

C. E. BARBA.

FISH CAR.

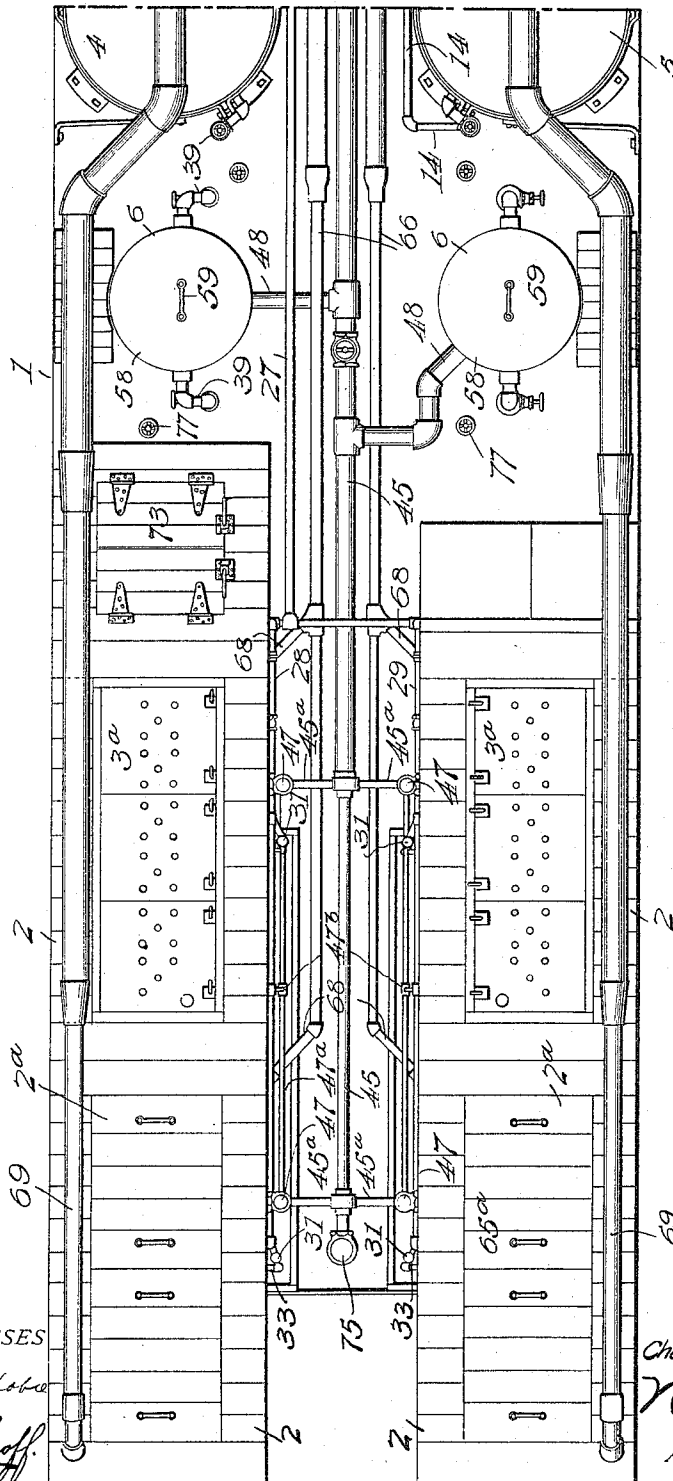
APPLICATION FILED JAN. 31, 1911.

1,156,515.

Patented Oct. 12, 1915.

8 SHEETS—SHEET 1.

Fig. 1.



WITNESSES

J. H. Macdonald
Emory J. Groff

Inventor:
Charles E. Barba

N. E. Lee
His
Attorney

C. E. BARBA.

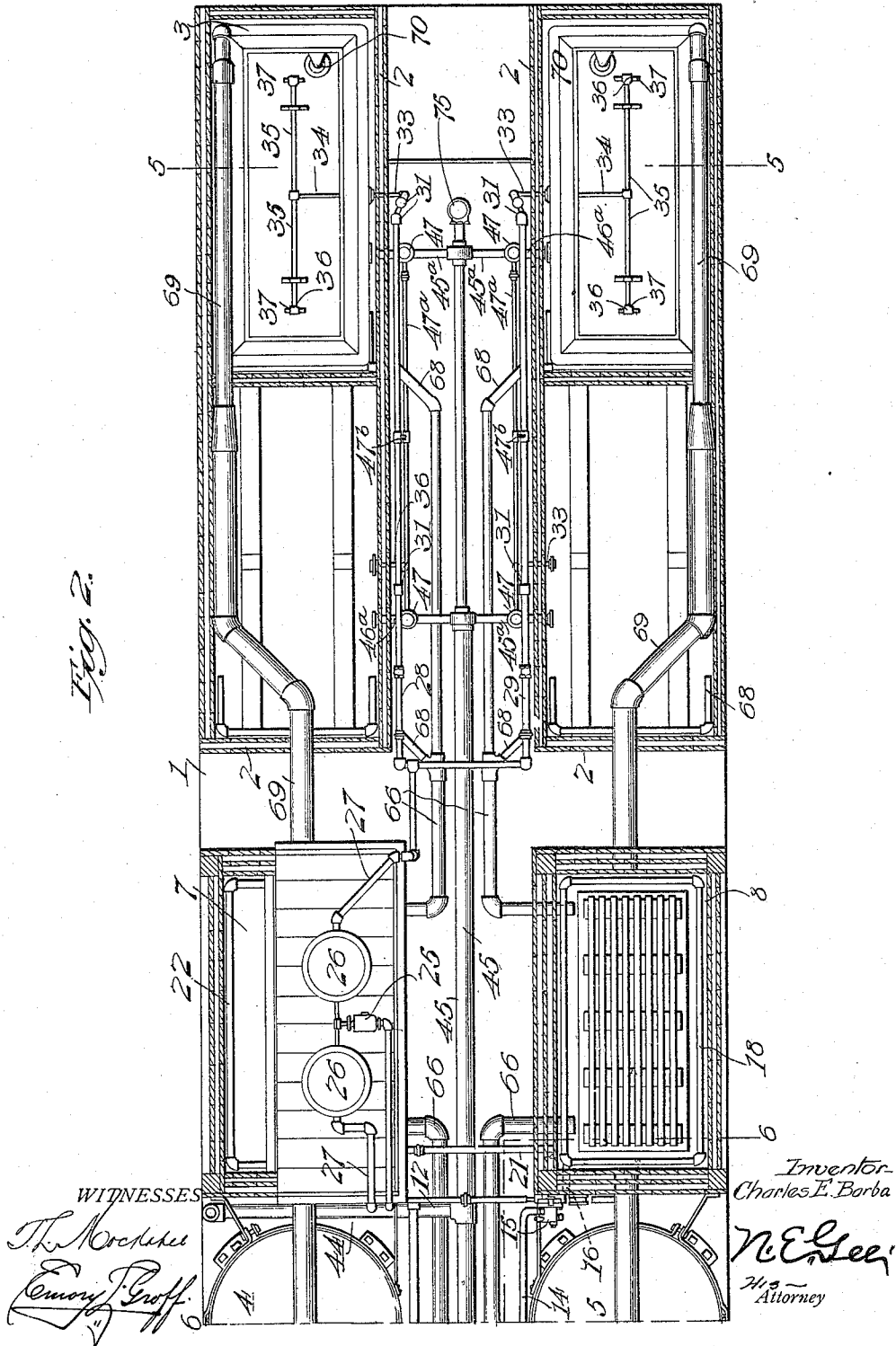
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8 SHEETS—SHEET 2.



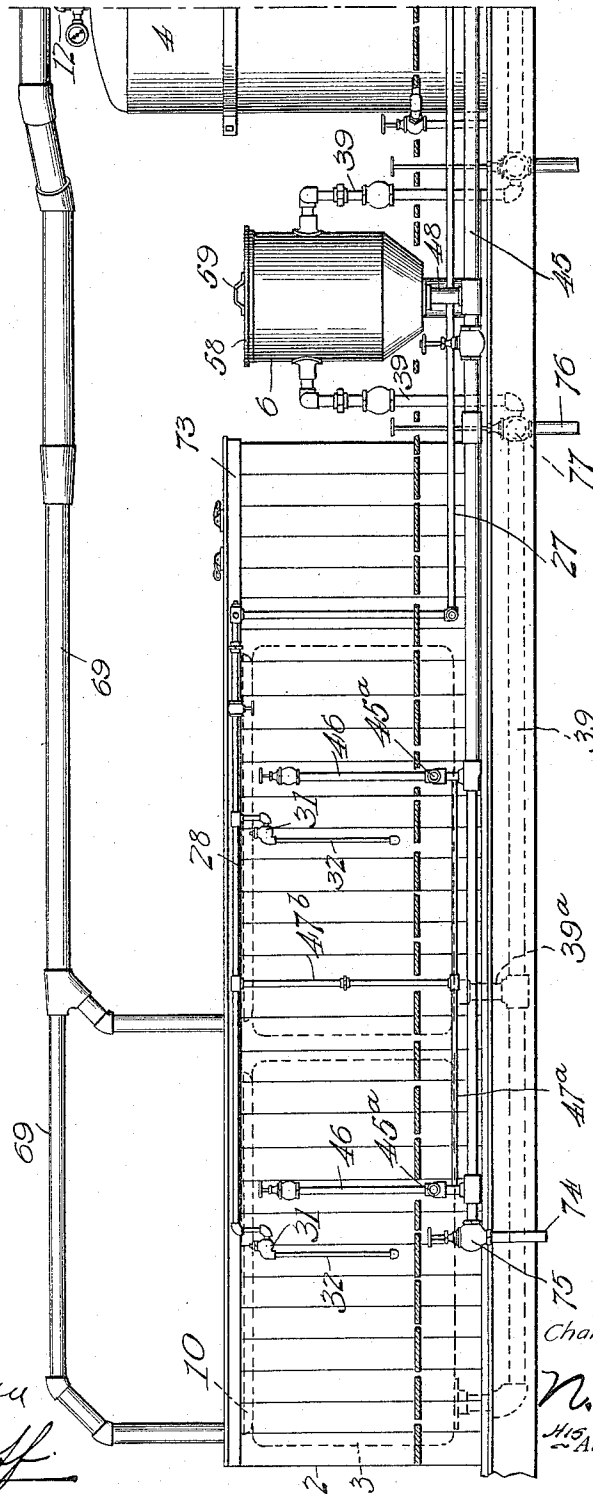
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8 SHEETS—SHEET 3.

Fig. 3.



WITNESSES

The Kockers
Emory G. Hoff

Inventor
Charles E. Barba

N. E. Gee
His Attorney

1,156,515.

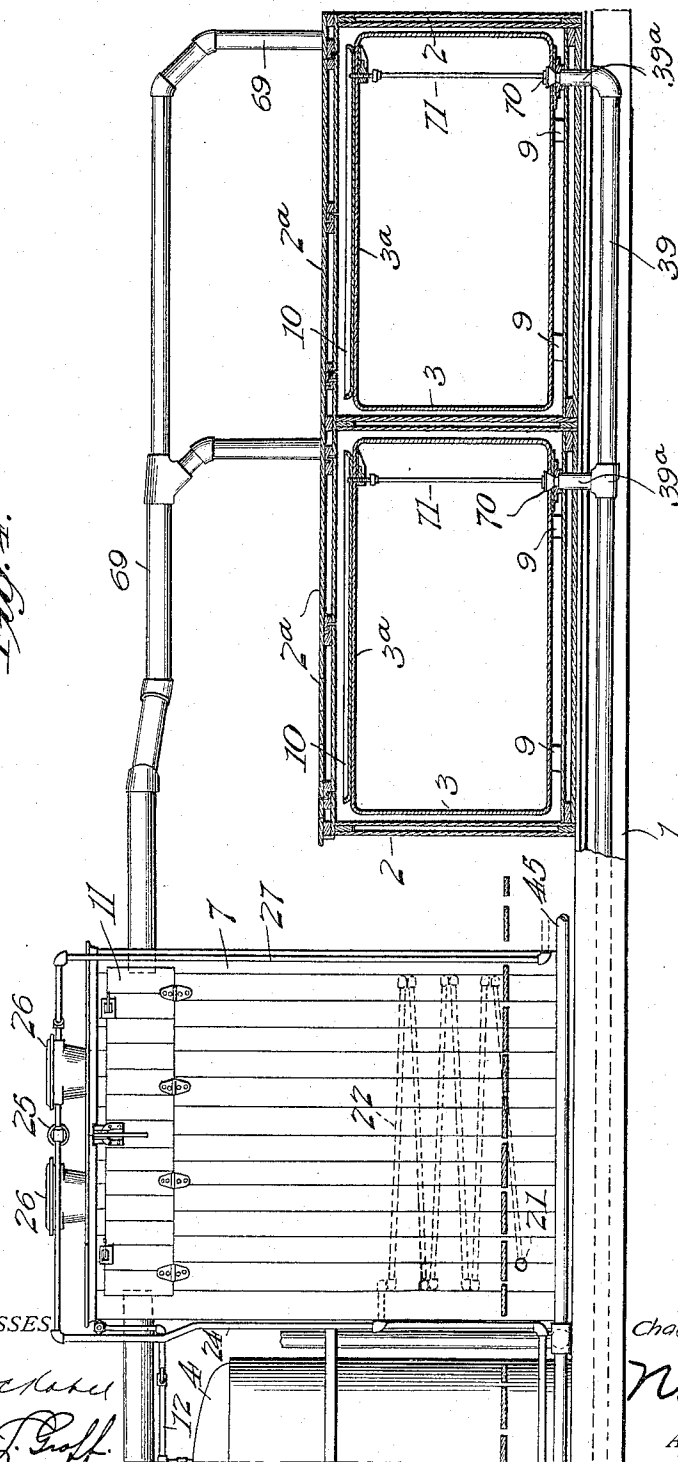
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8 SHEETS—SHEET 4.

Fig. 4.



WITNESSES

T. L. Moch...
Emory J. Hoff

Inventor
Charles E. Barba

N. E. Gee
His
Attorney

C. E. BARBA.

FISH CAR.

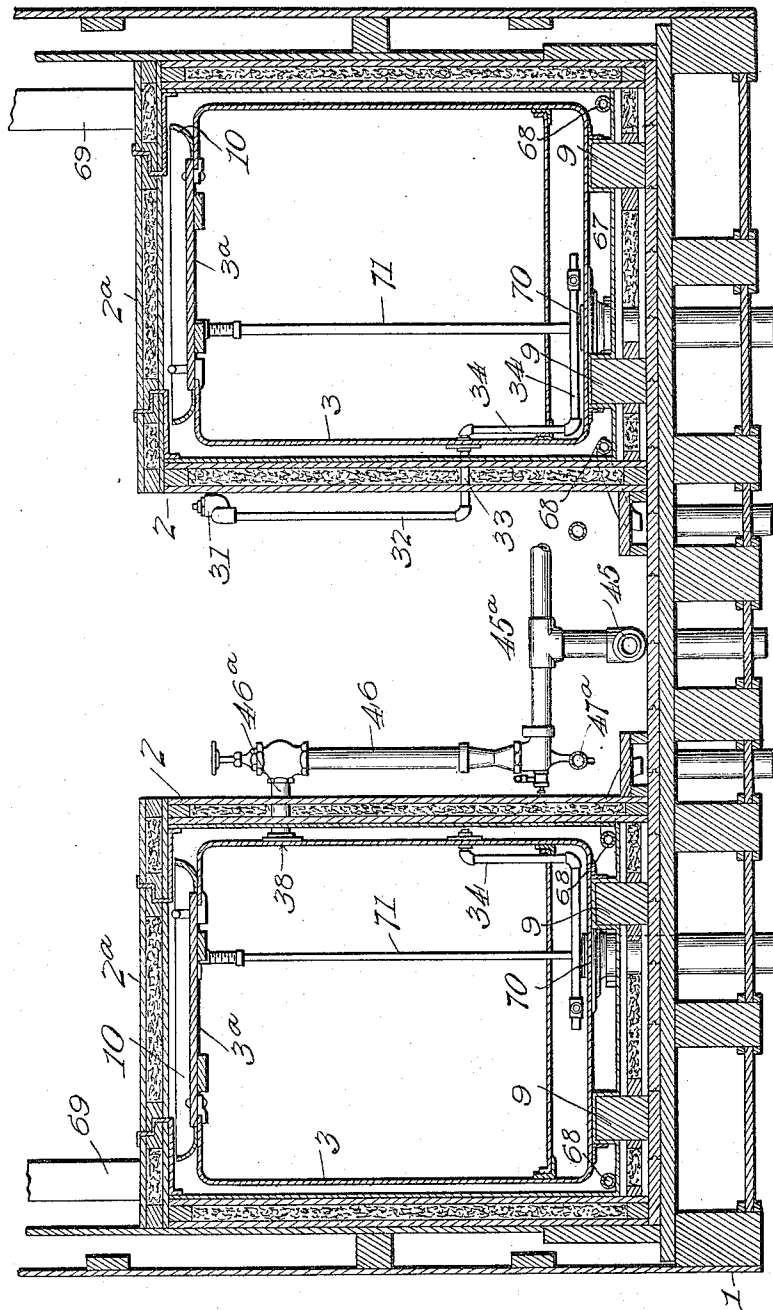
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8 SHEETS—SHEET 5.

Fig. 5.



WITNESSES

W. H. Rockwell
Emory L. Goff

INVENTOR

Charles E. Barba

N. E. Gee
His Attorney

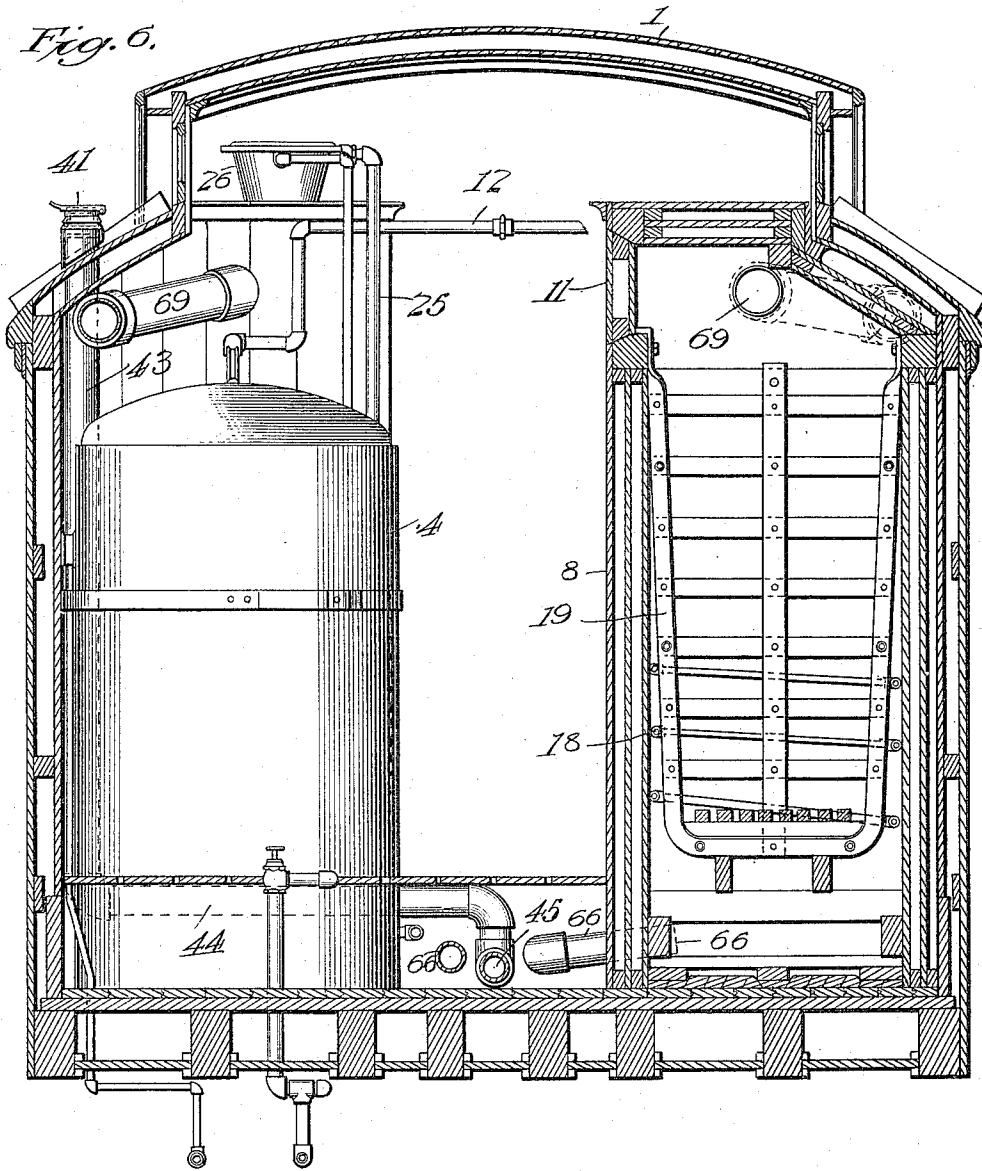
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8 SHEETS—SHEET 6.

1,156,515.

Fig. 6.



WITNESSES

J. H. Kockman
Emory J. Croff

INVENTOR
Charles E. Barba

N. E. Gee
His Attorney

C. E. BARBA.

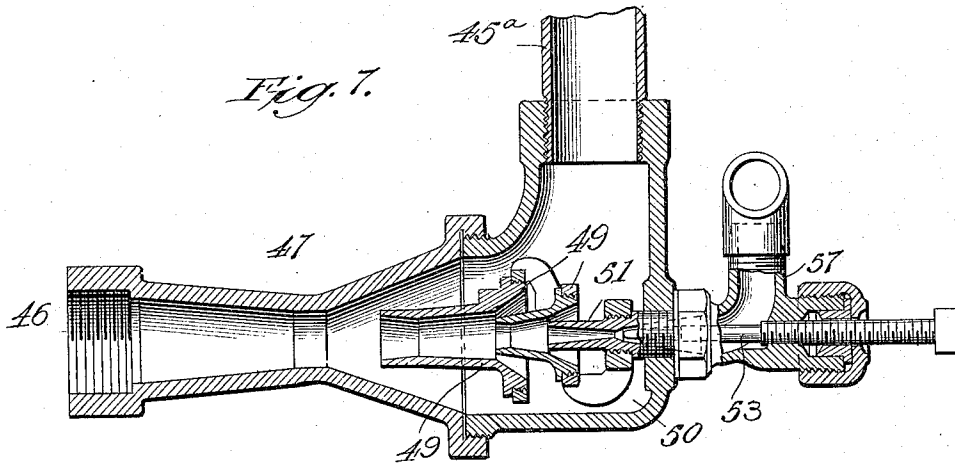
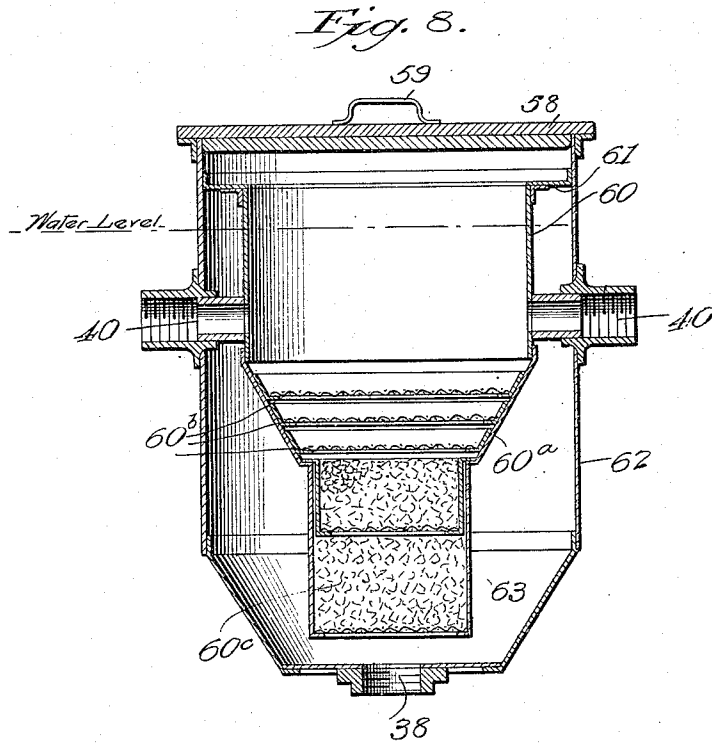
FISH CAR.

APPLICATION FILED JAN. 31, 1911.

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8 SHEETS—SHEET 7.

1,156,515.



WITNESSES

J. L. Moehle
Quay & Giff.

INVENTOR
Charles E. Barba

W. E. Gee
His Attorney

C. E. BARBA.

FISH CAR.

APPLICATION FILED JAN. 31, 1911.

1,156,515.

Patented Oct. 12, 1915.

8 SHEETS—SHEET 8.

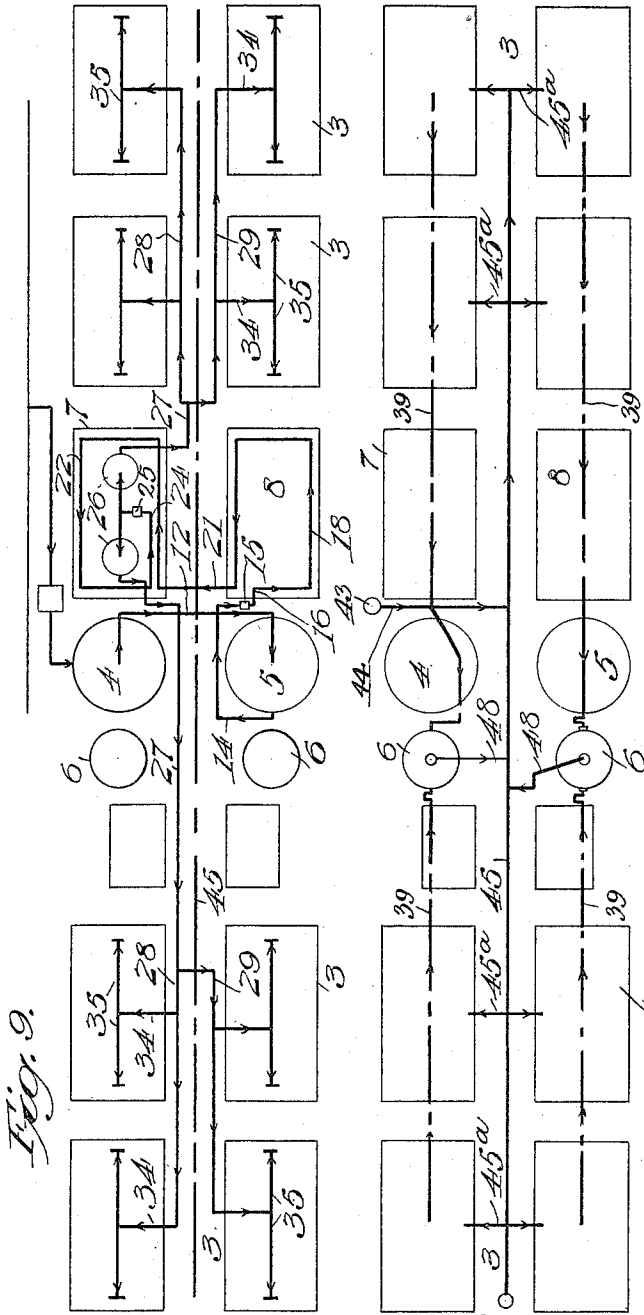


Fig. 9.

Fig. 10.

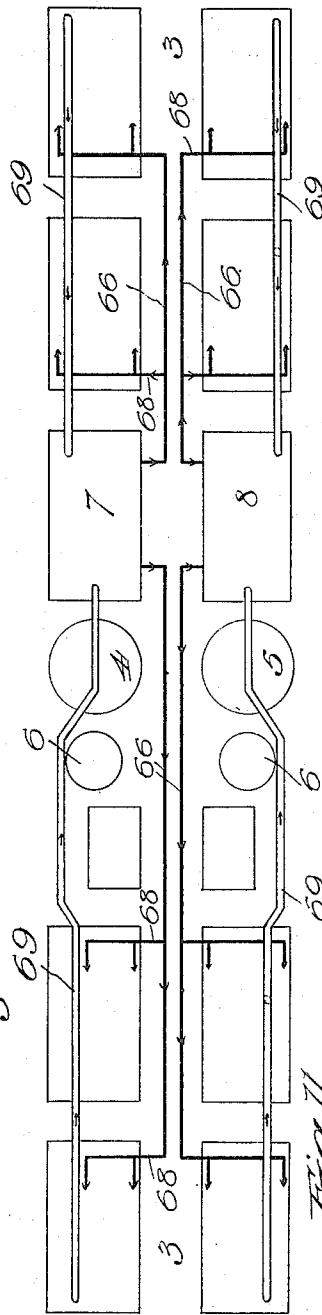


Fig. 11.

WITNESSES

The Machine
Emory J. Groff

INVENTOR

Charles E. Barba.

N. E. Gee
Attorney

UNITED STATES PATENT OFFICE.

CHARLES E. BARBA, OF ALTOONA, PENNSYLVANIA.

FISH-CAR.

1,156,515.

Specification of Letters Patent.

Patented Oct. 12, 1915.

Application filed January 31, 1911. Serial No. 605,828.

To all whom it may concern:

Be it known that I, CHARLES E. BARBA, a citizen of the United States, residing at Altoona, in the county of Blair and State of Pennsylvania, have invented certain new and useful Improvements in Fish-Cars, of which the following is a specification.

The present invention relates to railway cars of a combined express and refrigerator type, wherein special facilities are installed for the purpose of transporting live fish, and the primary object of the invention is the provision of a car or vehicle of this character which embodies novel features of construction whereby fish may be maintained in a healthy condition during transportation, thereby enabling transportation companies to deliver live fish to inland points with safety and despatch.

A further object of the invention is the provision of a railway car or similar vehicle constructed with fish tanks and equipped with novel means for producing a constant circulation of pure water through the same.

The invention further contemplates a novel means for aerating water in the fish tanks whereby the oxygen of the water is renewed as fast as it is exhausted by the fish.

The invention still further contemplates a novel refrigerating system for maintaining the fish tanks at the required low temperature during transportation.

With these and many other objects in view, which will more readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination, and arrangements of the parts hereinafter more fully described, illustrated, and claimed.

The essential features of the invention involved in carrying out the objects above specified are necessarily susceptible to a wide range of structural modification, but a preferred embodiment of the invention is shown in the accompanying drawings, in which:—

Figure 1 is a top plan view of the interior of one half of a car equipped with means for transporting live fish and constructed in accordance with the invention. Fig. 2 is a similar view of the opposite half of the car, portions being broken away and shown in section. Fig. 3 is an elevational view of that portion of the device illustrated in plan view on Fig. 1 of the drawings. Fig. 4 is a similar view through that portion of the de-

vice illustrated in plan view by Fig. 2 of the drawings, the fish tanks being shown in section. Fig. 5 is a transverse sectional view taken on the line 5—5 of Fig. 2. Fig. 6 is a similar view taken on the line 6—6 of Fig. 2. Fig. 7 is an enlarged sectional view of one of the water circulating injectors. Fig. 8 is a vertical sectional view of one of the water filters. Fig. 9 is a diagrammatic view of the system for aerating the water in the fish tanks. Fig. 10 is a diagrammatic view of the water circulating system, and Fig. 11 is a diagrammatic view of the refrigerating system.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

In constructing a car or similar vehicle for the transportation of live fish, there are three essential requirements which must be fulfilled: first, a constant circulation of pure water through the fish tanks; second, means for aerating the water whereby the fish are supplied with the necessary oxygen during transportation; and third, means for maintaining a moderately low temperature in the fish tanks, the said temperature to be about ten degrees lower than that of the water from which the fish were originally taken. In order to answer all of these requirements, the present invention embodies an aerating system, a water circulating system, and a refrigeration system, which will be hereinafter described in due order.

Referring to the drawings, the numeral 1 designates a car which may be of any conventional construction and is shown as provided at each end thereof with a series of compartments 2 within which the fish tanks 3 are mounted. In the present instance, there are four of the compartments 2 at each end of the car, two of the compartments being arranged upon each side thereof. Air reservoirs 4 and 5 are arranged upon opposite sides of the car 1 at substantially the middle portion thereof, a water filter 6 being located upon one side of each of the air reservoirs, while similarly constructed refrigerators 7 and 8 are located upon the opposite side of the respective air reservoirs. The fish tank compartments 2 are formed with walls constructed in some approved manner so as to be non-conductors of heat, and the fish tanks 3 rest upon the blocks 9 so as to be spaced from the walls

of the compartments both at the bottom, sides, and top thereof. The top of the compartments 2 are provided with the removable covers 2^a, and the fish tanks are also closed at the top thereof by removable covers 3^a, the said covers being normally held securely in position by some suitable fastening means. It will also be observed that the opening in the top of each of the fish tanks is surrounded by an upwardly curved flange 10 which serves to prevent the overflow and escape of water which may be displaced when placing fish in the tank, and also serves to return into the tank any water which may be splashed out of the same by the surging of the car when in motion. The walls of the refrigerators will also be constructed so as to be non-conductors of heat, and ice may be taken out of the same through suitable doors 11 provided for that purpose.

Having thus described the general arrangement of the car, I will now proceed to describe in detail the system provided for aerating the water in the fish tanks whereby the oxygen is renewed as fast as it is exhausted from the water by the fish.

Referring to Figs. 2 and 9 of the drawing, air from the train line enters the air storage reservoir 4 at the bottom thereof and passes out at the top through the pipe 12 which leads it to the top of the reservoir 5 at the opposite side of the car. From the bottom of the reservoir 5, the air enters a pipe 14 which leads it to a regulating valve 15 at one side of the refrigerator 8, the said valve being preferably set at forty-five pounds air pressure. After leaving this valve 15, the air passes through a pipe 16 which communicates with a coil 18 of the refrigerator. After circulating through this coil 18, the air is conveyed through a pipe 21 to a similar coil 22 in the opposite refrigerator 7. From this coil 22, the air which has been thoroughly cooled by circulating through the two refrigerators is conveyed by a pipe 24 to an air strainer 25 which is shown as located at the top of the refrigerator 7 and which serves to separate any foreign particles that may enter the system with the air received from the train line. The cold air upon leaving the strainer passes in either direction through air regulators 26, the said air regulators being preferably set at about a two pound pressure, so that all of the air used throughout the system is reduced to this pressure. From the regulators 26, the air circulates through the pipes 27 which terminate in the branches 28 and 29 extending along the outside of the fish tanks 3 upon each side of the car. From these branch pipes 28 and 29, the air passes through valves 31 of some suitable construction and enters the pipes 32, one of the said pipes 32 extending vertically downward on

the exterior of each of the fish tanks. The lower end of each of these vertical pipes 32 communicates with a horizontal pipe 33 which extends into the fish tank and connects with the pipe 34 (see Fig. 5). Each of the pipes 34 is provided at the bottom of the respective fish tank with branch pipes 35 which terminate in the T members 36 into the openings of which bass wood blocks 37 are secured, the air being designed to percolate through these bass wood blocks so as to aerate the water and replace the oxygen that has been taken up by the fish.

The means for producing a constant circulation of pure water through the fish tanks will now be described, and it may be mentioned that for the purpose of filling the fish tanks, a vertical pipe 43 has been provided upon one side of the car, the said pipe extending through the roof of the car where the upper end thereof is normally closed by some suitable valve member 41. When filling the tanks, this valve 41 is opened and the end of a hose introduced into the pipe 43. The water is conveyed through a horizontal pipe 44 which communicates at one end thereof with the pipe 43 to the main water pipe 45 which extends longitudinally of the car at the middle portion thereof, the end portions of the said pipe 45 communicating with the lateral branches 45^a and the vertical pipes 46 which extend upwardly at the exterior of the fish tanks and communicate through the short horizontal pipes 46^a with the interior of the fish tanks at a point toward the top thereof. An injector 47 is located at the junction of each of the vertical pipes 46 and horizontal branches 45^a, the said injectors upon each side of the car receiving air from pipes 47^a and serving to force the water upwardly through the pipes 46 into the fish tanks so as to produce a continual circulation of water through the said tanks. The pipes 47^a for supplying air to the injectors are shown as communicating with the branch pipes 28 and 29 of the aerating system through the vertical pipes 47^b. The intermediate portion of the main water pipe 45 communicates through the laterally extending pipes 48 with the bottom of the water filters 6 on opposite sides of the car. The upper portions of these water filters 6 communicate at opposite sides thereof with pipes 39 which extend toward both ends of the car and are arranged under the fish tanks, the said pipes communicating with the bottom of the fish tanks through the upwardly extending branches 39^a. Valves 70 control the outflow of water from the fish tanks through these pipes 39^a, the said valves being operatively connected with valve stems 71 which extend upwardly to the top of the tanks so as to be accessible from the exterior thereof. These valves 70 are normally open, and it will thus be ob-

vious that when water is introduced into the filling pipe 43, both the fish tanks and the water filters will be filled with water, the normal depth of the water being preferably about four inches above the inlets of the filters. The injectors 47 operate to force water into the fish tanks through the inlet pipes 46 and 46^a and to draw water through the pipes 45 and 48 from the filters 6, and as water is forced into the fish tanks, a corresponding amount of water leaves the same through the pipes 39 and 39^a and enters the top of the filters 6, the water being purified on account of the difference of water levels as it passes through the filters.

Referring more particularly to Fig. 7 in which is shown an enlarged sectional view through one of the injectors, it will be observed that these injectors consist essentially of a plurality of nozzles 49 located within a bowl 50 and receiving air from an air nozzle 51, the flow of air through the said nozzle being controlled by a needle valve 53 and air being supplied to the nozzle through an elbow 57 which, as has been previously mentioned, is placed in connection with the air pipes of the aerating system. The stem of the needle valve is threaded so as to be readily adjusted to regulate the flow of air through the air nozzle 51, and as the jet of air is forced through the nozzles 49, it operates in a well known manner to draw water through the branch pipe 45^a and force it upwardly through the feed pipe 46.

The water filter which has been designated in its entirety by the numeral 6, and of which an enlarged sectional view is shown in Fig. 8, is formed with an outer casing 62 within which is mounted an inner casing 60, the upper end of the inner casing being formed with a dished flange 61 which serves the double function of holding the inner casing spaced from the outer casing and also of causing the return into the inner casing of any water which may be thrown up from the same by the jolting of the car. The top of the outer casing 62 is closed by a removable cover 58 which has a suitable handle 59 applied thereto for the purpose of lifting the same when necessary. A basket shaped receptacle 60^a is applied to the lower end of the inner casing 60 and provided with a plurality of layers of wire screens 60^b having different meshes, the coarser meshes being at the top, while at the bottom is preferably placed a fabric similar to cheese cloth. Below this fabric there is preferably provided a quantity of charcoal or similar material 60^c, the filtration of the water being as perfect as the available space will permit. The water which is received from the fish tanks and carried to the filter by the pipes 39 enters the inner casing 60 through the sleeves 40, and after passing through the filtration material, collects in

the bottom 63 of the outer casing, from which it passes through the opening 38 into the pipe 48, and thence into the main water pipe 45, as has been previously described.

To provide for the moderately low temperature of both the air and water, there is installed a complete system of refrigeration, which includes the main ice chests or refrigerators 7 and 8 which have been previously mentioned. The cold air is drawn from the bottom of the refrigerators through the pipes 66 and enters the bottom of the fish tank compartments 2 through the branch pipes 68. This cold air circulates freely in the space provided between the exterior of the fish tanks 3 and the compartments within which they are located, and as the air becomes heated, it rises within the compartments and leaves the same at the top thereof through the air return pipes 69. These return pipes 69 carry the air back to the top of the refrigerators where it is again brought into contact with the ice and descends within the refrigerators as the temperature thereof is lowered until it again enters the pipe 66. The air is thereby kept in a constant circulation and the fish tanks maintained at the desired low temperature. The refrigerators also serve, as has been previously described, to cool the air which is introduced into the water of the fish tanks for aerating the same.

To provide for the fish that may die while *en route*, there is installed an insulated receptacle or box 73 wherein ice and fish are packed together, the fish being thereby transported in a perfectly sanitary condition. With the construction above described, it is apparent that the water within the fish tanks will be constantly aerated so as to replenish oxygen as fast as it is exhausted by the fish, and that a continual circulation of the water will be produced, the water being filtered so as to remove all impurities therefrom as it circulates through the system. Means have also been provided for maintaining the necessary low temperature in the fish tanks for keeping the fish in perfect condition while being transported. Particular attention is directed to the fact that no exterior source of power such as a motor or engine is required, the necessary circulation of the water being produced by injectors such as can be operated by the air pressure received from the train pipe.

For the purpose of withdrawing the water from the fish tanks and water circulating system, the extremity of each of the main water pipes 45 communicates with a short drain pipe 74 which extends downwardly through the floor of the car, communication between the water pipe and drain pipe being controlled by a suitable valve 75. In a somewhat similar manner, a drain pipe 76 is provided in each of the water return pipes

39, the said drain pipes being shown as located near the water filter and controlled by the valve 77. It will thus be obvious that by opening the valves 75 and 77, the water
5 will drain through the bottom of the car and empty the tanks, water filters, and water circulating pipes.

Without further description and elaboration it is thought that the many advantages
10 of this improved type of fish car will be readily apparent.

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

15 In a car for transporting live fish, includ-

ing a fish tank, an aerating system including a supply connection with the train supply pipe and having a discharge connection for the bottom of the tank, a water circulating system for the tank including an injector 20 arranged to discharge purified water into the top portion of the tank, and means for supplying air to the injector from the train supply pipe.

In testimony whereof I hereunto affix my 25 signature in the presence of two witnesses.

CHARLES E. BARBA.

Witnesses:

N. E. GEE,

J. F. MECK.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."