Dec. 27, 1955 E. E. LA SPINA 2,728,512

LADDER FOR FLOATING ROOF TANKS

Filed Oct. 6, 1952

Fig. 1

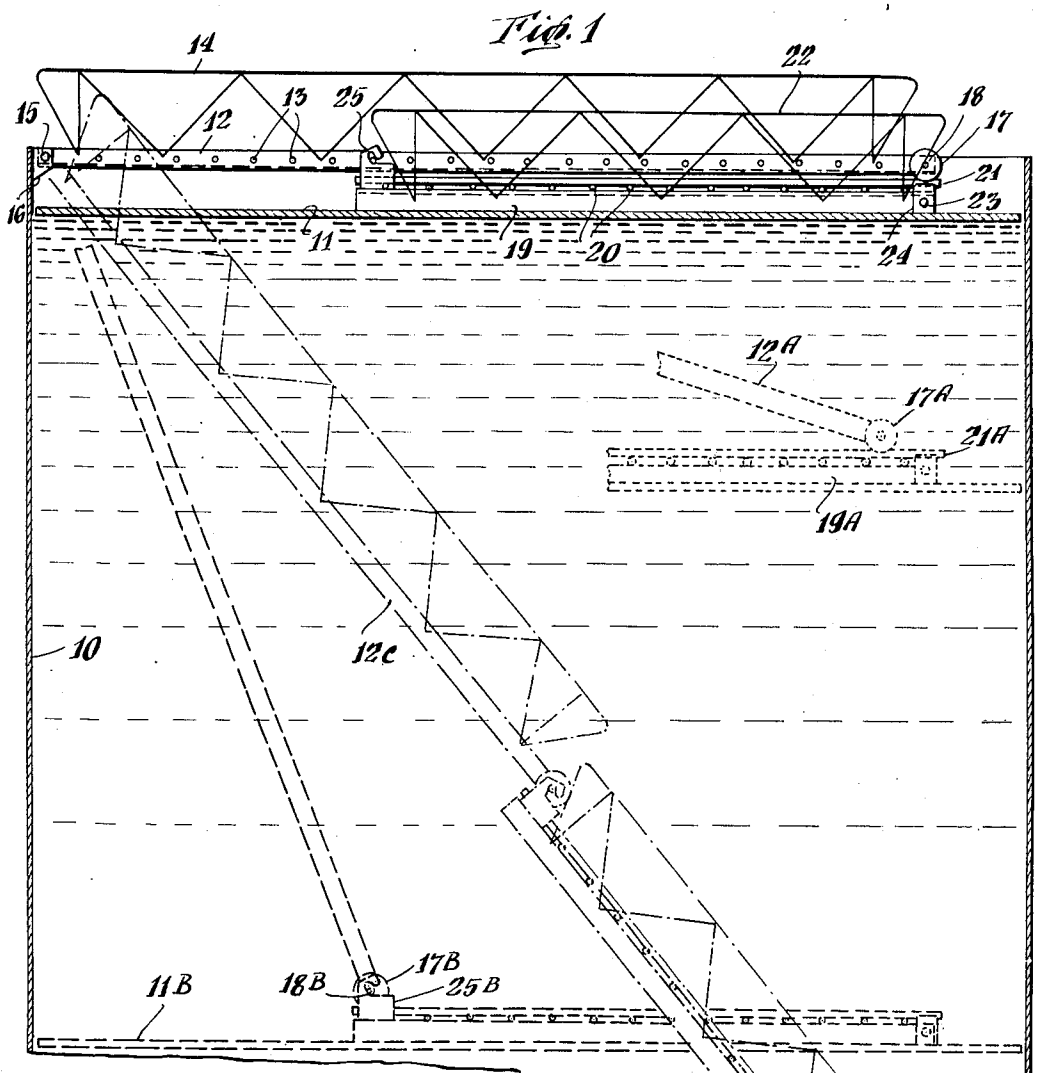
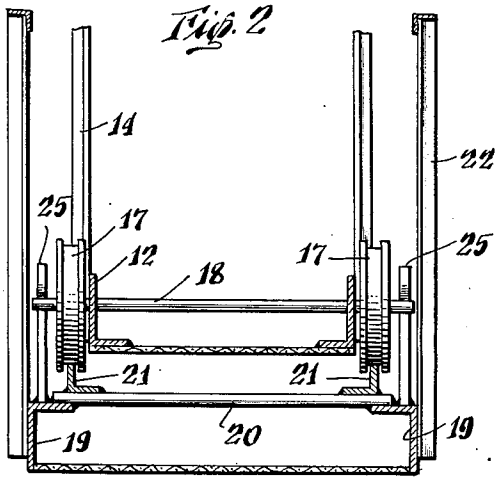



Fig. 2




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# LADDER FOR FLOATING ROOF TANKS

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1 Claim. (Cl. 228—1)

This invention is concerned with a ladder for floating roof tanks for the storage of light petroleum products such as gasoline and the like.

In order to prevent losses from evaporation, light petroleum products such as gasoline are frequently stored in tanks equipped with roofs which float upon the surface of the liquid, and move up and down therewith within the tank, somewhat as does a piston in an engine cylinder.

Access to the top of the roof is necessary for gauging and other purposes. To secure such access it is customary to provide a ladder, or stair, pivoted at the edge of the tank shell, with the lower end provided with wheels to run on a track mounted upon the surface of the roof, or other means whereby the ladder is self adjusting in position and effective vertical span to accommodate all positions of the roof. This arrangement is satisfactory with tanks whose diameter is great with respect to their height, but impossible with tanks whose diameter is less than the height between the tank rim and the roof when the roof is in down position.

This invention is directed toward the provision of a roof access ladder for tanks where the diameter is less than the vertical height between tank and roof when the roof is in the down position.

To understand this invention, reference is now made to the drawing which is attached to and made a part of this specification.

In the drawing, Figure 1 shows a tank, having a floating roof, in which tank a ladder or stairway made in accordance with this invention is installed, and Figure 2 shows an end view of the ladder, taken at the roof end, and should be read in conjunction with Figure 1.

In Figure 1, **10** denotes the side wall of the tank, shown in section, and **11** denotes the upper surface of the floating roof. Since neither the tank nor the roof are any part of this invention, neither are shown in any detail. At the upper portion of Figure 1, there is shown the ladder in full folded position, as assumed when the floating roof is at its highest position. The ladder consists of two portions. The first portion is composed of side rails **12**, carrying rungs **13**, and handrail **14**. This portion of the ladder is pivoted at its left hand end to the tank rim by pivots **15** mounted in brackets **16** which brackets are affixed to the tank rim. At the opposite end, the side rails **12** carry flanged wheels **17**, mounted upon an axle which may conveniently be formed by extending the last rung **18** of the ladder a suitable distance beyond the side rails **12**. This rung **18** is extended



to each side a distance greater than necessary to support flanged wheels **17**, for a purpose later to be explained.

The lower section of the ladder consists of side rails **19** and rung **20** and affixed thereto by proper fastening, such as welding, are two rail pieces **21**, adapted and spaced to form a track upon which flanged wheels **17** may roll. This portion of the ladder is provided with handrails **22**. The right hand end of this lower portion of the ladder is pivotally fastened to the tank roof by pivot pins **23** in brackets **24**. At the left hand end of the lower portion of the ladder there are provided hook plates **25**, notched to receive and hold the ends of rung **18** which extend beyond the flanged wheels **17**.

As the roof moves downward, the angular position of the two portions of the ladder changes, and the upper portion slopes, while the lower portion rests upon the roof, horizontally as shown in diagram at **12A** and **19A**, while the lower end upper section moves along, supported by its wheels **17A** rolling upon the track rails **21A**.

As the roof continues to move downwardly, the wheels reach the end of their travel, **17B**, when the roof reaches a level **11B**, and the extended axles **18B** become engaged in hook plates **25B**.

Thereafter, as the roof continues to move downwardly the ladder becomes a hinged structure suspended between pivots **15** and **23**, and finally when the roof has reached its lowest position **11C**, the ladder parts assume the position indicated at **12C** and **19C**.

Thus there is provided, at any stage of roof height, a continuous ladder or stair, extending from the tank rim to the floating roof surface, which ladder is sufficiently firm and stable to support any traffic necessary between these points while the tank is in service.

I claim:

In a floating roof tank of less diameter than height, an access ladder for the roof of said tank, said ladder comprising two sections, the upper section being pivotally supported at the rim of the tank side wall, the lower section being pivotally fixed to the tank roof at a point diametrically opposite said first named support and arranged to rest horizontally upon the floating roof in the upper range of travel of said roof, the free extremity of the upper section being provided with flanged wheels on either side, the lower section being so formed as to provide tracks at either side upon which said wheels may travel, the free end of the lower section being provided with socket members on either side, the free end of the upper section being provided with means for engaging said socket members when brought into contact therewith thereby providing a hinged two-section ladder which assumes a substantially straight form when the floating roof is at its lowest position.

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