This invention relates to new and useful improvements in multiple fluid generators.

One object of the invention is to provide a generator including a central column surrounded by a plurality of pipe coils communicating with the top and the bottom of said column, whereby a plurality of fluids having different temperatures may be produced and discharged from the generator.

A further object of the invention is to produce a generator including a central column surrounded by pipe coils connected with the column, whereby a plurality of fluids having different temperatures may be produced under an equalized pressure.

A still further object of the invention is to provide a generator including a central column surrounded by a plurality of pipe coils connected to said column, arranged so that one coil may be utilized for pre-heating water and one or more coils for generating steam of comparatively high velocity, while the remaining coils may be utilized for circulating either hot water or saturated steam which is produced in larger quantities than the velocity steam.

Another object of the invention is to provide a generator including a central column having a pre-heating and circulating pipe coils connected thereto and also including one or more steam coils connected at the top to the top of the column and discharging steam at the lower end which is not connected to the column, whereby the steam is discharged from the coil at its hots'est point because of the location of the fire under the generator.

Further reference will be made herein to the foregoing and other features of the invention which will be more particularly pointed out.

In the following specification an exemplification of the invention is set forth and this is illustrated in the accompanying drawings in which:

Fig. 1 is a plan view of a generator constructed in accordance with the invention;
Fig. 2 is an elevation of the same;
Fig. 3 is a vertical sectional view of the generator;
Fig. 4 is similar view at right-angles to Fig. 3; and
Fig. 5 is a partial vertical sectional view showing a modified form of the generator.

This application is filed as a division of my former application for apparatus for cleaning surfaces, Serial No. 168,161, filed February 14, 1927.

In the drawings the numeral 10 designates a generator which includes a central vertical column 11 closed at its upper and lower ends. A water supply pipe 12 enters a T 13, which latter is supported by the upper end of the column and is plugged by such support, which is indicated by the numeral 14.

The column is surrounded by a plurality of coils 15, 16 and 17 respectively. These coils are intermeshed so as to reduce the size of the generator and also to baffie the up-rising heat currents and thus more effectually heat said coils.

The coil 15 has its upper end connected to the T 13; while its lower end enters the side of the column 11, which is shown in Fig. 4. This coil acts to pre-heat the feed water which is introduced into the bottom of the column 11. The coils 16 have their upper and lower ends connected, respectively, to the upper and lower ends of the column 11 and are thus arranged to circulate either hot water or steam as the case may be. The coils 16 are employed for producing steam and have their upper end connected with the upper end of the column 11, while their lower ends are connected to the T 18 and mounted in a steam discharge pipe 19.

Any suitable fire may be maintained under the generator so that the heated air currents not only reach the column 11 but pass upwardly, through and around the coils 15.
Water being supplied through the coil 15 will be pre-heated as it passes downward and thus will enter the column 11 as hot water. The water supplied to the column 11 will be caused to circulate through the coils 16, entering at the lower ends and discharging at the upper ends. If a large quantity of water is supplied, the coils 16 and the column will be filled with water, but if a limited quantity of water is supplied, steam will be generated in the coils 16 and this will be discharged into the top of the column, as saturated steam.

A pickup pipe 20 extends downwardly from the top of the column and if its lower end is immersed in water, as is shown in Figs. 3 and 4, hot water would be discharged upwardly through said pipe, but if the water level was below the lower end of the pipe then saturated steam would be discharged upwardly through said pipe. The pipe 20 is connected above the column with a discharge pipe 21 which conducts the fluid to its work. A pressure gauge 22 may be connected with the pipe 21. Either saturated steam or hot water is discharged from the upper end of the column 11 into the upper ends of the steam coils 17. As this fluid progresses downwardly in said coils its temperature is raised so that it is converted into superheated steam by the time it discharges into the T's 18. The superheated steam is conducted from the generator through the pipe 19. A hot water pipe 23 leads from the lower end of the column 11 for the purpose of conducting hot water therefrom.

It is obvious that sufficient pressure will be created in the column 11 to force either hot water or saturated steam up through the pipe 20. It is also apparent that the steam generated in the coils 17 will create a back pressure and this pressure will be equalized throughout the generator, thus causing all of the fluids to flow in the direction desired.

It is possible to discharge very hot water or saturated steam through the pipe 21 while hot water of a lower temperature is discharged through the pipe 23 and superheated steam under relatively high velocity is discharged through the pipe 19, but all under an equalized pressure.

The fluids supplied by this generator are particularly designed for use in connection with the apparatus covered in the application hereinbefore mentioned. Therefore, it is highly desirable to obtain the particular fluids herein set forth and which are not common to an ordinary coil boiler. The fluid discharged through the pipe 21 is utilized for forming a detergent solution, while the hot water discharged from the pipe 23 is employed either to dilute said solution or for washing off the surface which has been cleaned; while the high velocity steam discharged from the pipe 19 is utilized to impel the detergent solution or the hot washing water as desired.

It is obvious that this generator is subject to various modifications. In Fig. 5 I have shown a form in which the pickup pipe 20 is omitted and a fluid discharge pipe 21 is connected directly to the upper portion of the column 11. In this form hot water would be discharged into the pipe 21 if the column was kept filled, but in practical operation saturated steam and not hot water would be discharged from the top of the column.

Various changes in the size and shape of the different parts, as well as modifications and alterations, may be made within the scope of the appended claims.

What I claim is:

1. In a generator of the character described, a generating unit comprising a central vertical column, a vertical pre-heating coil at one side of the column and having its upper end connected with a water supply and its lower end connected to the lower end of the column, a plurality of vertical circulating coils disposed radially of the column and having both their upper and lower ends connected to the column, and a vertical steam coil at one side of the column and having one end connected with the upper end of the column and its lower discharge end free from the column.

2. In a generator of the character described, a generating unit comprising a central vertical column, a vertical pre-heating coil having its upper end connected with a water supply and its lower end connected to the lower end of the column, a plurality of vertical circulating coils each disposed radially of the column and having their upper and lower ends connected to the column, a vertical steam coil having its upper end connected with the upper end of the column and its lower discharge end free from the column, and fluid discharge pipes leading from the top of the column.

3. In a generator of the character described, a generating unit comprising a central column, a pre-heating pipe coil disposed longitudinally of the column and having one end communicating with one end of the column and its opposite end arranged for connection with a water supply, a plurality of longitudinal circulating coils disposed radially of the column and having their ends connected to the ends of the column, and a longitudinal steam coil extending longitudinally of the column and having one end connected with one end of the column, and a steam discharge pipe connected with the opposite end of the steam coil for conducting steam therefrom.

4. In a generator of the character described, a generating unit comprising a central column, a pre-heating pipe coil disposed longitudinally of the column and having one
end communicating with one end of the column and its opposite end arranged for connection with a water supply, a plurality of longitudinal circulating coils disposed radially of the column and having their ends connected to the ends of the column, and a longitudinal steam coil extending longitudinally of the column and having one end connected with one end of the column and its opposite end arranged for connection with a water supply, a plurality of longitudinal circulating coils disposed radially of the column and having their ends connected to the ends of the column, and a longitudinal steam coil extending longitudinally of the column and having one end connected with one end of the column, a steam discharge pipe connected with the opposite end of the steam coil for conducting steam therefrom, and a fluid discharge pipe extending from one end of the column including a pickup pipe extending into said column.

5. In a generator of the character described, a generating unit comprising a central column, a pre-heating pipe coil disposed longitudinally of the column and having one end communicating with one end of the column and its opposite end arranged for connection with a water supply, a plurality of longitudinal circulating coils disposed radially of the column and having their ends connected to the ends of the column, and a longitudinal steam coil extending longitudinally of the column and having one end connected with one end of the column, a steam discharge pipe connected with the opposite end of the steam coil for conducting steam therefrom, and a pipe extending from one end of the column adjacent the steam discharge pipe for conducting hot water from said column.

6. In a generator of the character described, a generating unit comprising a central column, a pre-heating pipe coil disposed longitudinally of the column and having one end communicating with one end of the column and its opposite end arranged for connection with a water supply, a plurality of longitudinal circulating coils disposed radially of the column and having their ends connected to the ends of the column, a longitudinal steam coil extending longitudinally of the column and having one end connected with one end of the column, a steam discharge pipe connected with the opposite end of the steam coil for conducting steam therefrom, a fluid discharge pipe extending from one end of the column including a pickup pipe extending into said column, and a pipe extending from one end of the column adjacent the steam discharge pipe for conducting hot water from said column.

7. In a generator of the character described, a generating unit comprising a central vertical column, a vertical pre-heating coil located radially of the column and connected at its lower end to the lower end of the column, said pre-heating coil being connected at its upper end with a water supply free from the column, a plurality of vertical circulating coils disposed radially of the column and having both their upper and lower ends connected to the upper and lower ends of the column, a pair of steam coils disposed radially of the column and having their upper ends connected to the upper end of the column, a steam discharge pipe connected in common to the lower ends of the steam coils, a hot water discharge pipe connected to the lower end of the column, a pick-up pipe extending through the upper end of the column, and a fluid discharge pipe connected with the pick-up pipe.

In testimony whereof I affix my signature.

STUART A. WIER.