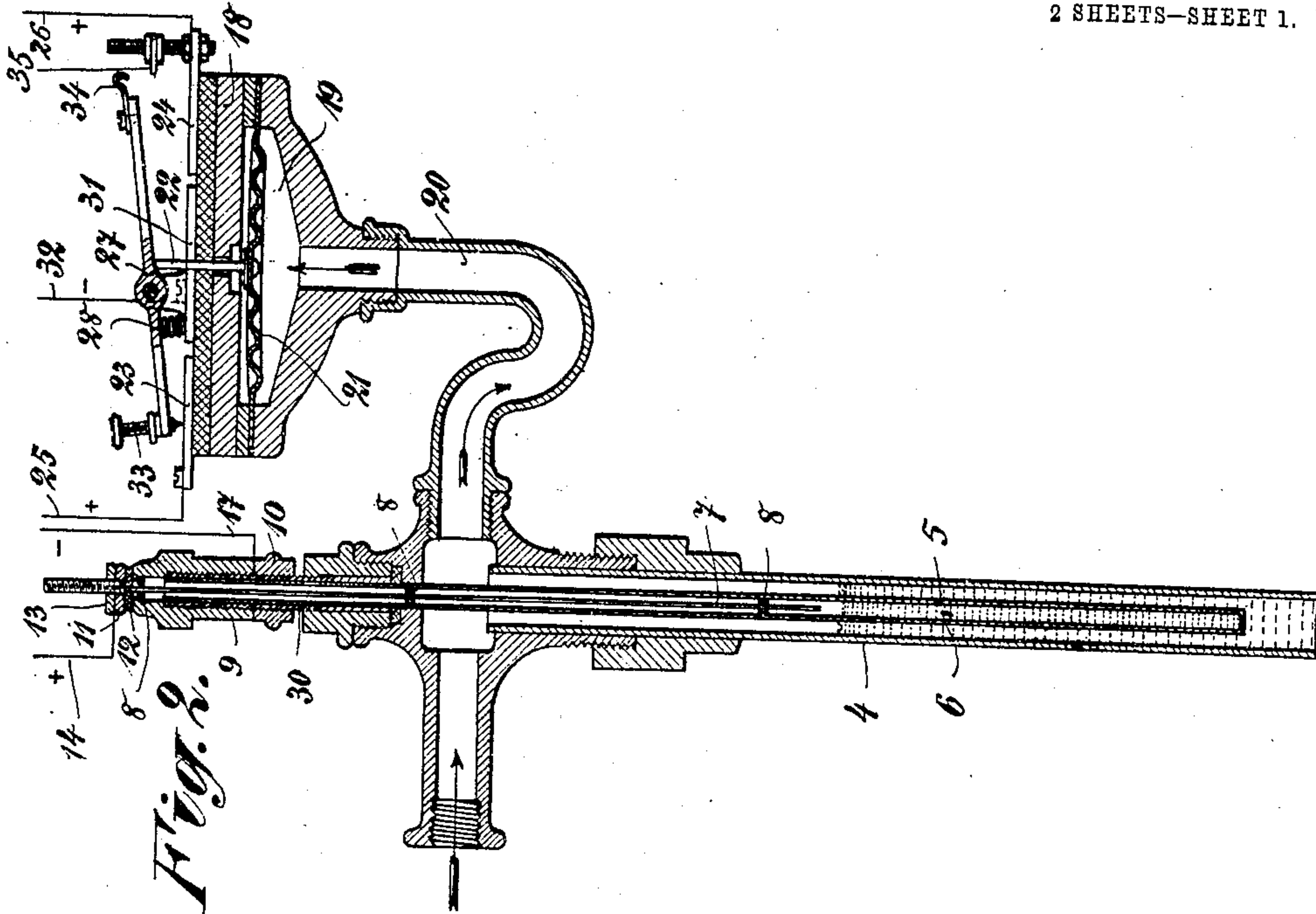


No. 841,186.

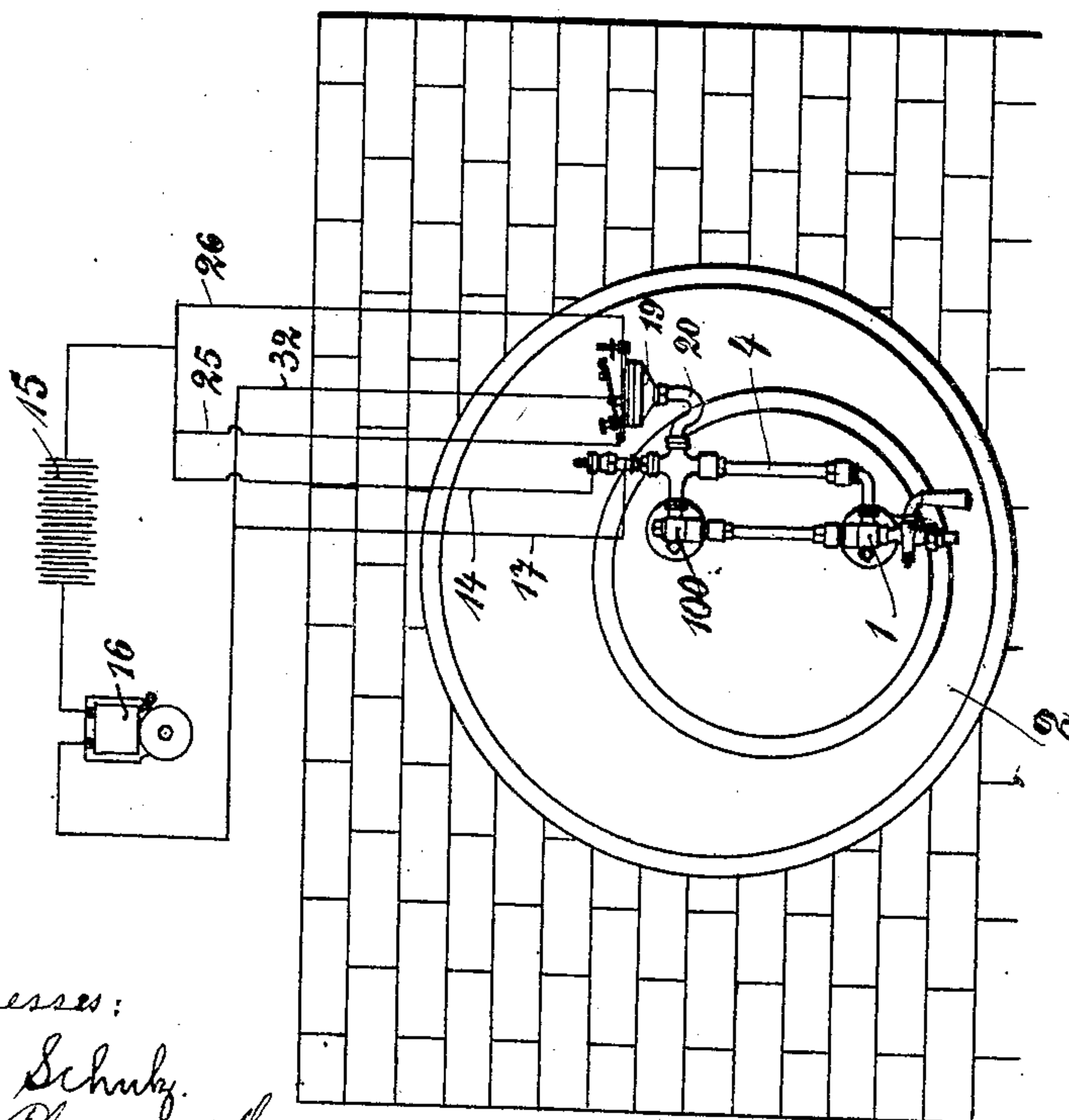
PATENTED JAN. 15, 1907.

H. SANDVOSS.  
ALARM SIGNAL FOR BOILERS.  
APPLICATION FILED FEB. 23, 1906.

2 SHEETS—SHEET 1.



*Fig. 1.*



Witnesses:  
William Schuby.  
Ernest Pennigwerth

Inventor:  
Hermann Sandvoss  
by his attorney  
Frank A. Green

No. 841,186.

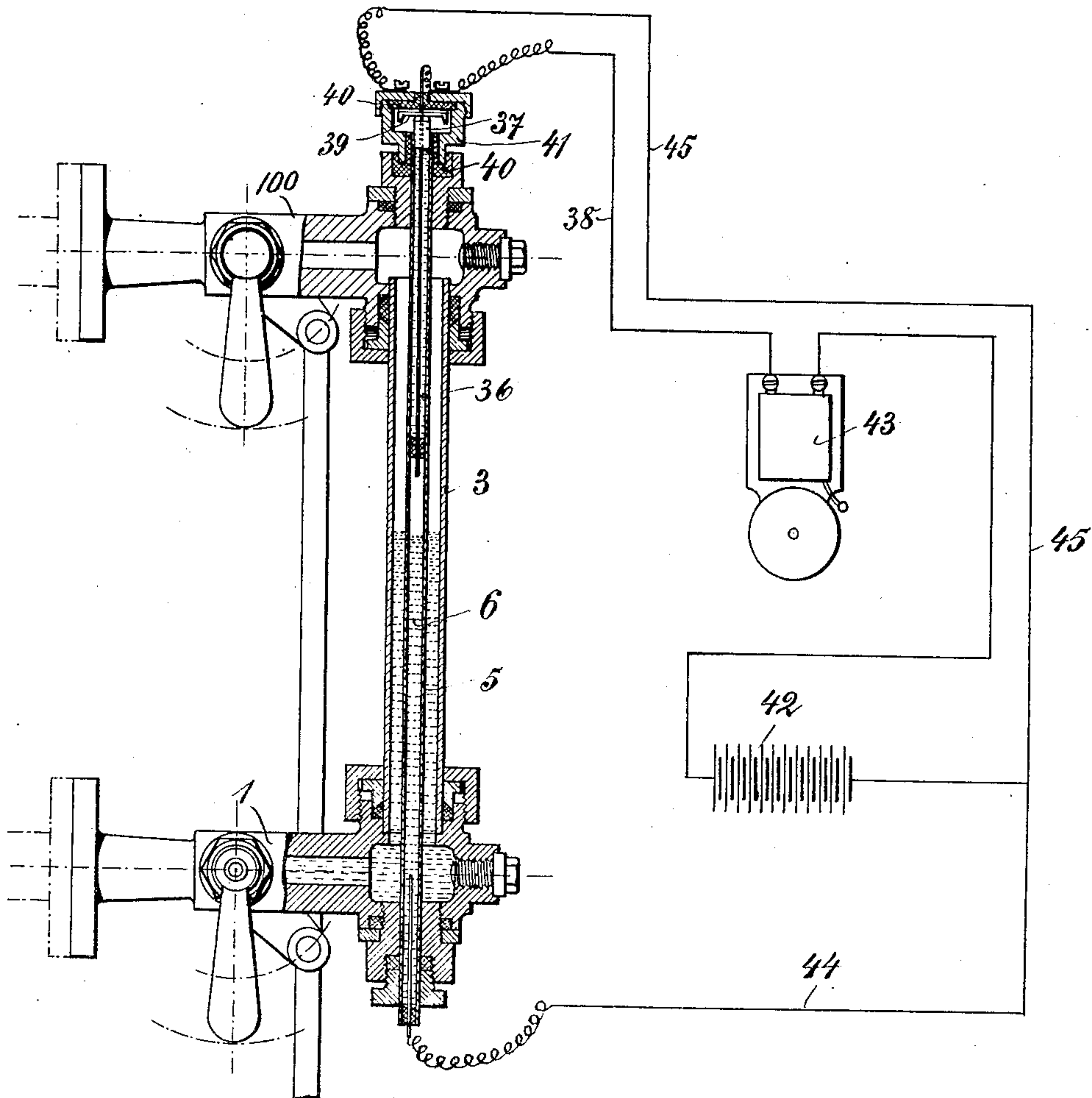
PATENTED JAN. 15, 1907.

H. SANDVOSS.  
ALARM SIGNAL FOR BOILERS.

APPLICATION FILED FEB. 23, 1906.

2 SHEETS—SHEET 2.

*Fig. 3.*



Witnesses:  
William Schulz  
Ernest Pennington

Inventor:  
Hermann Sandvoss  
by his attorney  
Dr. J. J. Ziesew



# UNITED STATES PATENT OFFICE.

HERMANN SANDVOSS, OF NEUSS, GERMANY.

## ALARM-SIGNAL FOR BOILERS.

No. 841,186.

Specification of Letters Patent.

Patented Jan. 15, 1907.

Application filed February 23, 1906. Serial No. 302,435.

*To all whom it may concern:*

Be it known that I, HERMANN SANDVOSS, a subject of the German Emperor, residing at Neuss-on-the-Rhine, in the Kingdom of Prussia, German Empire, have invented a new and useful Alarm-Signal for Boilers, of which the following is a full and complete specification.

This invention relates to an alarm-signal for boilers, &c., which signals a too high or too low steam-pressure and also a too low or too high water-stand.

The invention is shown on the accompanying drawings.

Figure 1 is a front view of a boiler furnished with the new apparatus. Fig. 2 is the apparatus in section, while Fig. 3 represents a special form of the apparatus for showing the stand of the water.

The apparatus may, as shown, be connected with the water-gage of the boiler direct, and the alarm-signal may be fixed so as to indicate the height of the water in the gage itself or in a separate tube or reed 4. In the latter there is a reed 5, which is filled with mercury to such a height that it about equals the normal height of the water in the boiler. In the reed 5 there is a conductor 7, which is held by the insulating-sleeves 8, which are fixed in the reed 5. It is advisable that there be a vacuum above the mercury column 6. The reed 5 is connected at the top with a threaded brass sleeve 30 or similar means, on which the regulating-screw 9 and the counter-nut 10 are screwed. The conductor 7, which is of wire or other suitable means, is carried through the regulating-screw 9 and held in it by an insulator 8. The wire 7, with the nut 11, rests against the insulating-ring 12 on the regulating-screw 9. By moving the regulating-screw 9 the wire, which is adjustable in the insulators, may be moved in either direction and so set exactly to the water-stand required. The conductor 7 is connected by the wire 14 between the nuts 11 and 12 with an electric supply 15 and a signal 16, while the reed 5, which is also made of some conducting material, is also connected with the alarm-signal 16 and the supply 15 by the wire 17. Water-tube 4 is connected at its lower end by pipe 1 with the water-space of boiler 2. It is also connected at its upper end and above the maximum height of mercury column 6 with the steam-space of the boiler by pipe 100.

At the normal height of the water in the boiler the mercury stands at the position shown in the drawings. If, however, the water falls, the quicksilver 6, influenced and expanded by the steam, will come into contact with the conductor 7, by which a circuit is set up. With the construction shown in the drawings the current passes from the battery 15 through the conductor 7 and through the mercury column to the reed 5, conductor 14 to the alarm 16, and back to the battery. The apparatus may also be made to signal too high a stand of the water. For this purpose a second mercury column 36 is fitted at the top of the tube, Fig. 3, on which rests a bush 37 or any similar object. If then the top column of mercury be influenced by the water rising too high in the boiler, it cools and contracts accordingly, so that the bush sinks and with it the contact-plate 39, which rests lightly on it and is connected with the conductor 38. The contact-plate touches the edge of the sleeve 41, which is separated from it by the insulators 40, whereby a circuit is set up, the current going from the battery 42 through the conductor 45 to the sleeve 41, from here through the contact-plate 39 and the conductor 38 to the alarm 43, and from the latter to the battery 42. When this method is applied, the lower column of mercury is connected by the conductor 44 with the battery 42.

In the housing 19 with its cover 18, which is connected by the pipe 20 with the upper horizontal tubes of the water-gage or with the steam-chamber of the boiler, there is a diaphragm 21, which is suitably made of corrugated metal and is elastic. On this diaphragm, which may also be influenced by a spring, rests the pin 22, which is carried through the cover 18. The pin 22 may also be secured to the diaphragm 21, which may also be replaced by a piston.

On the cover 18 are the insulated plates 23 and 24, to which are attached the conducting-wires 25 and 26. On a further plate 31 there is a single or, as shown in the drawings, a double lever 27 pivoted, which is influenced by a weight or a spring 28. From the plate 31 there leads a wire 32 to the alarm 16, while the wires of the plates 23 and 24 lead to the battery 15.

The diaphragm 21 is sprung toward one side, while it is influenced on the other by the pressure in the pipe, whereby when the nor-



mal pressure is attained it is exactly centered. If now the pressure becomes too great, the diaphragm moves upward, which by means of the pin in turn moves the double lever upward, whereby the contact-pin sinks onto the contact-plate 23 and closes the circuit. On the other hand, when the pressure is too low the diaphragm in striving to reach its normal position, brings the contact-pin 34 of the lever 27 into contact with the plate 24, or, as shown in the drawings, with a pin or rod 35. Now in order to stop the alarm when, for example, the fires are put out and to bring it automatically into work again, the contact-pin 34 is made resilient. When it touches the contact-pin 35, the current is closed. If, however, the pressure becomes less, the resilient pin 34 leaves the pin 35, and thus breaks the current.

In order to facilitate the setting of the contact-lever 27, a scale or similar contrivance may be employed.

In place of a single alarm 16 for indicating the stand of the water and the high and low pressure of the steam there may be different alarms, so that it is quite audible whether the water is too low or whether the pressure of steam is too high or too low.

The contrivance for showing or indicating

the stand of the water and the pressure may also be separate.

Having now fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a boiler-alarm, an outer tube, an inner tube, a mercury column within the inner tube, a contact adapted to be engaged thereby, an alarm in circuit, means for connecting the lower end of the outer tube with the water-space of the boiler, and means for connecting the upper end of said tube with the steam-space of said boiler, substantially as specified.

2. In a boiler-alarm, an outer tube, an inner tube, a lower mercury column, and a separate upper mercury column in the inner tube, contacts for said columns, an alarm in circuit, means for connecting the lower end of the outer tube with the water-space of the boiler, and means for connecting the upper end of said tube with the steam-space of said boiler, substantially as specified.

Signed by me at Düsseldorf, Germany, this 2d day of February, 1906.

HERMANN SANDVOSS.

Witnesses:

WILLIAM ESSENWEIN,  
PETER LIEBER.