turn, at its forward end being supported by two pairs of driven wheels 19 having axles 20 carried by the ends of springs 21, and the springs mounted for oscillation on a jack shaft 22 drivingly connected to the wheels, all as is conventional in what is termed in the art as a bogie suspension.

The shaft 22 is suspended by hangers 22a from the forward horizontal portions 18a of the frame beams 18 so that the wheels 19 are suspended from the supplemental frame 18 for oscillation. These forward portions 18a are pivotally connected to the underside of the rear end of the main frame 15 by two pairs of ears 23 and 24, one pair 23 being fixed to the frame beams 18, and the other pair 24 being fixed to the side portions of the main frame 15.

Pivot pins 25 extend through each pair of ears 23 and 24 to pivotally connect them to each other, and thus to provide a horizontal pivotal connection between the main frame and the supplemental frame. Thus the two frames are movable relatively in vertical planes about the pins 25 as a center. It is important to note that this pivotal connection between the two frames is to the rear of the axle 22, since it is essential to the desired load distribution, as will be more fully described hereinafter.

The frame beams 18 have intermediate portions 18b which are inclined upwardly from the rear ends of the forward portions 18a to rear lineal portions 18c. These frame portions 18b and 18c are in converging relation (see FIG. 3) and in trailing relation to the rear end of the main frame 15, with the portions 18c substantially in the same plane as that of the main frame, and supported adjacent its rear end by a single wheel 26 and forming a vehicle which trails and is supplemental to the truck frame 15. This wheel 26 is rotatably mounted in a forked axle 27 having its upper end rotatable in a flat structure 28 that spans the frame beams 18, and whereby the wheel 26 is mounted for swivel movement in the manner of a caster. The frame-spanning structure 28 may be utilized to support thereon water and gasoline tanks 29 and 30, respectively.

Adjacent the forward end of the truck and to one side of the longitudinal center or major axis of the main frame 15 is a driver's cab or station 31 supported on a frame 31' which may be fixed to the main frame and to the sub-frame 16. Directly in front of the driver's seat in the cab 31 so as to be disposed to the same side of the longitudinal center of the frame 15 is a conventional steering wheel 31a by which the driver can steer the front wheels 17 of the truck.

Supported in inclined position on the main frame 15 preferably so that its major axis is in a vertical plane coincident with the longitudinal center of the frame, is a rotary concrete mixing drum 32 which, in construction and manner of operation to load, mix and discharge concrete therefrom, is conventional. However, in its association with the truck it is characterized from previous transit mixers in being mounted on the truck with its loading and discharge end 33 located at the forward end of the truck instead of at the rear end as heretofore.

The drum 32 is mounted for rotational movement on the truck frame 15 by a stub shaft 34 fixed to the rear

3

or closed end of the drum, and rotatable in a bearing 35 on a support 36 fixed on the rear end of the frame. Adjacent its forward end the drum 32 is supported for rotational movement by a pair of rollers 37 supported in fixed brackets 38 and having rolling contact with a ring 39 fixed on the drum.

It is important to note that since the pivots 25 are to the rear of the axle 22, the drum 32 and the truck frame are so supported at their rear ends as to impose the resultant load partly on the wheels 19 and partly on the caster wheel 26. This results in reducing the load individually imposed on all wheels of the truck.

Where the drum is of the large capacity type and the truck correspondingly large, such as is the case in the present mixer, the combined weight of the two and their appurtenances is such that when supported by six wheels only, the individual wheel loadings are such as to exceed the legal limits of most states. It is by distributing the load of both the drum and truck to all seven wheels as above described, that the individual wheel loadings are made such as to meet the legal requirements.

For driving the truck, a conventional engine 40 is provided which is controllable from the cab 31 by any suitable means (not shown), and for driving the drum 32 a conventional power take-off mechanism is provided which includes a clutch 41 (FIG. 1) connected to a shaft 42 that in turn is connected to a transmission mechanism 43 controllable from the cab 31 by any conventional means. Through a shaft 44, this mechanism is connected to a reducer 45 that operates a shaft 46 having a bevelled gear 47 that constantly meshes with a bevelled ring gear 48 fixed on the outer periphery of the drum 32.

As is conventional in transit mixers of this type, the drum 32 has above its open end 33 a charging spout 49 that functions to direct concrete aggregates into the drum as discharged from a source situated above the spout. Additionally, and as is conventional, a discharge spout 50 is supported adjacent the open drum end 33 into which the mixed concrete is ejected from the drum. A conventional distributing chute 51 is mounted, as at 52, on the spout 50 for swiveling movement, and supported at its lower end on the truck by an arm 53 so that the chute can be adjusted both vertically and horizontally to occupy any inclined position desired for accurately directing the concrete as poured from the spout 50 to any required point on the job.

Usually the chute 51 as so mounted is movable manually to the desired position, but in my invention I provide a mechanism by which the chute can be moved to and held in any adjusted position by the driver while seated in the cab 31.

In the present instance this mechanism is hydraulically operated, and it comprises an arm 53 which, as best shown in FIG. 5, includes a hydraulic ram indicated at R. The plunger rod 53a of this ram is pivotally connected, as at 54, to the chute 51, and the lower end of the cylinder 53b of the ram is pivotally connected, as at 55, to a shaft 56 mounted vertically in a bearing sleeve 57 formed in a bracket 58 fixed to a cross beam 59 which spans the beams 16.

A crank arm 60 is fixed to the upper end of the shaft 56 and, at one end, is pivotally connected, as at 61a, to the plunger rod 61 of a second hydraulic ram R1 (see FIGS. 4, 5 and 6). The rod 61 operates in a cylinder 62 of the ram R1, and one end of the cylinder is pivotally connected, as at 63, to a bracket 64 fixed on one of the beams 16.

As shown schematically in FIG. 6 fluid under pressure is supplied to the rams R and R1 for actuating the plunger rods 53a and 61, from a reservoir fluid tank T. This tank is connected by line 70 to a pump P of any suitable character for placing the fluid under pressure and for delivering it to either end of the cylinder 53b of the ram R and exhausting it from the other end through lines 71 and 72 by operation of a four-way control valve V which is connected to the pump by a line 73 and to the tank T through

4

lines 74 and 75. Similarly, fluid under pressure from the pump P can be supplied to one end of the cylinder 62 of the ram R1 and exhausted from the other end, through lines 76 and 77 under the control of a four-way valve V1. This valve is connected to the pump P by a line 78, and to the tank T through the line 75.

In FIGURES 7 and 8 is shown one means by which the driver of the truck can operate either valve V or V1 while seated in the cab. This means comprises a lever 80 having an upper flat portion 80a, and a lower flat portion 80b at right angles to the portion 80a. The portion 80b at its lower end is pivoted, as at 81, to a connector 82, which operatively couples the lever to the stem 83 of the valve V so that by swinging movement of the lever about the pivot 81, the valve stem is movable axially in one direction or the other to operate the valve as intended.

Similarly, the upper lever portion 80a is pivoted as at 84 to one end of a connection 85 which couples the lever to the stem 86 of the valve V1 so that by swinging the lever about the pivot the valve stem is movably axially in one direction or the other to operate the valve as intended.

Similarly, the upper lever portion 80 is pivoted, as at 84, to one end of a connector 85 which couples the lever to the stem 86 of the valve V1 so that by swinging the lever about the pivot the valve stem is movable axially in one direction or the other to operate the valve as intended. The connectors 82 and 85 include ball and socket joints 82a and 85a, respectively, which allow the lever to be moved to actuate one valve stem 83 or 86 without operating the other.

In the operation of the chute-actuating mechanism, the chute can be moved vertically in either direction through operation of the valve V by the lever 80 to supply fluid under pressure from the pump P to either end of the ram cylinder 53b and exhaust it from the other end to the tank T. The chute can be moved horizontally in either direction through an angle of 180 degrees through operation of the valve V1 again by the lever 80, thus supplying fluid pressure from the pump to either end of the ram cylinder 62 and exhausting it from the other end to the tank. Under movement of the plunger rod 61 the crank 60 is turned to rotate the shaft 56, and, hence, cylinder 53b and rod 53a.

Thus it will be clear that the driver, while seated in the cab, can, through operation of the lever 80, cause the chute 51 to be moved either horizontally or vertically to occupy any desired position necessary to distribute the mixed concrete to a particular spot in advance of or to either side of the truck, and at any elevation.

In the use of the mixer the charging spout 49 can be quickly positioned directly beneath the source of concrete aggregates thereabove by merely driving the truck forwardly to the proper location which the operator can readily determine from the cab. Upon the mixer reaching the job with the concrete mixed during transit by rotation of the drum, it is only necessary to head the mixer into that pre-selected area at which the concrete is desired to be distributed. Once this is accomplished the driver can, without leaving the cab, operate the chute-actuating mechanism to move the lower end of the chute to any position for pouring the concrete to a pre-selected spot on the job.

Manifestly, such use of the mixer to load and then distribute the concrete at the job eliminates the time-consuming backing of the mixer into proper position for either operation, as well as the necessity of the driver having to leave the cab to visually adjust the chute.

Referring now to FIG. 9, a second form of transit concrete mixer is illustrated, and which is designed to mix and transport lighter loads of concrete than is the first form, and hence has a less capacity mixing drum 90 mounted on a truck frame 91 of suitable length for the purpose, and supported on a pair of dirigible front wheels 92 and a pair of rear wheels 93. In this instance

5

the four wheels are adequate to meet the legal requirements as to wheel loadings of most states.

As in the first form of mixer the drum 90 is supported on the truck with its open end 94 at the forward end thereof and to one side of the driver's cab 95. The drum is mounted for rotational movement by rollers 96 engaging a ring 97 fixed on the drum and a shaft 98 fixed to the closed end of the drum and supported in a bearing 99.

For driving the truck, an engine 100 is supported on the truck frame at the rear of the drum 90 and housed in a hood 101. The engine is operatively connected to a transmission mechanism 102 which, in turn, is connected to a gear-containing box 103. The latter is through shafts 104 connected to differentials 105 for driving the wheels 92 and 93. Suitable means, such as that illustrated, is provided for operating the transmission mechanism 102 from the cab 95. A power take-off from the engine 100 includes a shaft 106 that operates a transmission and speed-reduction unit 107 controllable by a lever 108 which, through a rod or cable 109, can be actuated by a lever 110 located in the cab.

As in the first form of mixer, a loading spout 111 is located at the open end 94 of the drum 96, and beneath such spout is a discharging spout 112 from which a distributing chute 113 is swivelly suspended. A hydraulic mechanism for actuating the chute 113 is similarly provided, and this mechanism is controllable from the cab 95. The mechanism may be the same as shown and described in connection with the first form of mixer, but with the shaft 56 thereof mounted in a bracket 58a projecting from the forward end of the truck. Manifestly, this second form of mixer provides the same advantages as to aggregate loading and concrete distributing as does the first form, since it too can head-in for both operations instead of backing in as in previous mixers.

Although I have herein shown and described only two forms of transit concrete mixers, each embodying my invention, it is to be understood that various changes and

6

modifications may be made therein without departing from the spirit of the invention and the spirit and scope of the appended claims.

What I claim is:

1. In combination: a truck having a frame; dirigible wheels supporting the front end of the frame; a supplemental frame pivotally connected at its forward end portion to and beneath the rear end of the truck frame so as to swing about a horizontal axis transversely of the truck frame; dual rear wheels suspended from the front end portion of the supplemental frame for oscillating movements about a horizontal axis transversely of the truck frame; and a caster wheel supporting the rear end portion of the supplemental frame.

2. A transit concrete mixer, including: a truck having a frame; dirigible wheels supporting the front end of the frame; a supplemental frame pivotally connected at its forward end portion to and beneath the rear end of the truck frame so as to swing about a horizontal axis transversely of the truck frame; dual rear wheels suspended from the front end portion of the supplemental frame for oscillating movements about a horizontal axis transversely thereof and forwardly of the pivotal connection of the supplemental frame with the truck frame; a caster wheel supporting the rear end portion of the supplemental frame; and a mixing drum so mounted on the truck frame that its discharge end is at the forward end of the truck, while its rear end is supported on the truck frame at a point substantially directly above the pivotal connection of the supplemental frame with the truck frame.

References Cited in the file of this patent

UNITED STATES PATENTS

2,705,134	Jerner	Mar. 29, 1955
2,706,623	Styes	Apr. 19, 1955
2,713,929	Castendyck	July 26, 1955
2,729,435	Harbers et al.	Jan. 3, 1956
2,859,949	Willard	Nov. 11, 1958