Nov. 16, 1948. W. F. BANKAUF ET AL 2,453,961

DEWATERING APPARATUS

Filed April 26, 1945 3 Sheets-Sheet 1

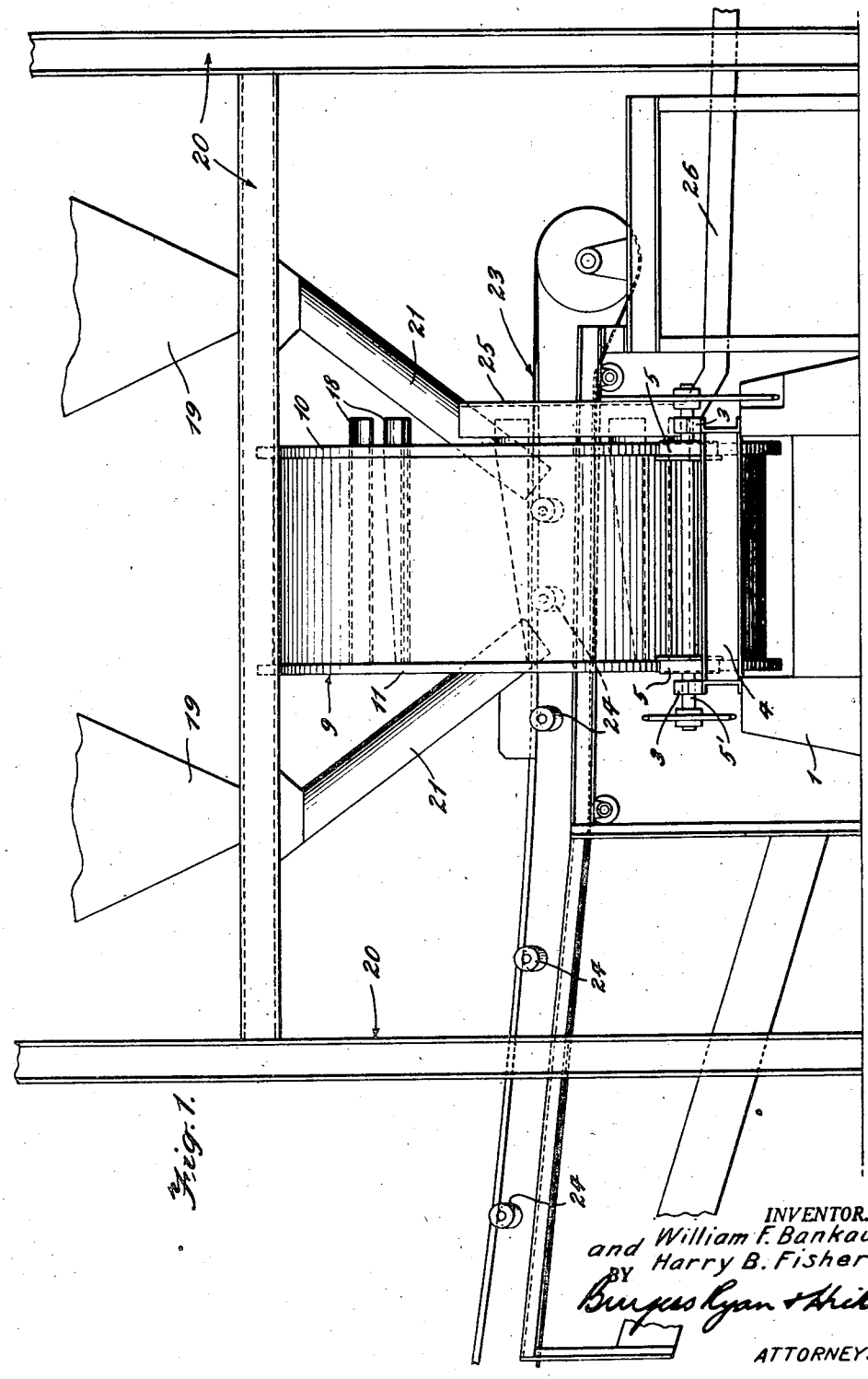


Fig. 1.

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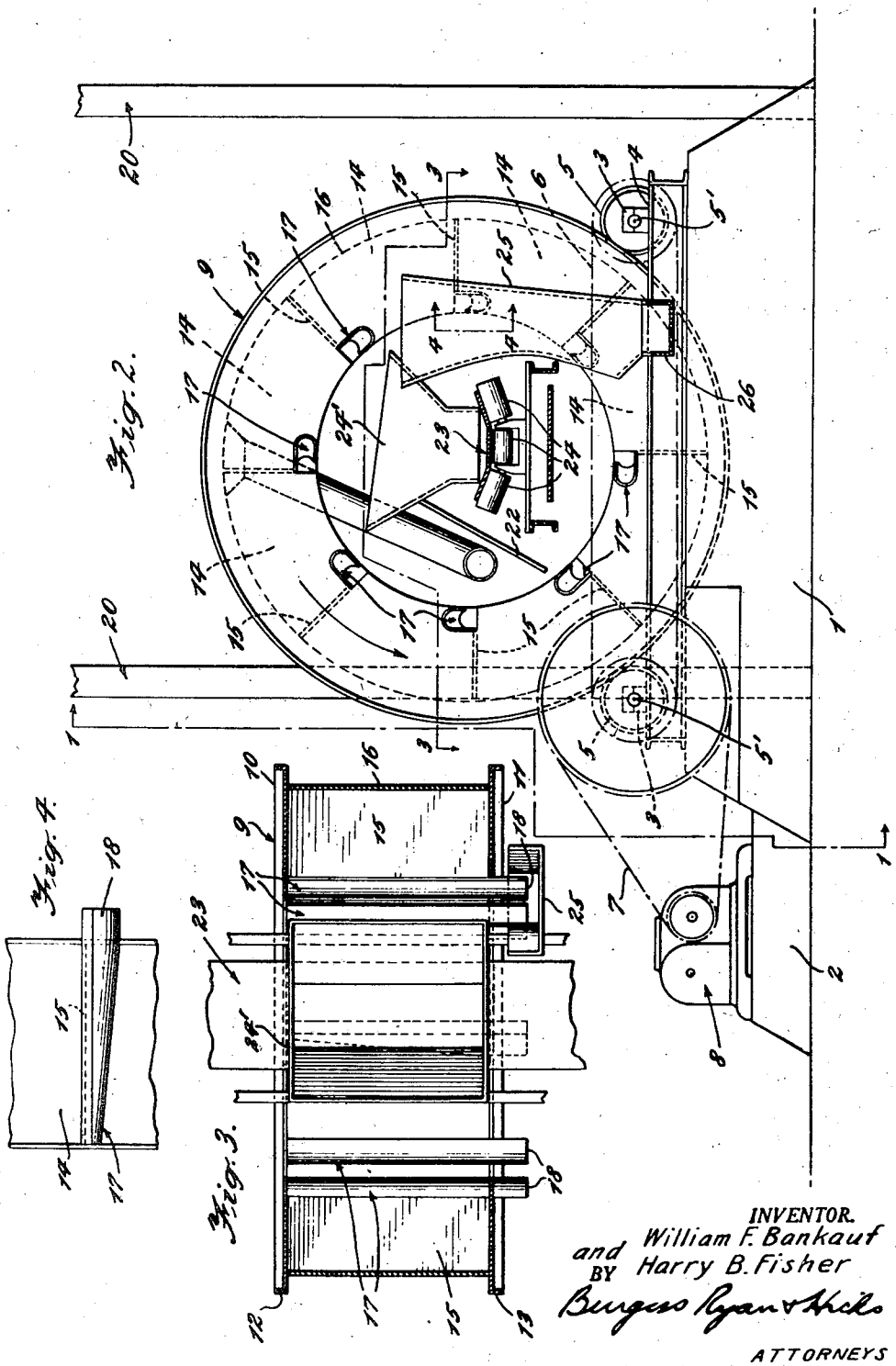


Fig. 2.

Fig. 4.

Fig. 3.

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Fig. 6.

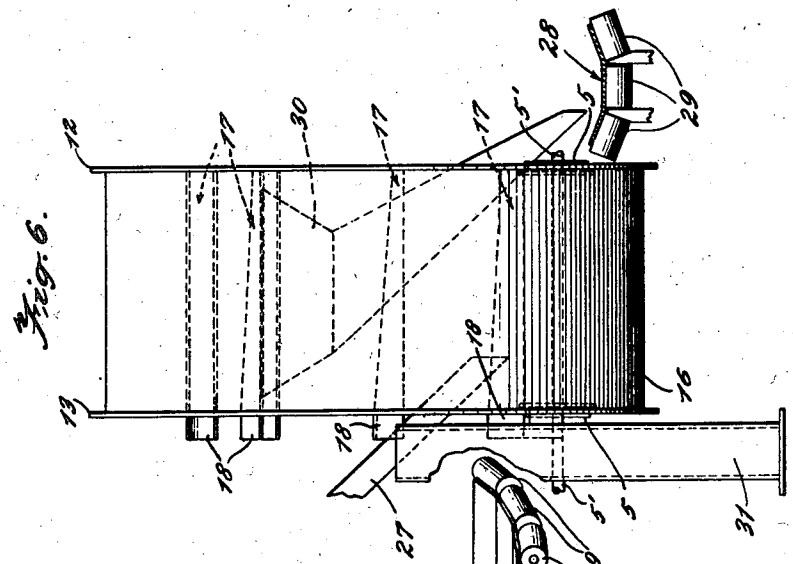
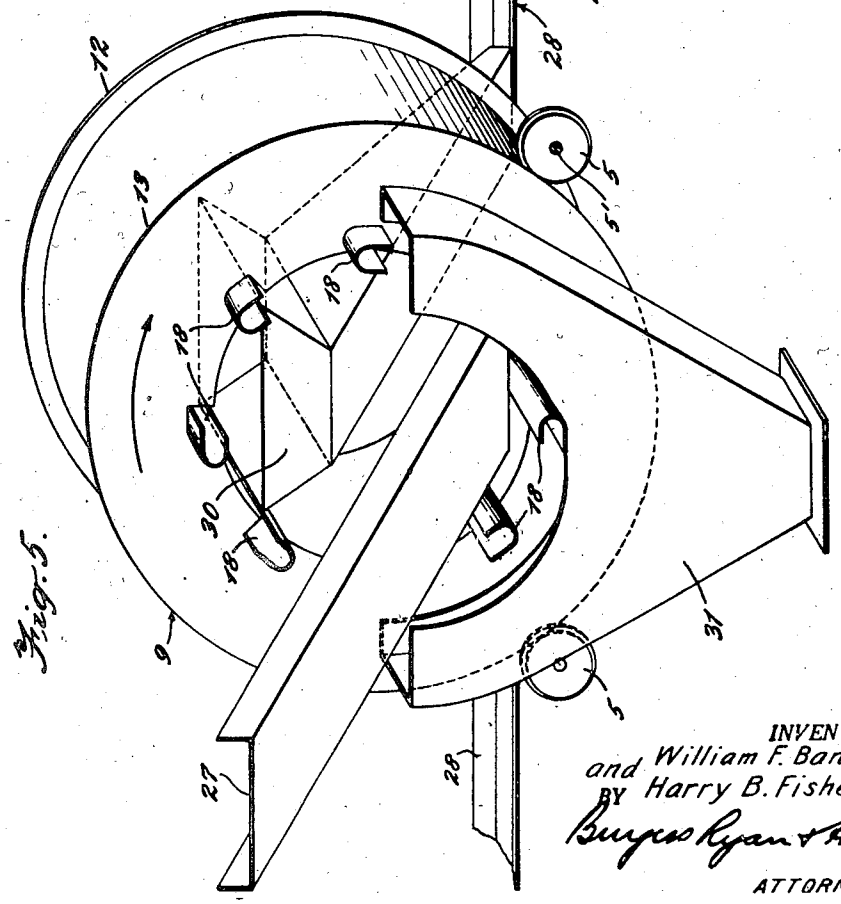


Fig. 5.



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DEWATERING APPARATUS

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Application April 26, 1945, Serial No. 590,480

7 Claims. (Cl. 210—51)

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This invention relates to dewatering apparatus having for its general purpose to receive wet sand from a source of supply and remove the major part of the water therefrom by a continual process of decanting.

The primary object of the invention is an apparatus of this character which is highly efficient and capable of sustained operation with a minimum of attention and which furthermore is so organized as to be adaptable to a variety of existing installations, particularly where headroom is at a premium, all as will later be more fully apparent.

With the foregoing and other objects in view, as will hereinafter appear, the invention comprises the devices, combinations and arrangements of parts hereinafter set forth and illustrated in the accompanying drawings of a preferred form and an alternative embodiment of the invention, from which the several features of the invention and the advantages attained thereby will be readily understood by those skilled in the art.

In the drawings,

Fig. 1 is an end elevational view of a preferred form of installation, the view being taken as on the line 1—1 of Fig. 2;

Fig. 2 is a side elevational view of the installation, partially sectioned;

Fig. 3 is a horizontal section on the line 3—3 of Fig. 2;

Fig. 4 is a broken out elevational view taken as on the line 4—4 of Fig. 2;

Fig. 5 is a perspective view of a modified construction; and

Fig. 6 is an end view thereof.

Referring first to the form of the invention shown in Figs. 1 and 4 the major part of the apparatus is shown supported on a suitable foundation 1 and an adjacent auxiliary foundation 2. Supported in bearings 3 on the angle irons 4 on the foundation 1 are spaced roller members 5 the shafts 5' of which are diagrammatically indicated as coupled together by sprocket chain 6 and adapted to be driven through sprocket chain 7 by a motor 8 mounted on the foundation 2.

Supported on and driven by the rollers 5 is a dewatering wheel, generally designated 9. In general, the dewatering wheel comprises an open center annular structure which in this instance, and preferably, includes a pair of spaced annular side plates 10 and 11 having peripheral flanges 12 and 13 respectively which ride on the rollers 5. The wheel structure incorporates a series of

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circumferentially arranged buckets or compartments closed at their outer ends and having their open ends directed radially inwardly toward the open center of the wheel. As shown, the buckets or compartments marked 14 are formed by spaced partitions 15 welded or otherwise rigidly secured to the side plates 10 and 11. A closure plate 16 forms a bottom for the outer ends of all of the buckets.

Provision is made for draining water from each bucket and preferably discharging it to one side of the wheel structure. In this instance, in which the partitions are square to the side plates 10 and 11, suitable gutters are provided for this purpose.

At their inner ends the partitions 15 terminate short of the inner margins of the side plates 10 and 11 and along the inner edge of each partition is mounted a gutter 17 extending the full width of each bucket. The gutters are suitably sloped to provide lateral drainage. As shown, particularly in Fig. 4, each gutter slopes from one end to the other end at its right hand end (as viewed in that figure) is provided with an extension 18 which protrudes beyond the side plate 11. The opposite ends of the gutters are closed.

As will be apparent, the wheel structure is so constructed and driven that its open center is left entirely free and clear, and according to the present invention this space is utilized to accommodate sand feeding and sand receiving means; that is to say, means for supplying the wet sand to the wheel and means for receiving the relatively dry sand discharged by the wheel, such arrangement readily accommodating the structure to existing installations and in a minimum of space. It not infrequently happens that the wet sand supply is arranged to be delivered at a relatively low height above the ground level but, as will be recognized, the described structure is readily adaptable to such arrangements.

As shown more particularly in Fig. 1, the sand feeding means illustrated includes a pair of hoppers 19 mounted on a superstructure generally designated 20 and discharging into angularly disposed guide spouts 21 located one on each side of the wheel. Any sand feeding means adapted to deliver the sand to the apparatus at the height of the center opening of the wheel structure will serve. The inner or lower ends of the guide spouts are located within the open center of the wheel structure and, as shown in Fig. 2, are positioned to discharge the incoming wet sand into one of the buckets in the lower

part of the wheel. An appropriate guide plate 22 is indicated in that figure.

In this preferred form the sand receiving means includes a belt conveyor generally designated 23 which, as shown in Fig. 1, extends clear through the center of the wheel structure, its upper or load-receiving stretch being supported on suitable rollers 24. Immediately above the conveyor belt 23 is a funnel 24 the open upper end of which is preferably enlarged to extend over a series of buckets, that is, to encompass two or more of the partitions 15 in the upper part of the wheel.

The operation of the apparatus will be readily understood. The wheel is continuously driven in the direction indicated by the arrow in Fig. 2 and at a slow speed. The wet sand is fed into the buckets as they pass in turn beneath the guide plate 22 and a settling action occurs in the buckets. As the wheel rotates, the water is decanted into the gutters 17 and is laterally discharged from the wheel. An enclosure 25 is provided to receive the discharged water and direct it to a chute 26. Before each bucket reaches the top of the wheel, by far the greater part of the water will have been removed from the sand and, in due course, the latter slides out of each bucket through the funnel 24' and onto the conveyor belt 23 which may be driven by any suitable means and by which it is continuously removed.

Referring now to the modified form illustrated in Figs. 5 and 6, the wheel structure is the same as that already described and the corresponding elements are similarly numbered. In this instance the wet sand is supplied to the buckets by way of a chute 27 substantially as before but the dewatered sand is continuously removed by a belt conveyor 28 supported on rollers 29 and extending alongside rather than through the open center of the wheel. The discharged or dewatered sand is dumped into a funnel 30 corresponding generally to the funnel 24' but having its lower end extending laterally beyond one side of the wheel so as to deposit the sand onto the belt conveyor 28. In this instance, also, the water receiving enclosure 31 is indicated as being of somewhat different form from that illustrated in Fig. 2, but in its general mode of operation this modified structure will be recognized as closely resembling that of the form already described.

In the light of the foregoing description of two illustrative forms of the invention which, of course, may be modified to suit the conditions at hand, the following is claimed:

1. Sand dewatering apparatus comprising an open-center, annular wheel structure incorporating a series of circumferentially arranged buckets having their open ends directed radially inwardly toward the open center of the wheel; drive means engaging the wheel radially outwardly from the open center thereof; wet sand supply means mounted adjacent one side of the wheel and adapted to discharge into the open center of the wheel to supply wet sand by gravity to a bucket in the lower part of the wheel; water discharge means secured to the wheel and extending laterally beyond one side thereof from each bucket adjacent an inner edge thereof and at the lower side of each rising bucket; a conveyor belt extending through the open center of the wheel; a sand guiding funnel having its receiving end extending over a series of buckets in the upper part of the wheel and its discharge end directed to supply the conveyor belt and means for moving the belt.

2. Sand dewatering apparatus comprising an

open-center, annular wheel structure incorporating a series of circumferentially arranged buckets having their open ends directed radially inwardly toward the open center of the wheel; drive means engaging the wheel radially outwardly from the open center thereof; wet sand supply means mounted adjacent one side of the wheel and adapted to discharge into the open center of the wheel to supply wet sand by gravity to a bucket in the lower part of the wheel; water discharge means secured to the wheel and extending laterally beyond one side thereof from each bucket adjacent an inner edge thereof and at the lower side of each rising bucket; a conveyor belt extending through the open center of the wheel and positioned to receive sand discharged by gravity from a bucket in the upper part of the wheel and means for moving the belt.

3. Sand dewatering apparatus comprising an open-center, annular wheel structure incorporating a series of circumferentially arranged buckets having their open ends directed radially inwardly toward the open center of the wheel; drive means engaging the wheel radially outwardly from the open center thereof; wet sand supply means mounted adjacent one side of the wheel and adapted to discharge into the open center of the wheel to supply wet sand by gravity to a bucket in the lower part of the wheel; water discharge means adjacent the open end of each bucket; and sand receiving means located within the open center of the wheel in position to receive sand discharged by gravity from a bucket in the upper part of the wheel, said last-mentioned means extending and thereby adapted to deliver the received sand outside of the wheel.

4. In a sand dewatering apparatus, the combination of a wheel structure including a pair of spaced, annular plates, a series of spaced, radial partition members rigidly uniting the plates and at right angles to the surfaces thereof, closure means for the outer ends of the spaces between the partitions, means for rotatably supporting the wheel structure, a gutter arranged along an inner edge of each partition and extending at one end beyond one of the said plates, each gutter being sloped with respect to its partition to direct water toward the extended end of the gutter, and sand feeding and sand receiving means located within the central space defined by the annular plates, said sand feeding means comprising a guide positioned to discharge into partitioned spaces in the lower part of the wheel structure and said sand receiving means being positioned to receive gravity-discharging sand from partitioned spaces in the upper part of the wheel structure.

5. In a sand dewatering apparatus, the combination of a wheel structure including a pair of spaced, annular plates, a series of spaced, radial partition members rigidly uniting the plates, closure means for the outer ends of the spaces between the partitions, means for rotatably supporting the wheel structure, a gutter arranged along an inner edge of each partition and extending at one end beyond one of the said plates, each gutter being sloped with respect to its partition to direct water toward the extending end of the gutter, and sand feeding and sand receiving means located within the central space defined by the annular plates, said sand feeding means comprising a guide positioned to discharge into partitioned spaces in the lower part of the wheel structure and said sand receiving means being positioned to receive gravity-discharged sand from

partitioned spaces in the upper part of the wheel structure.

6. In a sand dewatering apparatus, the combination of a wheel structure including a pair of spaced, annular plates, a series of spaced, radial partition members rigidly uniting the plates, closure means for the outer ends of the spaces between the partitions, means for rotatably supporting the wheel structure water outlet means adjacent the inner end of each of said spaces, and sand inlet and sand discharge means located within the central space defined by the annular plates, said sand inlet means comprising a guide positioned to discharge into partitioned spaces in the lower part of the wheel structure and said sand discharge means being positioned to receive gravity-discharged sand from partitioned spaces in the upper part of the wheel structure.

7. Sand dewatering apparatus comprising an open-center, annular wheel structure incorporating a series of circumferentially arranged buckets having their open ends directed radially inwardly toward the open center of the wheel; roller means engaging peripheral portions of the wheel structure and supporting the same with freedom to rotate about the axis of the center opening; water outlet means adjacent the open end of each bucket adapted to discharge water laterally of the wheel structure; and sand feeding and sand receiving means located within the

said center opening, said sand feeding means comprising a guide positioned to discharge into partitioned spaces in the lower part of the wheel structure and said sand receiving means being positioned to receive gravity-discharged sand from partitioned spaces in the upper part of the wheel structure.

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REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
203,104	Bennett	Apr. 30, 1878
633,040	Reed	Sept. 12, 1899
871,366	Schwarz	Nov. 19, 1907
918,054	Jackson	Apr. 13, 1909
975,331	Davidson	Nov. 8, 1910
1,350,154	Hamilton	Aug. 17, 1920
2,061,841	Lang	Nov. 24, 1936
2,136,400	Steindorf	Nov. 15, 1938
2,322,415	Buckbee	June 22, 1943
2,323,920	Knudsen	July 13, 1943

FOREIGN PATENTS

Number	Country	Date
31,744	The Netherlands	Dec. 16, 1933