J. MILNE.

SUPERHEATER.

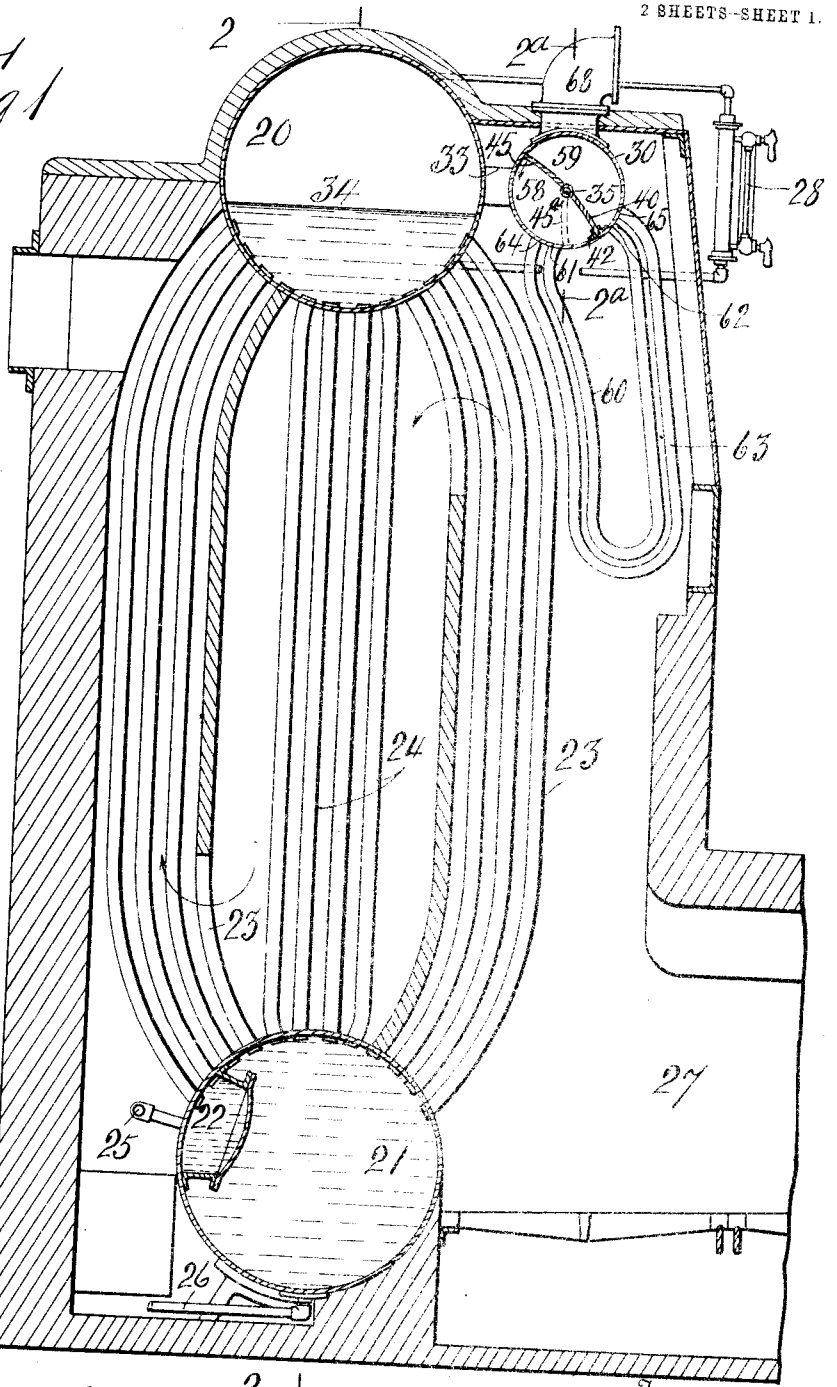
APPLICATION FILED JAN. 19, 1910.

1,025,151.

Patented May 7, 1912.

2 SHEETS—SHEET 1.

Fig 1



Witnesses:

Martin Zimansky.

John J. Millin

2—

Inventor

John Milne,

By his Attorney

A. de Bonneville

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2 SHEETS—SHEET 2.

Fig 2

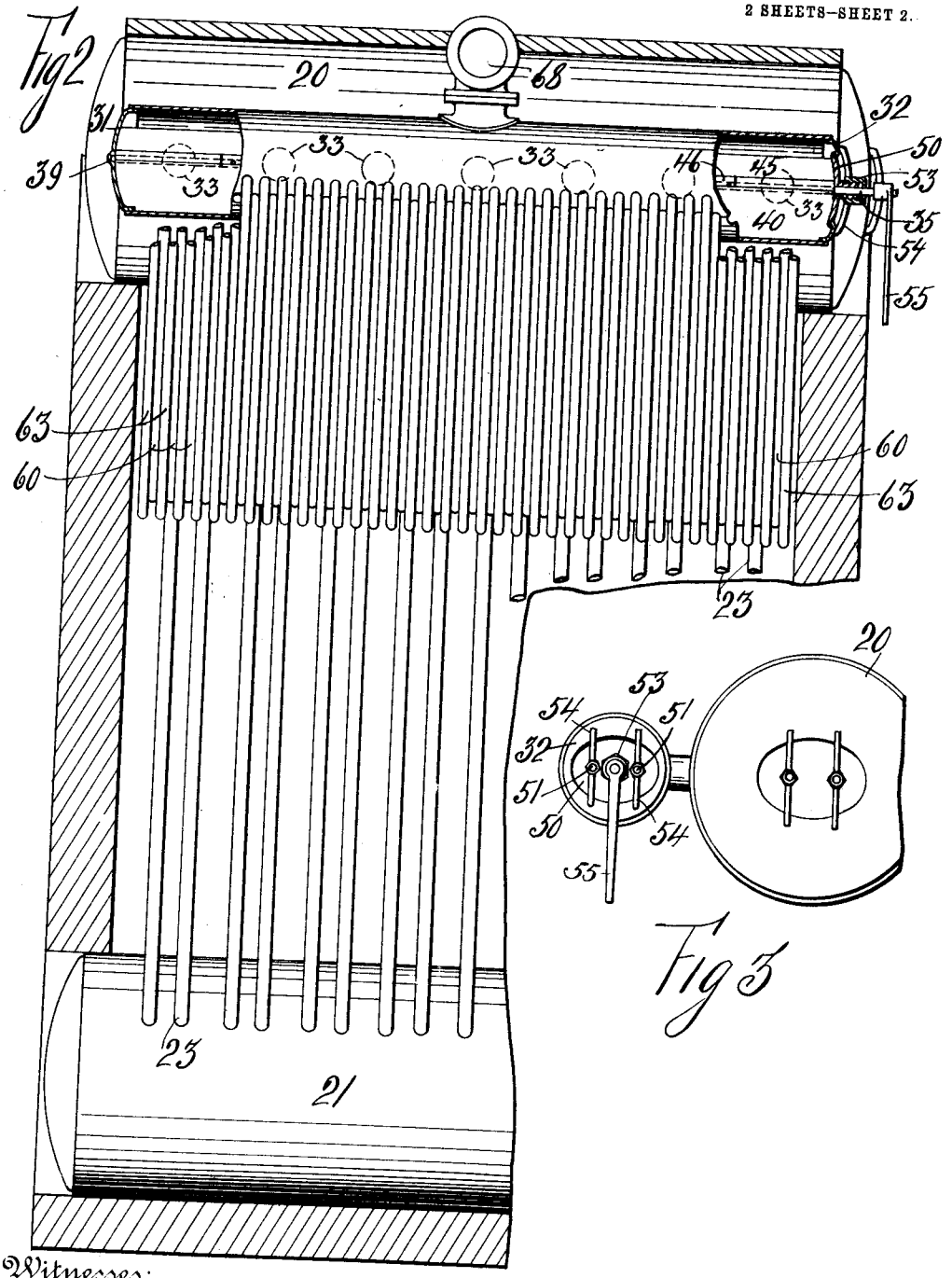

Fig 3

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UNITED STATES PATENT OFFICE.

JOHN MILNE, OF NEW YORK, N. Y.

SUPERHEATER.

1,025,151. Specification of Letters Patent. Patented May 7, 1912.

Application filed January 19, 1910. Serial No. 538,850.

To all whom it may concern:

Be it known that I, JOHN MILNE, a citizen of the United States, and resident of the borough of Manhattan, in the county of New York and State of New York, have invented certain new and useful Improvements in Superheaters, of which the following is a specification.

This invention relates to superheaters and is characterized by having steam superheating tubes that can be converted into steam generating tubes. These tubes can be flooded by raising the water level of the boiler with which the invention coacts to prevent their deterioration and burning when starting the operations of the said boiler. The superheater is further characterized by comprising a drum with an inlet chamber and an outlet chamber and which are connected by the steam superheating tubes.

In the accompanying drawings the invention is shown connected to a two drum steam boiler, and it is to be understood that it may be attached to many of the various types of steam generators, without departing from the spirit of the invention.

Figure 1 represents a partial vertical section of the steam superheater with a partial vertical section of a two drum boiler. Fig. 2, shows a partial right hand end view of Fig. 1, with a front and furnace removed, and partial sections of Fig. 1, on the lines 2, 2, and 2^a, 2^a, and Fig. 3, represents a partial side view of the invention as seen on the right hand side of Fig. 2.

Referring particularly to Figs. 1 to 3 a boiler is represented with the upper drum 20, lower drum 21, feed water chamber 22, steam generating tubes 23, 24, feeding piping 25, blow-off piping 26, furnace 27 and water gage glass 28. A steam super-heater drum 30 with the heads 31, 32 is connected to the upper drum 20 by the connecting nipples 33, which latter are located appreciably above the normal water level 34 in the said drum 20. A hinge rod 35 in the drum 30 has one end bearing in a depression 39 formed in the head 31, and the other end of said rod passes through a stuffing box to be presently described. A stationary partition 40 has its upper end portions 41 encircled around said hinge rod 35, and its lower end is fastened to the inner surface of the drum 30, by means of angle irons 42. A movable partition 45 has an eye 46 which encircles the hinge rod 35 and the swinging end thereof bears against the inner surface of the drum 30. The said movable partition by being placed in proper position with respect to the inlet nipples 33, divides the interior of the drum into a steam inlet chamber 58 and a steam outlet chamber 59. Over an opening in the head 32 is located a removable plate 50, from which extend the studs 51 and a stuffing box with the cap 53. Dogs 54 bear on the head 32 and engage the studs 51 to clamp the plate 50 in place. The hinge rod 35 passes through said stuffing box, and has connected thereto the operating handle 55. Continuous parallel return bend steam super-heating tubes 60 with the ends 61, 62 and continuous return bend steam superheating tubes 63 with the ends 64 and 65, extend from the steam superheater drum 30. The ends 61 and 64 of the said tubes are on one side of the stationary partition 40, and the said ends 62, 65 are on the other side thereof. Steam outlet piping 68 extends from the upper part of the steam superheater drum 30, and connects with the outlet chamber 59. The tubes 60 are preferably opposite the spaces between the tubes 63 as shown.

To operate the invention to produce superheated steam the movable partition 45 is located as shown in full lines in Figs. 1 and 2, with its upper end above the level of the connecting nipples 33. The steam in the drum 20 with this location of the movable partition enters the steam inlet chamber 58 of the steam superheater drum, and from thence enters the tubes 60, 63 through the ends 61, 64. The steam after being superheated in the tubes enters the steam outlet chamber 59, and from the latter it is conducted through the piping 68. The steam during its passage through the tubes 60 and 63 is superheated by reason of being heated by the hot gases generated in the furnace 27, and the avoidance of the entrance of water from the drum 20 to the drum 30, the normal water level in the drum 20 being maintained below the level of the connecting nipples 33. Should it be desired to convert the tubes 60 and 63 into steam generating tubes, the operator turns the operating handle 55 to locate the partition 45 in its position 45^a indicated in dotted line in Fig. 1. The water is then permitted to rise in the

drum 20, so that it will enter the drum 30 and flood the tubes 60 and 63. With the latter conditions steam is generated in the said tubes 60 and 63, which enters the drum 30. Steam from the drum 20 also enters the drum 30, and from the latter the steam is led through the piping 68. Should steam of a predetermined temperature be required, the movable partition 45 is located to its raised position, and then the water level in the drum 20 is raised to deliver water to the superheating tubes 60 and 63 from the drum 20, to admit the proper quantity of water required.

The partition 45 may be located in various positions before the nipples 33, and with the water level in the drum 20, below said nipples a portion of the steam generated in the drum 20 will pass through the outlet chamber 59 of the superheater drum 30, and from thence to the outlet piping 68. A second portion of the steam generated in the drum 20 will enter the inlet chamber 58 of the drum 30 and from the latter pass through the superheating tubes 60 and 63, and thence through the outlet chamber 59 to the outlet piping 68. By this means, steam of varying degrees of saturation may be produced with the invention without raising the water level in the boiler for the purpose of admitting water into the superheating tubes 60 and 63, the amount of saturation being controlled by the location of the partition 45 with respect to the nipples 33.

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

1. In a steam superheater the combination of a drum, a stationary partition in said drum, steam superheating tubes with one end of each extending from the drum on one side of said partition and the other end of each tube connected to the drum on the other side of said partition, a movable partition in said drum coacting with the stationary partition, an inlet for steam connected to the drum, means to locate the movable partition above said inlet to divide the drum into an inlet chamber for one of the ends of each tube and into an outlet chamber for the other end of each tube, means to superheat the steam in the tubes, and means to conduct the steam from the said outlet chamber.

2. In a superheater the combination of a drum, a stationary partition extending part away from the inner surface of the drum, a movable partition in the drum coacting with the stationary partition to divide the drum into an inlet chamber and an outlet chamber, tubes outside of the drum with the ends of each connecting the chambers and means to locate the movable partition between the ends of each of said tubes.

3. The combination of a steam superheater drum, a partition in said drum, superheating tubes connected with said drum with one end of each tube extending from said drum on one side of said partition, and the other end of each tube connected to the drum on the other side of the partition, a steam generating drum adjacent to the superheated drum, and connections between the two drums, so that by varying the level of the water in the steam generating drum, steam or water will be delivered to the steam superheater drum for the formation of either superheated or saturated steam.

4. In a steam superheater the combination of a drum, heads for the drum, means to connect said drum with a steam supply, an outlet for steam connected to the drum, a hinge rod journaled in said drum with one end thereof extending through one of said heads, a stationary partition extending between the hinge rod and the inner surface of the drum, a movable partition with one end fastened to the hinge rod and the other end extending to the inner surface of the drum, steam superheating tubes with one end of each connected to the drum on one side of the stationary partition and the other end of each connected to the drum on the other side of the stationary partition, and means to turn the hinge rod with its movable partition.

Signed at the borough of Manhattan in the county of New York and State of New York this 14th day of January A. D. 1910.

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Witnesses:
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