

(No Model.)

W. J. BALDWIN.
GREASE SEPARATOR.

No. 533,424.

Patented Feb. 5, 1895.

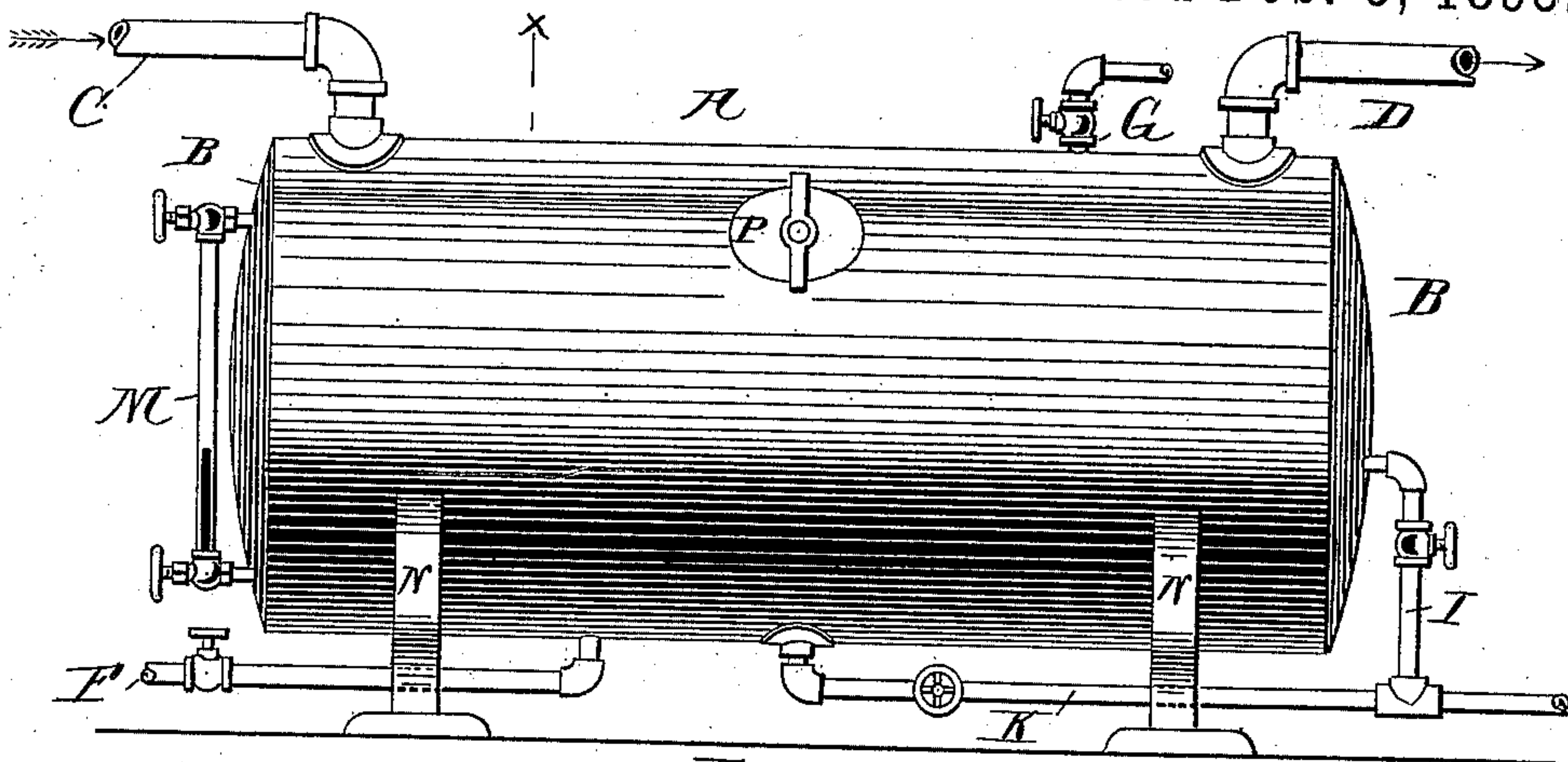


Fig. 1.

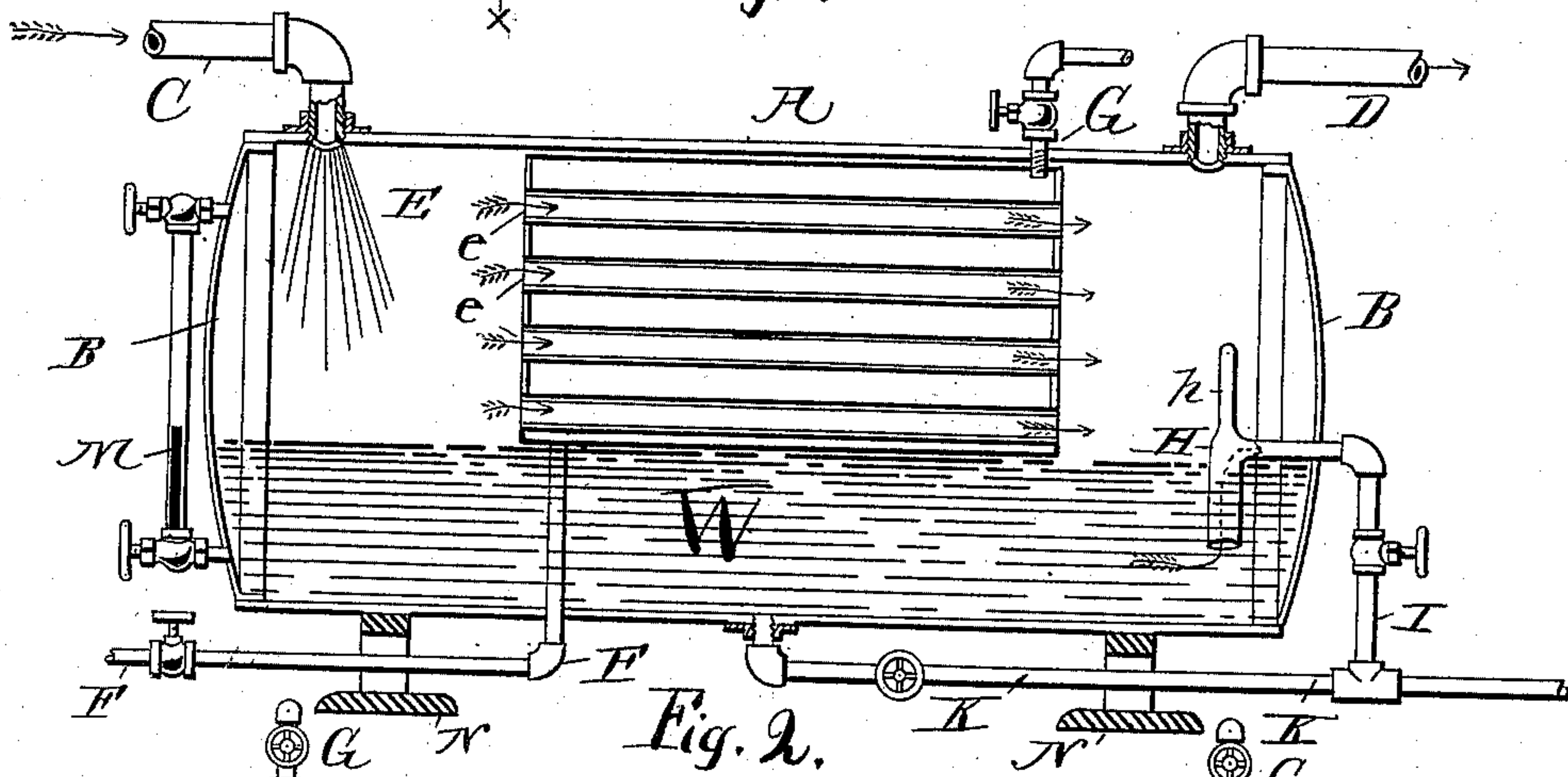


Fig. 2.

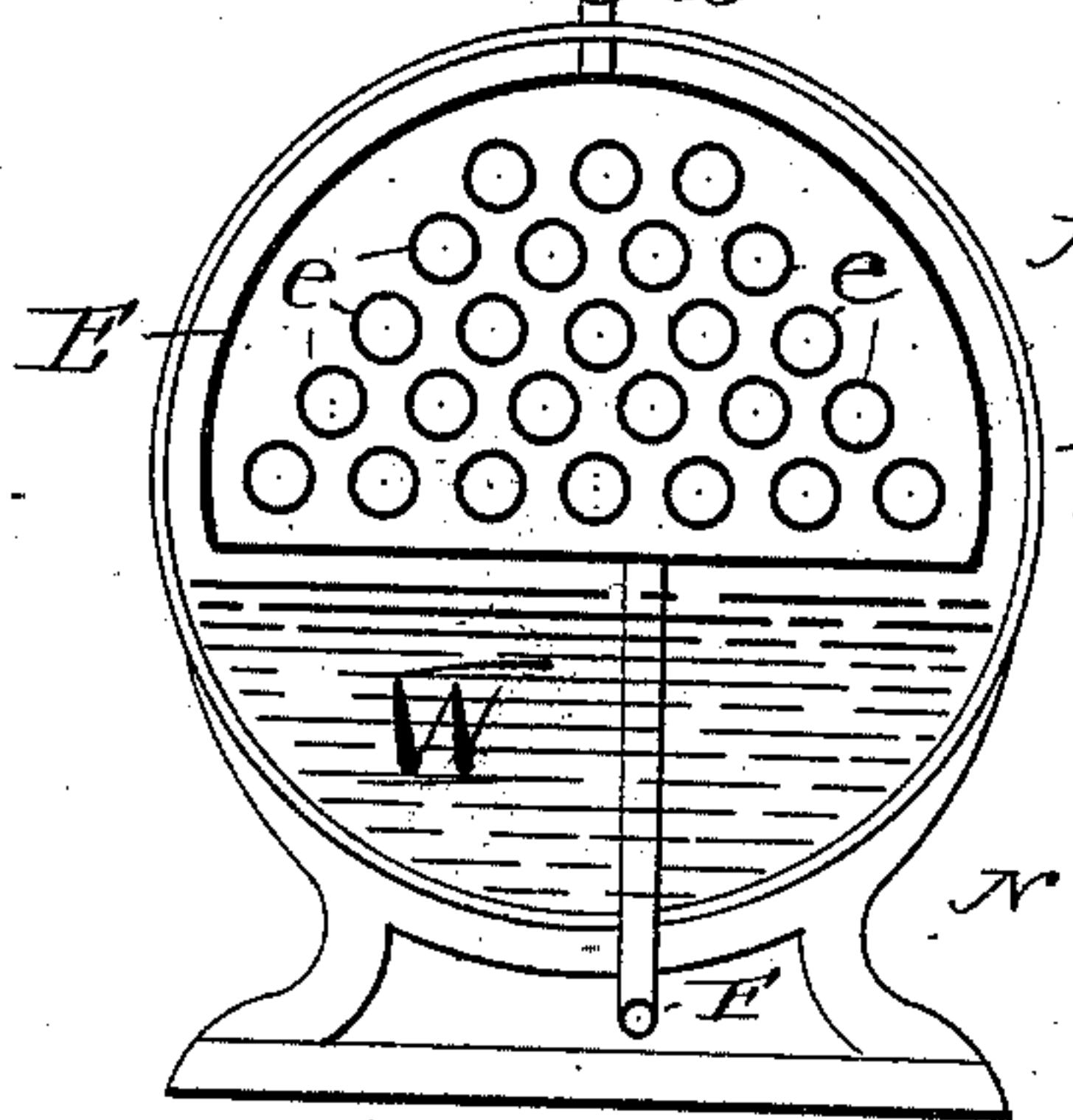


Fig. 3.

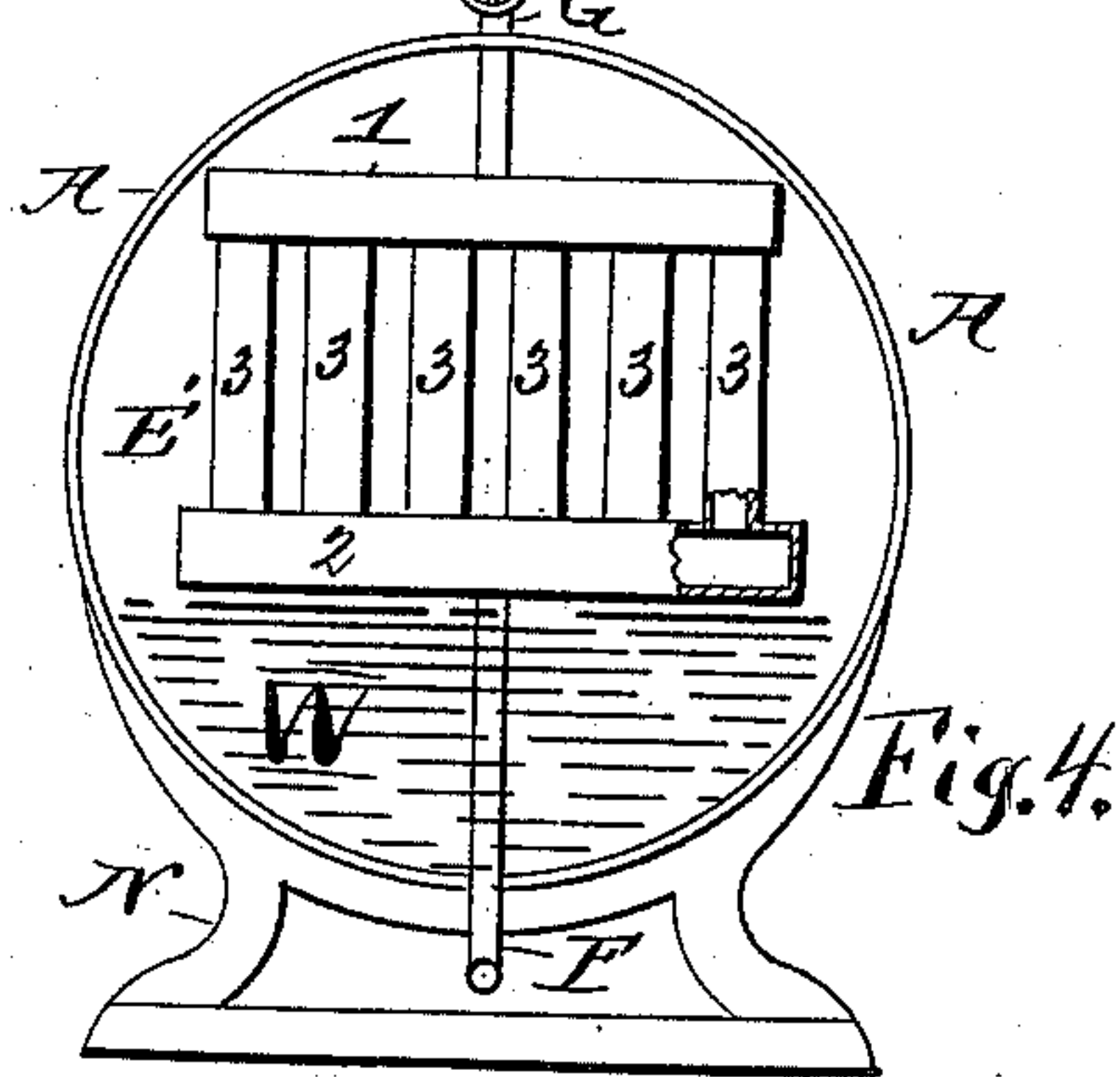


Fig. 4.

WITNESSES:

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GREASE-SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 533,424, dated February 5, 1895.

Application filed June 26, 1894. Serial No. 515,665. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM J. BALDWIN, a citizen of the United States of America, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Grease-Separators, of which the following is a specification.

My invention relates to improvements in grease separators, for removing grease and other impurities from steam.

My invention consists essentially, first, in employing a receptacle to receive the steam, which receptacle is of great cross-area as compared with the cross-area of the pipe through which the steam is admitted. By this arrangement, the velocity of the steam, while in the receptacle, becomes very low, notwithstanding that the velocity in the pipe is great, so that the grease and other impurities have time to settle into the water which is placed in the bottom of the receptacle, and are not swept away into the outlet pipe by high velocity currents of steam.

In the second place, my invention consists in employing in the receptacle a condenser, through or around which water is flowing, and over or through which the steam passes. In this manner the water, according to its well known property, takes up heat through the surface of the condenser very quickly, and thus condenses the grease and other vaporizable impurities out of the steam; said impurities collecting on the surfaces of the condenser and trickling down into the water of the receptacle. In this manner I am able to obtain a much more thorough separation of grease from the steam, than has heretofore been possible by any grease separator known to the art, and my experience shows that the separation is so thorough as to be almost perfect. This perfection of separation is attained by the condenser, for without the condenser, a certain quantity of oil and grease is carried up by the steam from the surface of the water in the receptacle and over into the pipes or apparatus into which the steam goes, the water in the receptacle not being able to catch and retain all the oil and grease; but by causing the steam, as it rises from the water (or even passes through the receptacle) to come

into contact with a condenser, this small residuum of oil or grease is precipitated and separated from the steam, so as to leave the steam practically entirely free of all oil or grease.

Where this apparatus is used, the purified steam as it leaves the separator can be condensed in heating apparatus, and then returned to the boiler without danger of carrying oil and grease with the steam into the boiler. The water of the condenser also having absorbed much heat from the steam can if desired be used for various purposes.

Referring to the drawings which accompany the specification to aid the description, Figure 1 is an elevation of a preferred form of the apparatus. Fig. 2 is a longitudinal vertical section of the same. Fig. 3 is a cross section of the same, on the line $x x$ of Fig. 1. Fig. 4 is a cross section of a separator showing a modification of the condenser.

The receptacle A of the separator can be of any desired shape, and is conveniently made as a cylinder of boiler plate with flanged and riveted heads B B, C being the steam inlet and D the outlet pipe, and provided as desired with suitable valves. The cross-area of the receptacle A is made many times greater than the area of the pipe C or D, (in practice even from sixty to one hundred times greater is advisable.) Thus even if the steam is flowing at a very high velocity through the pipe C, its velocity in the receptacle A will be but a small fraction thereof, and therefore the steam will be moving toward the outlet D with a very gentle velocity which will give the grease and other impurities time to settle into the water W in the lower part of the receptacle and will not lift them again into the outlet pipe D. I find, accordingly that this arrangement gives excellent results, but I have much improved the separator by placing in it a condenser E, which is constantly cooled by a current of water entering by a pipe F and passing out by a pipe G. Said condenser may be similar to any surface condenser, the particular form and construction being immaterial, and a very good kind of condenser is that shown in Fig. 2, which consists of a shell with heads E E through which pass tubes $f f$. The water flows around the

tubes, in the space between the same and the shell, while the steam passes through the tubes, though of course the opposite arrangement of the water flowing through tubes and steam around them could be employed.

A T-shaped overflow pipe H connects by bends and branch I with the blow out K, which in its turn is tapped into the bottom of the receptacle A, said pipes I and K being each provided with valves. Said overflow pipe H descends about half way below the normal water level in the receptacle A, so that the grease floating on the top of the water cannot enter said overflow pipe, (Fig. 2.) The branch *h* of said overflow H is open to prevent siphonage. A gage M may be placed on the receptacle A.

N N are skeletonized standards to support the receptacle A, the pipes F K being led through them as shown.

P is a manhole to permit inspection of the receptacle.

The operation will be readily understood. Steam entering by the pipe C, goes first to the water W, which takes up much of the grease and other impurities. The steam then rising goes through and over the condenser E, which rapidly absorbs heat from the steam, condensing the remaining grease and other impurities which collect in the tubes *ff* and on the other surfaces of the condenser, and trickle down into the water W; the low velocity of the steam in the receptacle A allowing them to do so. The purified steam passes out by the pipe D to the coils of heating or other apparatus. As the condensed water from the steam rises to the level of the water in the receptacle A, it overflows by the pipes H, I, to the blow off tank (the valve on pipe I being normally open while that on pipe K is normally closed), and said pipe H descending about half way below the level of the water

W the grease from the surface of the water will not enter the tank.

Whenever it is necessary to blow out the receptacle A the valve on pipe I is closed and that on pipe K opened, and the steam in the receptacle A sweeps the contents at a very high temperature into a blow off tank, not shown as forming no part of the present invention.

The condenser E', shown in Fig. 4, consists of two boxes 1, 2, connected by tubes 3. The water flows through the said boxes and tubes, while the steam passes around them. The operation of the separator is similar to that just described.

Now, having described my improvements, I claim as my invention—

1. The combination in a grease separator of a receptacle for the condense water, provided with inlet and outlet, a condenser in said receptacle provided with an inlet and an outlet whereby a water circulation is maintained through the condenser, and an overflow from the said receptacle having its inlet orifice below the normal water level in the receptacle, substantially as described.

2. The combination in a grease separator, of a receptacle A, provided with an inlet and outlet for steam; and an overflow from said receptacle A having its inlet below the normal water level of the receptacle and provided with an open connection which extends to the steam space of the said receptacle, substantially as and for the purpose described.

In testimony that I claim the foregoing as my invention I have hereunto set my hand, this 13th day of June, 1894, in the presence of two witnesses.

WILLIAM J. BALDWIN.

Witnesses:

BERNARD J. BECKE,
PATRICK A. FAY.