May 6, 1924. 1,493,091

J. H. WIGGINS

FLOATING DECK

Filed March 3, 1922 4 Sheets-Sheet 1

Fig. 1.

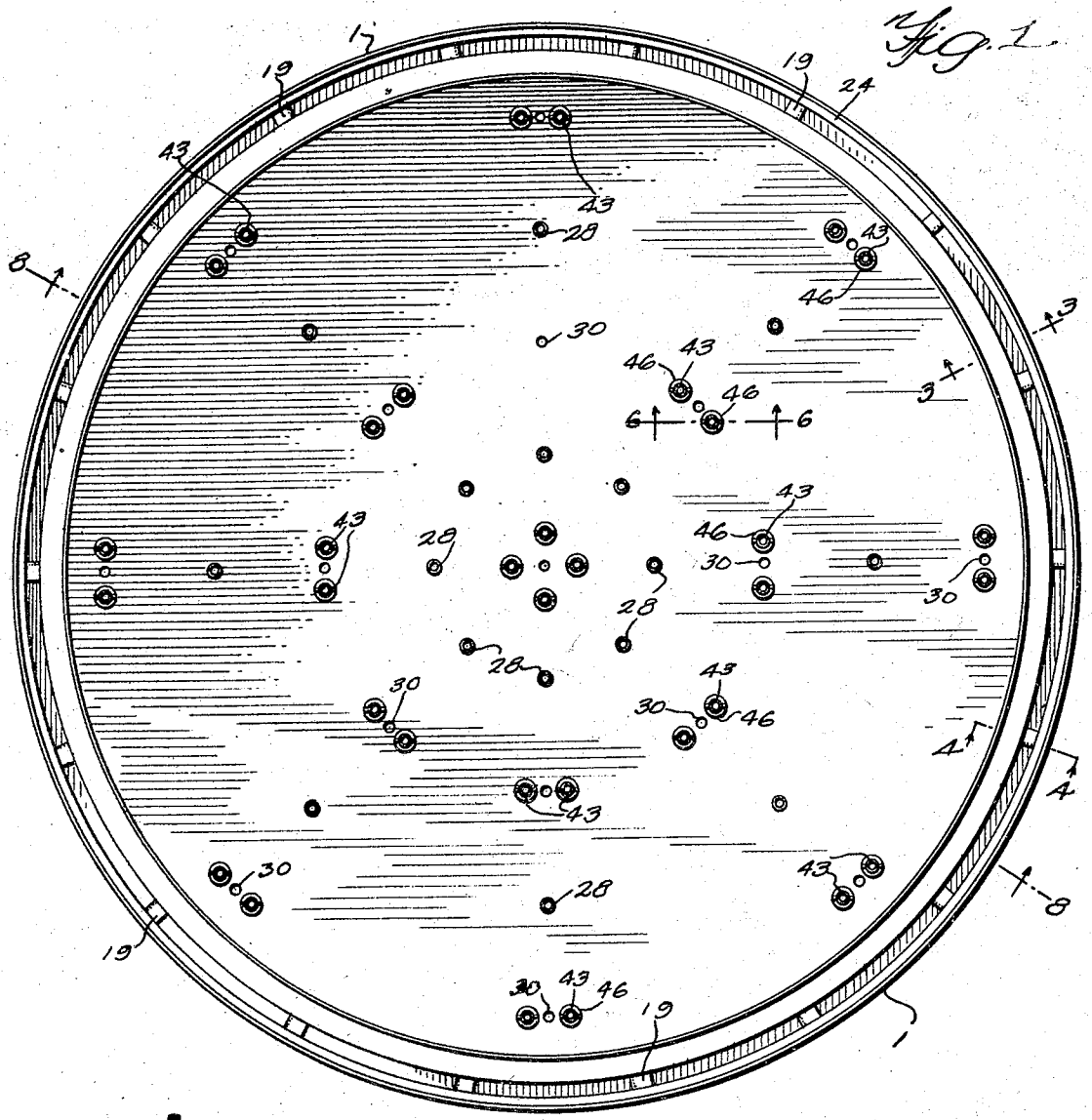
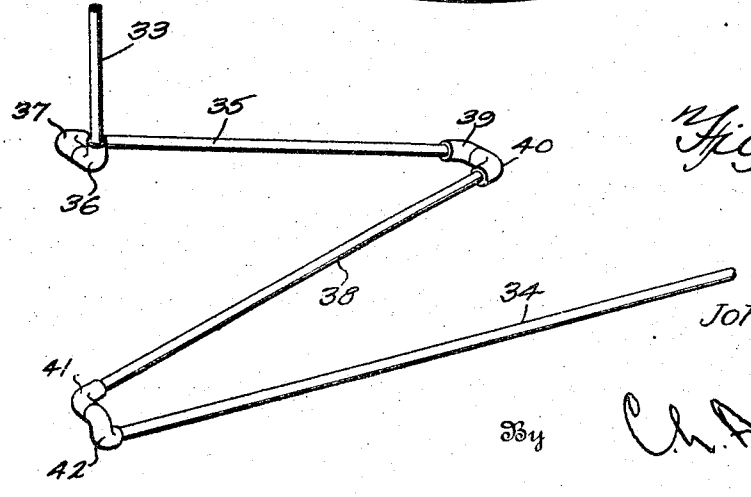


Fig. 2.



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FLOATING DECK

Filed March 3, 1922 4 Sheets-Sheet 2

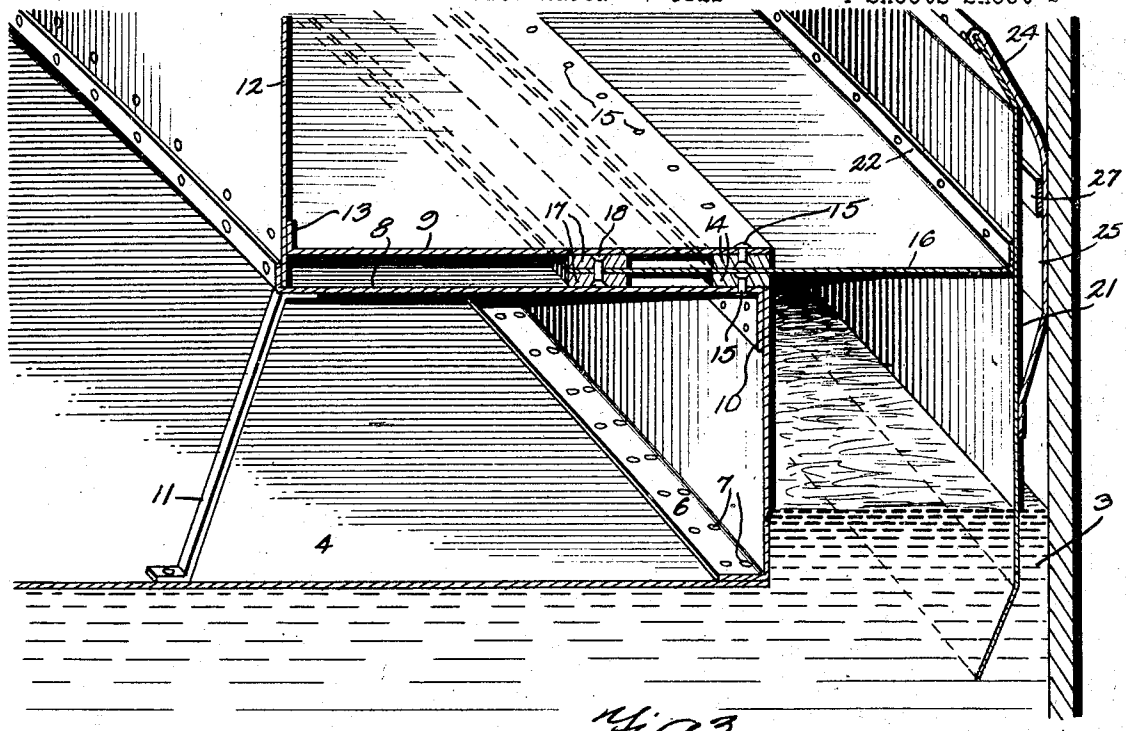

Fig. 3.

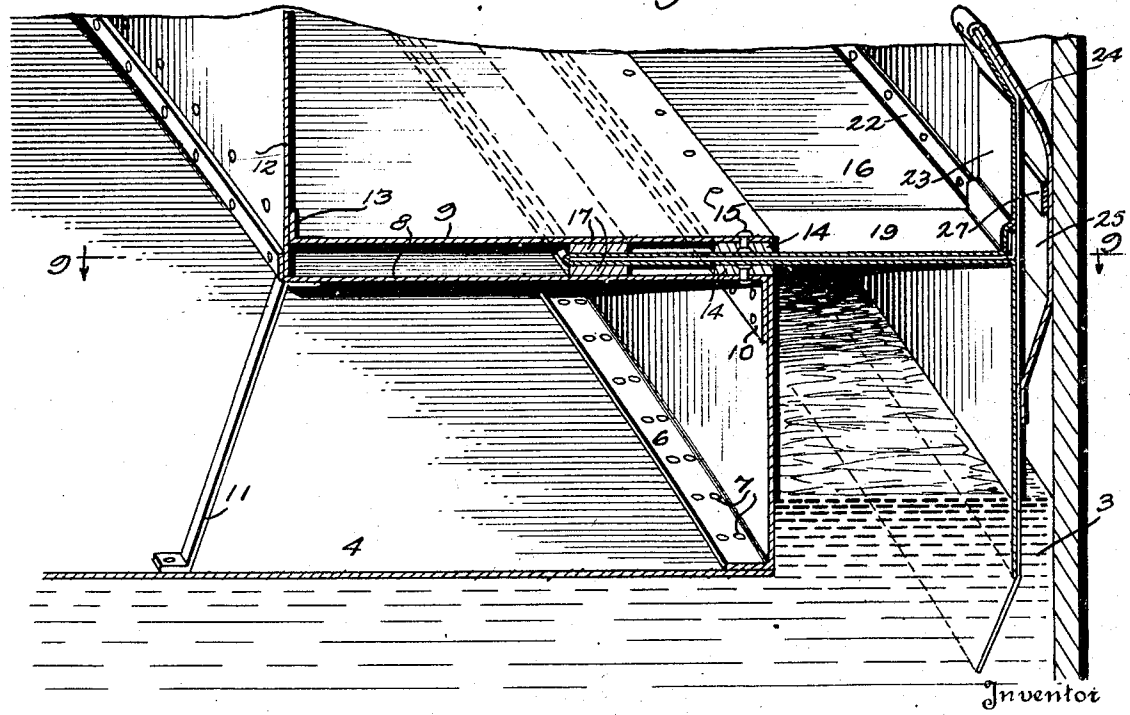

Fig. 4.

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May 6, 1924. 1,493,091

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FLOATING DECK

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Fig. 5.

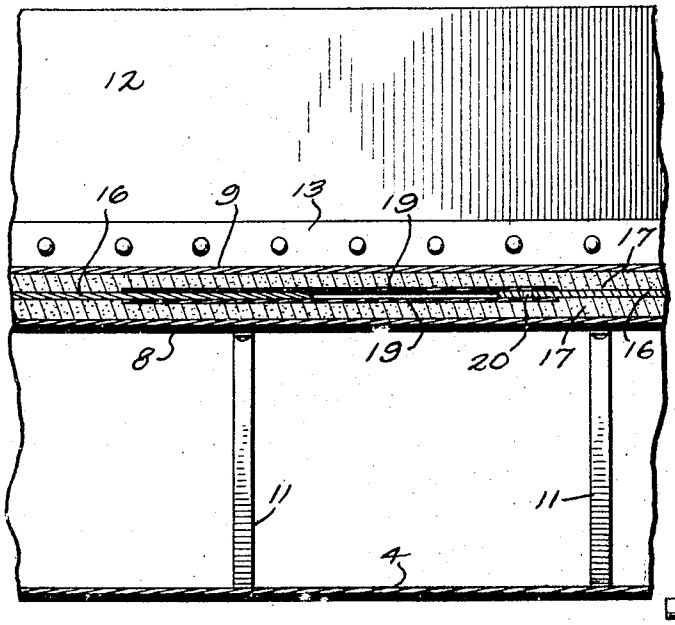


Fig. 6.

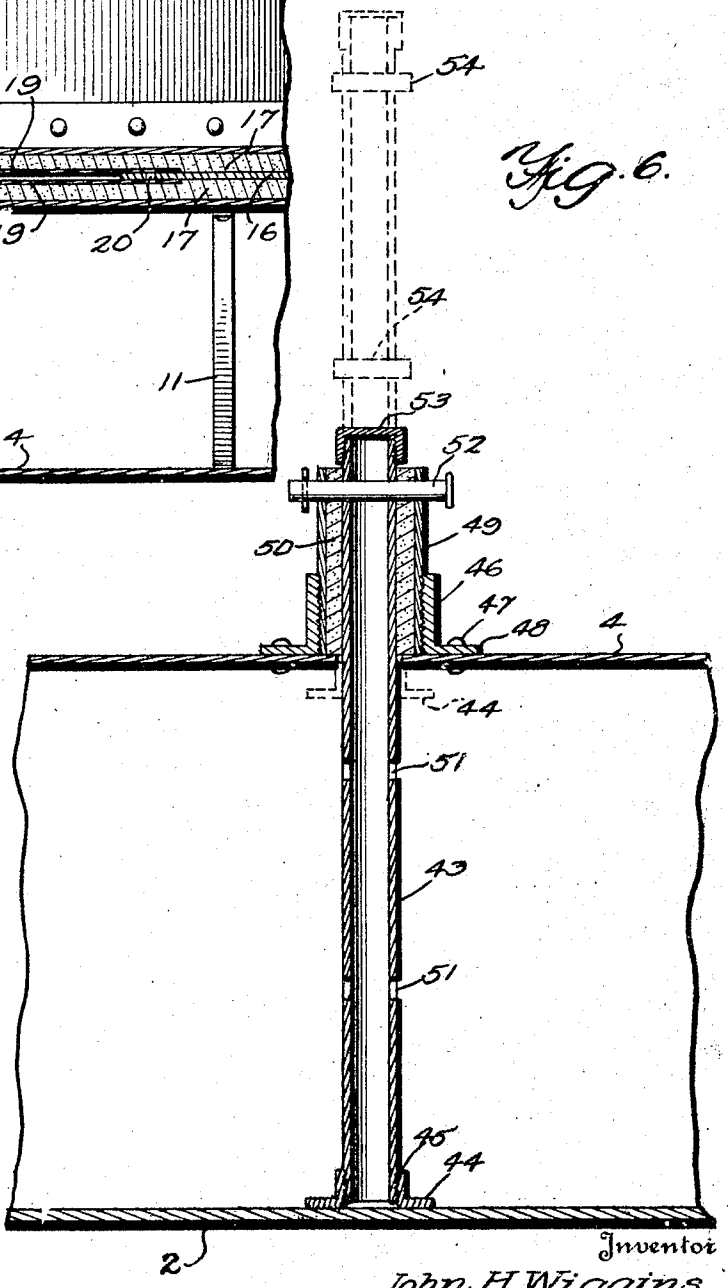
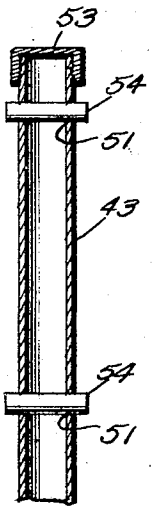


Fig. 7.



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1,493,091

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FLOATING DECK

Filed March 3, 1922

4 Sheets-Sheet 4

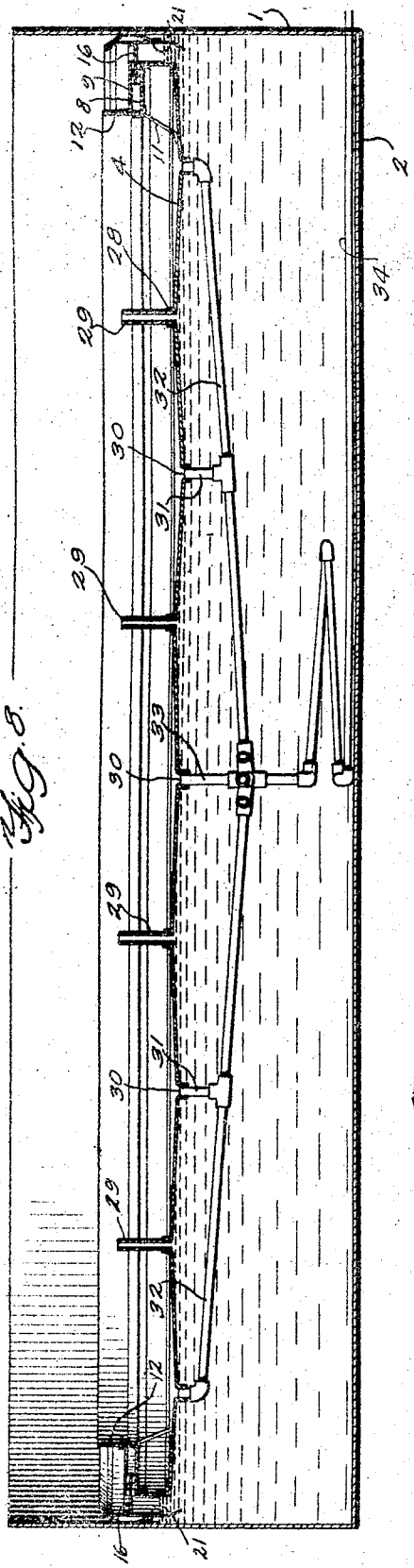

Fig. 9.

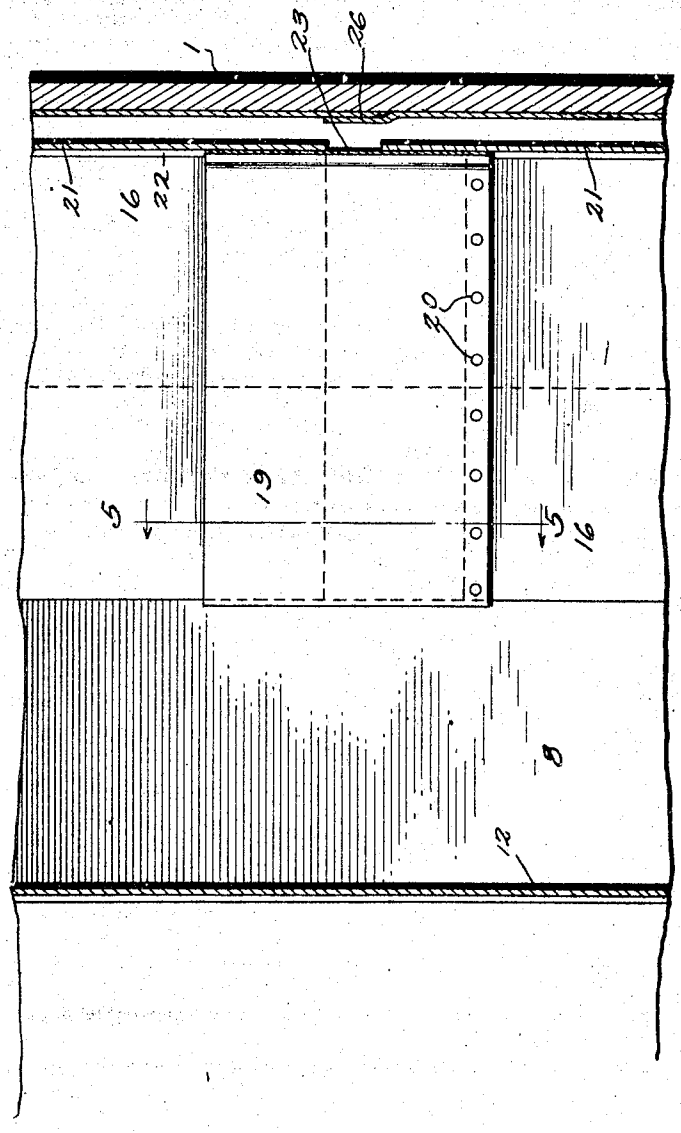

Fig. 9.

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Patented May 6, 1924. 1,493,091

UNITED STATES PATENT OFFICE.

JOHN HENRY WIGGINS, OF BARTLESVILLE, OKLAHOMA.

FLOATING DECK.

Application filed March 3, 1922. Serial No. 540,847.

To all whom it may concern:

Be it known that I, JOHN HENRY WIGGINS, a citizen of the United States, residing at Bartlesville, in the county of Washington and State of Oklahoma, have invented certain new and useful Improvements in Floating Decks, of which the following is a specification.

This invention relates to liquid storage tanks of the type that comprise a movable top or deck which floats upon and is supported by the liquid in the tank.

One object of my invention is to provide a practicable and inexpensive floating deck for liquid storage tanks that can be made in large sizes and which will effectively protect the contents of the tank from fire and from exposure to the atmosphere, thereby reducing the fire hazard and evaporation losses to a minimum.

Another object is to provide an inexpensive, light-weight floating deck for liquid storage tanks that has perfect stability.

Another object is to provide a practicable means for supporting a tank deck during the operation of erecting the tank and when the tank is empty, that can be easily removed when it is desired to float the deck on the body of liquid in the tank.

Another object is to provide a liquid storage tank that is equipped with a highly efficient means for permitting the escape of air and any gases that collect on the underside of the deck and for insuring the removal of rain water that collects on the top side of the deck. Other objects and desirable features of my invention will be hereinafter pointed out.

To this end I have devised a liquid storage tank that consists of a vertically-disposed shell of cylindrical shape which forms the side wall of the tank, and a floating deck adapted to be supported by the liquid in the tank and comprising a solid central portion or body portion and a variable peripheral portion that serves as a closure for the annular space between the side wall of the tank and the central body portion of the deck, said peripheral portion being constructed in such a manner that it is capable of expanding and contracting sufficiently to compensate for variations in the relative position and dimension of the deck and side wall, due to expansion and contraction of the metal plates from which said parts are formed. Preferably, the body portion of the deck is composed of horizontally-disposed, thin metal plates connected together in such a way as to form one large limber sheet that floats upon the body of liquid in the tank and whose peripheral edge is spaced away from the side wall of the tank, the purpose of constructing the body portion of the deck in this manner being to make it as light as possible and also reduce the cost of same. Said body portion is reinforced and strengthened at its periphery by a rigid rim, or any other suitable means, and the variable peripheral portion of the deck is formed preferably from a plurality of horizontally-disposed members arranged in overlapping relation and in such a way that they can move relatively to each other so as to increase or decrease the diameter of said peripheral portion. In the form of my invention herein illustrated a shoe whose lower edge projects into the liquid is arranged at the outer edge of the variable peripheral portion of the deck so as to slide upon the inner surface of the side wall of the tank, and means is provided for holding said shoe pressed tightly against said wall. Vent openings are arranged at numerous points throughout the area of the body portion or central portion of the deck to provide for the escape of air and any gases that collect on the underside of the deck and drain openings and co-operating drain pipes are arranged at numerous points throughout the area of said body portion, so as to provide for the escape of rain water that falls on the top side of the deck. In view of the fact that the body portion of the deck is limber, it is advisable to provide means for counteracting unequal loads on same which have a tendency to capsize the deck. Various means can be used for this purpose, but I prefer to construct the drain pipes that are used for conducting water off of the top side of the deck in such a way that said drain pipes act as a truss that maintains the deck in a substantially horizontal plane at all times. The means previously referred to that is used for temporarily sustaining the deck during the operation of erecting the tank and when the tank is empty can be formed in various ways without departing

from the spirit of my invention, but in the form of my invention herein illustrated said sustaining means is composed of vertically-adjustable members carried by the deck and adapted to be moved downwardly into engagement with the bottom of the tank and then secured to said deck in such a way that they sustain the deck and hold it in parallel relationship with the bottom of the tank.

Figure 1 of the drawings is a top plan view of a storage tank constructed in accordance with my invention that is adapted to be used for storing oil.

Figure 2 is a perspective view of the jointed portion of the drain pipe.

Figure 3 is an enlarged vertical sectional view, taken on the line 3—3 of Figure 1.

Figure 4 is an enlarged vertical sectional view, taken on the line 4—4 of Figure 1.

Figure 5 is a detail vertical sectional view, taken on the line 5—5 of Figure 9, looking in the direction indicated by the arrows.

Figure 6 is a detail vertical sectional view, illustrating the construction of one of the supports that is used for temporarily sustaining the deck of the tank during the operation of constructing the tank or when the tank is empty.

Figure 7 is another detail sectional view of said support.

Figure 8 is a vertical transverse sectional view, taken on the line 8—8 of Figure 1, showing the deck supported by or resting upon the body of liquid in the tank; and

Figure 9 is a horizontal sectional view, taken on the line 9—9 of Figure 4, looking in the direction indicated by the arrows.

Referring to the drawings which illustrate one form of my invention, 1 designates a vertically-disposed, cylindrical shell that forms the side wall of a tank that is designed to be used for storing oil, said tank being provided with a bottom 2 and with a floating deck or top that rests upon and is supported by the body of oil 3 in the tank. Said floating deck or top comprises a main body portion 4 of less diameter than the diameter of the side wall of the tank, and a variable peripheral portion for closing the annular space between the main body portion 4 of the deck and the side wall of the tank. In the form of my invention herein illustrated the body portion 4 of the deck is formed from relatively thin metal plates secured together in such a way as to form a single solid limber sheet that covers the major portion of the top surface of the body of liquid in the tank 1, and said body portion is provided at its peripheral edge with a rigid rim 5 provided at its lower edge with a horizontally-disposed flange 6 which is secured to the main body portion 4 of the deck by fastening devices 7, as shown more clearly in Figures 3 and 4. The rim 5 forms a rigid circumference for the limber portion of the deck and imparts sufficient strength to said limber portion to enable it to stand any tangential compression and any variable load such as workmen walking on the deck.

The variable peripheral portion of the deck that closes the annular space between the side wall of the tank and the main body portion 4 of the deck is so constructed that it will ride over irregularities on the inner surface of the side wall of the tank, such as the seams where the plates forming said side wall are connected together, and said variable portion is so constructed that the diameter of same will increase and decrease automatically so as to compensate for variations in the diameter of the side wall of the tank, due to expansion and contraction of the metal from which said side wall is formed or for any other reason. In the form of my invention herein illustrated an annular shoe whose lower edge projects downwardly into the body of liquid in the tank so as to trap off any gas or vapor rising from the surface of the oil lying between the side wall of the tank and the main body portion 4 of the deck, is arranged in sliding engagement with the inner surface of the side wall of the tank, and the variable peripheral portion of the deck just referred to is combined with said shoe in such a manner that the shoe virtually forms a part of same.

As shown in Figures 3 and 4, the body portion 4 of the deck is provided with a pair of horizontally-disposed plates 8 and 9, of annular form in outline, arranged above said body portion at the periphery of same and spaced apart so as to receive a plurality of horizontally-disposed, segmental plates 16 that slide between said plates 8 and 9 and co-operate with same to form an expansible and contractible closure for the annular space between the side wall of the tank and the central body portion 4 of the floating deck. The plate 8 is rigidly connected to the portion 4 of the deck by means of a depending flange 10 on the outer edge of said plate 8 that is secured to the upwardly-projecting rim 5 on the portion 4 of the deck and braces 11 are provided for securing the inner edge of said plate 8 to the part 4 of the deck. A vertically disposed baffle plate 12 that projects upwardly from the inner edge of the plate 8 serves as a support for the inner edge of the plate 9, said plate 9 being provided with a flange 13 that is secured by suitable fastening devices to the baffle plate 12. The space between the plates 8 and 9 is partially closed at its outer edge by means of annular packing rings or gaskets 14 which are secured to said plates by fastening devices 15, and the segmental plates 16 previously referred to are slidingly mounted between the gaskets 14 and are provided

at their inner edges with annular gaskets 17 that bear against the plates 8 and 9, as shown in Figures 3 and 4, said gaskets being secured to said segmental plates 16 by fastening devices 18. The ends of the segmental plates 16 are spaced apart so as to provide for the radial movement of said plates or the inward and outward movement of said plates relatively to the cooperating plates 8 and 9 on the main body portion 4 of the deck, and the joints or spaces between the ends of said segmental plates 16 are covered by pairs of horizontally-disposed plates 19 arranged so that they will embrace the end portions of adjacent plates 16, each pair of plates 19 being rigidly connected to one of the segmental plates 16 and arranged so that they will telescope over or slide upon an adjacent plate 16, as shown in Figure 5.

The annular shoe, previously referred to, that is arranged in sliding engagement with the inner surface of the side wall of the tank is preferably composed of a number of arc-shaped sections 21, arranged in the same horizontal plane so as to form a ring that extends around the side wall of the tank and which is disposed in parallel relation to said side wall. Each section 21 of the shoe is rigidly connected to one of the segmental plates 16, as, for example, by means of a flange 22 on the plate to which the section of the shoe is riveted, and said sections 21 are so proportioned that the ends of same are spaced apart, as shown in Figure 9, each of the plates 19 having an upwardly-projecting portion 23 that bridges the gap between two adjacent sections of the shoe. In order to insure said shoe bearing snugly against the side wall of the tank, said shoe is provided with a resilient engaging means formed preferably from resilient devices 24 carried by the sections 21 of the shoe and constructed in such a way that they will bear against the inner surface of the side wall 1 of the tank, said devices 24 being provided at their ends with overlapping portions 26, shown in Figure 9, so as to form a substantially continuous, ring-shaped, resilient element that bears against the side wall of the tank throughout its entire circumference. Preferably, a spring band 27 or some other suitable means is arranged in engagement with the resilient elements 24 on the sections 21 of the shoe, so as to hold said resilient elements in snug engagement with the side wall of the tank, when the shoe expands and contracts, due to variations in the diameter of the side wall of the tank and when the shoe rises and falls, due to a variation in the level of the liquid in the tank.

In a tank that is used for storing oil it is essential that the deck or top of the tank be constructed in such a manner as to provide for the escape of relatively small amounts of gases and vapors which may collect on the underside of the deck, without, however, exposing the oil in the tank to the direct action of sufficient air to cause great evaporation of the oil. It is also essential that means be provided for preventing water from collecting on the top side of the deck, as an accumulation of water on same might capsize the deck. Accordingly, I have provided the main body portion 4 of the deck with vent openings 28 arranged at numerous points throughout the area of same and drain openings 30 arranged at numerous points throughout the area of said main body portion and combined with drain pipes. Each of the vent openings 28 communicates with an upwardly-projecting vent pipe 29 and the drain openings 30 communicate with downwardly-projecting pipes 31. The pipes 31 are, in turn, connected to inclined pipes 32 arranged on the underside of the deck and joined to a manifold pipe 33 arranged vertically inside of the tank, preferably at the center of same, and connected by means of a jointed pipe to an outlet pipe 34 that extends to the exterior of the tank, as shown in Figure 8, the purpose of using a jointed pipe between the manifold 33 and the outlet pipe 34 being to provide for the rise and fall of the floating deck. While I have stated that a jointed pipe is used for connecting the manifold 33 to the outlet pipe 34, I wish it to be understood that it is immaterial, so far as my invention is concerned, what means is employed for carrying away the water that enters the inclined pipes 32 which communicate with the drain openings 30 in the deck of the tank. The inclined pipes 32 are joined to the manifold 33 at a point far enough below the deck to insure water flowing through said pipes 32, even if the deck is tilted out of a horizontal position. In Figure 2 of the drawings I have shown one form of jointed pipe that may be used between the manifold 33 and the outlet pipe 34, composed of a short section of pipe 35 connected to the lower end of the manifold 33 by couplings 36 and 37 that are free to turn or oscillate with respect to each other, a second section of pipe 38 connected by means of couplings 39 and 40 with the pipe 35 and couplings 41 and 42 for connecting the pipe 38 with the outlet pipe 34, said pipe sections and couplings co-operating with each other to form a jointed discharge pipe that will extend and contract automatically as the deck of the tank rises and falls, due to variations in the level of the liquid in the tank. Owing to the fact that the main body portion 4 of the deck is limber, the weight which the drain pipes above referred to impose on said portion 4 causes said portion to sag or deflect downwardly

at the points where the drain openings 30 are formed therein. The vent openings 28 are so arranged with relation to the drain openings 30 that said vent openings will be located at points intermediate the deflected portions of the deck from which the drain openings lead. Consequently, the deck of the tank may be said to comprise a flexible member provided at numerous points throughout its area with deflected portions from which drain pipes lead and provided with upwardly-bowed portions intermediate said deflected portions that are equipped with vent openings, the numerous depressions in the top surface of the deck forming a highly efficient means for carrying away drain water that falls on the deck and the numerous upwardly-bowed portions of the deck insuring the free escape of air and gas that collects on the underside of the deck, due to the fact that vents or gas outlets are located at the highest point of the deck of the tank. In addition to carrying off the water that collects on the top side of the deck, the drain pipes 31 and 32 and the manifold 33 and the jointed pipe connected to same act collectively to form a balancing means, suspended from the underside of the deck, which exerts a sufficient downward thrust on the central portion of the main body of the deck to counteract a load on the top side of the deck near the periphery of same that tends to tilt the deck. The pipes 31 and 32 also co-operate with each other to form a truss for the limber portion 4 of the deck.

In the form of my invention herein illustrated the means that is used for temporarily supporting the deck during the operation of erecting the tank and when the tank is empty consists of a number of tubular supports 43 carried by the portion 4 of the deck and adapted to be moved downwardly into engagement with the bottom of the tank and then secured to the portion 4 of the deck so as to sustain the weight of same. As shown in Figures 6 and 7, the portion 4 of the deck is provided with openings in which tubular posts 43 are slidingly mounted, each of said posts being provided at its lower end with a base 44 secured to the post by screw threads 45 and having its upper end projecting through a sleeve 46 provided with a flange 48 that is secured to the portion 4 of the deck by means of fastening devices 47. The sleeve 46 surrounds a tubular packing member 49 through which the post 43 slides, packing members 50 being used so as to form tight joints at the points where the supports 43 project through the top of the tank, and thus tending to prevent the evaporation of the oil in the tank. Each of the supports 43 is provided with a plurality of transversely-disposed holes 51 arranged at different levels for receiving pins 52 that are arranged transversely in holes in the tubular member 49, as shown in Figure 6. If it is desired to support the floating deck of the tank by means of the supports 43, said supports are moved downwardly into engagement with the bottom of the tank, as shown in Figure 6, and the pins 52 are arranged transversely in the tubular members 49 on the portion 4 of the deck and in the upper end portions of the supports 43, so as to transfer the weight or load of the deck onto the supports 43. After the tank has been filled with oil the supports 43 are disconnected from the elements 49 on the top side of the deck and are moved upwardly into an inoperative position, as shown in broken lines in Figure 6, each of the supports 43 being provided with a cap 53 for closing the upper end of same and with plugs 54 that are adapted to be arranged in the holes 51 in the supports so as to prevent the contents of the tank from evaporating through said supports.

When the tank is filled with oil the deck or top of the tank floats upon said oil, as shown in Figure 8. The variable peripheral portion of the deck closes the annular space between the side wall of the tank and the main body portion 4 of the deck, and thus effectively protects the contents of the tank from fire and from evaporation, said peripheral portion being of such construction that the diameter of same can increase or decrease automatically and thus compensate for relative movement between the side wall of the tank and the body portion 4 of the deck, due to expansion and contraction of the metal from which said parts are formed. The rim 5 not only imparts rigidity to the circumferential portion of the body part 4 of the deck, but it also prevents the oil at the edge of said part 4 from flowing onto the top surface of same. The shoe that bears against the inner surface of the side wall of the deck is preferably so proportioned that it projects downwardly below the surface of the oil in the tank, and as said shoe is effectively supported and held in horizontal alignment with the main body portion 4 of the deck by the co-operating plates 8, 9 and 16, it is impossible for said shoe to assume such a position that it binds upon the side wall of the tank. Any rain water that collects on the surface of the deck is conducted off of same by the drain pipes that co-operate with the drain openings in the deck, and notwithstanding the fact that the main body portion of the deck is limber, it will be maintained in a substantially horizontal position, even when it is subjected to an uneven load, by the downwardly inclined drain pipes on the underside of the deck that act as a truss to carry a load arranged

at the edge of the deck and also as a pendulum to counteract any strains or pressures tending to capsize the deck.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A floating deck for liquid storage tanks, comprising a main body portion that normally floats upon the liquid in the tank, and a variable peripheral portion composed of relatively movable, horizontally-disposed elements for closing the space between said main body portion and the side wall of the tank.

2. A floating deck for liquid storage tanks, comprising a main body portion adapted to normally float upon the liquid in the tank, and a variable peripheral portion comprising a shoe arranged in sliding engagement with the side wall of the tank and a plurality of horizontally-disposed, relatively movable members combined with said shoe and main body portion in such a way as to form a tight closure for the space between the side wall of the tank and the main body portion of said deck.

3. A floating deck for liquid storage tanks, comprising a main body portion adapted to normally float on the liquid in the tank, a shoe disposed oppositely to the side wall of the tank and arranged with its lower edge submerged in the liquid in the tank, and a closure for the space between said main body portion and shoe constructed in such a manner that the shoe can move horizontally relatively to said main body portion.

4. A floating deck for liquid storage tanks, comprising a main body portion adapted to normally float on the liquid in the tank, a shoe disposed oppositely to the side wall of the tank and arranged in sliding engagement with said wall with its lower edge submerged in the liquid in the tank, and a closure for the space between said shoe and the main body portion of the deck which supports said shoe in such a way that said shoe can move relatively to said main body portion sufficiently to compensate for expansion and contraction of the side wall of the tank.

5. A floating deck for liquid storage tanks, comprising a main body portion adapted to normally float on the liquid in the tank, a shoe disposed oppositely to the side wall of the tank and arranged with its lower edge submerged in the liquid in the tank, and co-operating, horizontally-disposed, overlapping elements carried by said shoe and the main body portion of the deck to form a variable peripheral portion for the deck.

6. A floating deck for liquid storage tanks, comprising a main body portion adapted to normally float upon the liquid in the tank, a shoe surrounding said body portion and disposed oppositely to the side wall of the tank, co-operating, horizontally-disposed members connected to said shoe and main body portion and arranged in sliding engagement with each other, and means for holding said shoe in sliding engagement with the side wall of the tank.

7. A floating deck for liquid storage tanks, comprising a main body portion adapted to normally float upon the liquid in the tank, an annular shoe surrounding said portion and composed of a number of sections that are adapted to bear against the inner surface of the side wall of the tank, and an expansible and contractible means arranged at the periphery of the main body portion of the deck for carrying said shoe sections.

8. A floating deck for liquid storage tanks, comprising a main body portion adapted to normally float upon the liquid in the tank and provided adjacent its periphery with an upwardly-projecting rim, an annular shoe surrounding said rim and disposed oppositely to the side wall of the tank, and means for closing the annular space between said rim and shoe and for supporting said shoe in such a way that the shoe can move relatively to the main body portion of the deck so as to compensate for variations in the diameter of the side wall of the tank.

9. A floating deck for liquid storage tanks provided with a main body portion adapted to normally float upon the liquid in the tank, a shoe disposed oppositely to the side wall of the tank and composed of a number of arc-shaped sections, and radially movable plates arranged at the periphery of the main body portion of the deck for carrying the sections of said shoe.

10. A floating deck for liquid storage tanks provided with a main body portion adapted to normally float upon the liquid in the tank, a shoe disposed oppositely to the side wall of the tank and composed of a number of arc-shaped sections, radially movable plates arranged at the periphery of the main body portion of the deck for carrying the sections of said shoe, and means for closing the joints between said radially movable plates.

11. A floating deck for liquid storage tanks, comprising a main body portion adapted to float upon the liquid in the tank and provided at its periphery with an upwardly-projecting rim, an annular shoe surrounding said rim and composed of a number of sections whose lower edges are submerged in the liquid in the tank, a horizontally reciprocating means on the main body portion of the deck for supporting said shoe sections in such a way that the shoe can expand and contract as the diameter of the side wall of the tank varies, and a resilient means combined with said shoe sections in such a way as to hold them in engagement with the side wall of the tank.

12. A floating deck for liquid storage tanks, comprising a main body portion that is adapted to float on the liquid in the tank, an annular shoe surrounding said portion and disposed oppositely to the side wall of the tank, a resilient means on said shoe that bears against the inner surface of the side wall of the tank, and co-operating, horizontally-disposed elements on said main body portion and shoe arranged in sliding engagement with each other for sustaining said shoe.

13. A floating deck for liquid storage tanks, comprising a main body portion composed of a plurality of relatively thin metal plates connected together in such a manner as to form a limber sheet that floats upon and covers the major portion of the liquid in the tank, and means for closing the space between the peripheral edge of said limber sheet and the side wall of the tank.

14. A floating deck for liquid storage tanks, comprising a main body portion composed of a plurality of relatively thin metal plates connected together in such a manner as to form a limber sheet that floats upon and covers the major portion of the surface of the liquid in the tank, and means that forms a rigid rim for the circumferential portion of said limber sheet.

15. A floating deck for liquid storage tanks, comprising a limber body portion adapted to normally float upon the liquid in the tank and provided with a rigid or stiff circumferential portion, and a truss suspended from the underside of said body portion that exerts a sufficient downward thrust on the central part of same to counteract unequal loads and strains on the peripheral part of said body portion that tend to tilt same.

16. A floating deck for liquid storage tanks, comprising a limber sheet adapted to float upon the liquid in the tank and provided with a substantially rigid or stiff circumferential portion, and means depending from the underside of said sheet that exerts a downward thrust on the central portion of same, and thus tends to balance same and hold it in a horizontal position.

17. A floating deck for liquid storage tanks, comprising a limber sheet adapted to float upon the body of liquid in the tank and provided at numerous points throughout its area with drain holes, drain pipes co-operating with said holes and connected to said sheet in such a manner that they tend to deflect the sheet downwardly at points in proximity to said drain holes, and vent openings in said sheet arranged intermediate said drain holes.

18. A floating deck for liquid storage tanks, comprising a flexible sheet adapted to float upon the liquid in the tank and provided with downwardly deflected portions and upwardly deflected portions, a drainage means communicating with drain openings in the downwardly deflected portions of said sheet, and vent openings in the upwardly deflected portions of said sheet.

19. A floating deck for liquid storage tanks, comprising a limber body portion adapted to float upon the liquid in the tank and provided at numerous points throughout its area with drain openings, and drain pipes communicating with said drain openings, suspended from the underside of said body portion and arranged so that they act as a truss for said body portion.

20. A floating deck for liquid storage tanks, comprising a body portion of smaller diameter than the side wall of the tank composed of a plurality of relatively thin metal plates connected together in such a manner as to form a limber sheet, means for imparting rigidity to the circumferential portion of said limber sheet, and means for closing the annular space between the periphery of said body portion and the side wall of the tank.

21. A floating deck for liquid storage tanks, comprising a body portion of smaller diameter than the side wall of the tank provided with drain openings and composed of a plurality of relatively thin metal plates connected together in such a manner as to form a limber sheet, drain pipes connected to the underside of said body portion and operating to cause the limber sheet that constitutes said body portion to deflect downwardly adjacent said drain openings, and a variable closure for bridging the space between the side wall of the tank and said limber body portion.

22. A floating deck for liquid storage tanks provided with drain openings arranged at numerous points throughout its area, inclined drain pipes arranged on the underside of said deck and leading from said openings, and a manifold to which said pipes are connected at a point far enough below said deck to insure water flowing through said drain pipes when the deck is tilted.

23. A liquid storage tank, comprising a side wall, a floating deck adapted to normally rest upon the liquid in the tank, and a supporting structure for temporarily sustaining the deck during the operation of erecting the tank or when the tank is empty, constructed in such a manner that it can be removed from the tank when the deck is floating upon the liquid in the tank.

24. A liquid storage tank provided with a floating deck that is adapted to normally float upon the liquid in the tank, and a temporary sustaining means for said deck comprising elements adapted to be arranged

in engagement with the bottom of the tank and connected to said deck to carry the load of the deck.

25. A liquid storage tank provided with a deck that normally floats upon the liquid in the tank, and a supporting means carried by said deck and adapted to be moved downwardly into engagement with the bottom of the tank to temporarily sustain the deck under certain conditions.

26. A liquid storage tank provided with a deck that normally floats upon the liquid in the tank, temporary supports slidingly mounted in said deck and adapted to be moved downwardly into engagement with the bottom of the tank to sustain the deck under certain conditions, and means for detachably connecting the deck to said supports.

27. A liquid storage tank provided with a floating deck, vertically-disposed, temporary sustaining members slidingly mounted in holes in said deck, tubular members on the deck through which said sustaining members pass, and means for detachably connecting said sustaining members to said tubular members.

28. A floating deck for oil tanks, comprising a body portion of smaller diameter than the diameter of the tank, a plurality of horizontal plates slidably connected thereto, and vertical shoe members carried by said plates and adapted to engage the wall of the tank.

29. A floating deck for oil tanks, comprising a body portion of smaller diameter than the diameter of the tank, a pair of spaced horizontal guide plates arranged adjacent the edge of the body portion, a plurality of slidable, horizontally-disposed plates mounted between said guide plates and extending outwardly, and substantially vertical shoe members carried by said slidable plates and adapted to engage the wall of the tank.

30. A floating deck for oil tanks, comprising a body portion of smaller diameter than the diameter of the tank, a plurality of horizontal plates slidably connected thereto, vertically-disposed shoe members carried by said plates, and means for retaining said shoe members in engagement with the wall of the tank.

31. A floating deck for oil tanks, comprising a body portion of smaller diameter than the diameter of the tank, a plurality of horizontal plates slidably connected thereto, vertically-disposed shoe members carried by said plates, and a spring engaging said shoe members to retain them in engagement with the wall of the tank.

32. A floating deck for oil tanks, comprising a body portion of smaller diameter than the diameter of the tank, a plurality of horizontal plates slidably connected thereto, vertical shoe members carried by said plates, and resilient engaging members carried by said shoe members and adapted to contact with the wall of the tank.

33. A floating deck for oil tanks, comprising a body portion of smaller diameter than the diameter of the tank, a plurality of horizontal plates slidably connected thereto, vertical shoe members carried by said plates, resilient engaging members carried by said shoe members and adapted to contact with the wall of the tank, and a circumferential spring arranged on the inside of said engaging members to retain them in contact with the wall of the tank.

34. A floating deck for oil tanks, comprising a limber body portion of smaller diameter than the diameter of the tank, a substantially rigid rim secured to the edge of the body portion, a pair of spaced horizontal guide plates carried by said rim, a plurality of slidable, horizontally-disposed plates mounted between said guide plates and extending outwardly, and substantially vertical shoe members secured to the outer ends of said slidable plates and adapted to engage the wall of the tank.

35. A floating deck for oil tanks, comprising a limber body portion of smaller diameter than the diameter of the tank, a substantially rigid rim secured to the edge of the body portion, a pair of spaced horizontal guide plates carried by said rim, a plurality of slidable, horizontally-disposed plates mounted between said guide plates and extending outwardly, substantially vertical shoe members secured to the outer ends of said slidable plates, and resilient engaging members carried by said shoe members and adapted to contact with the wall of the tank.

36. A floating deck for oil tanks, comprising a limber body portion of smaller diameter than the diameter of the tank, a substantially rigid rim secured to the edge of the body portion, a pair of spaced horizontal guide plates carried by said rim, a plurality of slidable, horizontally-disposed plates mounted between said guide plates and extending outwardly, substantially vertical shoe members secured to the outer ends of said slidable plates, resilient engaging members carried on said shoe members, and a spring arranged on the inside of said engaging members to retain them in contact with the wall of the tank.

37. A floating deck for oil tanks, comprising a body portion of smaller diameter than the diameter of the tank, a plurality of horizontal plates arranged circumferentially and extending beyond the edge of said body portion, one edge of each of said plates being provided with extensions arranged above

and below the plane of said plates and adapted to overlap the adjacent edge of the next plate, and vertical shoe members carried by said plates and adapted to engage the wall of the tank.

38. A floating deck for oil tanks, said deck being provided with a plurality of openings, tubular members secured to said deck adjacent to and surrounding said openings, said tubular members being provided with transverse openings, supporting members extending through said deck openings and said tubular members, said supporting members being adapted to rest upon the bottom of the tank and being provided with a plurality of spaced transverse openings, and pins adapted to be received in the transverse opening of each of the tubular members and one of the transverse openings of each of the supporting members.

In testimony whereof I affix my signature.

JOHN HENRY WIGGINS.