

# THE USES OF STEAM.

## A Business Enterprise of a Novel Character.

### Plans of the San Francisco Steam Company.

#### Steam in the Streets for Power and Heat— How Mineral Wool Was Discov- ered—The Holly System.

During the past four years the public has from time to time heard something about the San Francisco Steam Company. Exactly what the company is or what it proposes to do has not, however, often been explained, although while it was applying to the Board of Supervisors for a franchise three years ago, the President of the corporation several times discussed his enterprise before committees of the Board. The company was organized December 22, 1867, with a capital of \$5,000,000, and soon after acquired by assignment the franchise to establish a steam plant and supply the inhabitants of San Francisco with heat and power, granted to P. T. Dickinson, David McKay and N. W. Spaulding on December 13, 1866. The officers of the company comprise some well-known citizens. President, P. T. Dickinson; Vice President, Abner Doble; Secretary, Jerome Spaulding; Attorney, James A. Waymire. Directors—P. T. Dickinson, Abner Doble, Charles Montgomery, J. A. Waymire and N. W. Spaulding. Since its incorporation the company has, it states, been engaged in securing subscriptions to its stock, and making arrangements for placing a million dollars worth of bonds in Europe, with the money obtained from which operations will be commenced.

All this has not been done without, as the mountaineer would say, a "prospect." During 1867 F. H. Prentiss, director, engineer and manager of the New York Steam Company, spent several months here going over the ground and making estimates of the cost and probable revenue of an enterprise similar to that of New York and other large cities. The result of his work was a report which has since caused the company to proceed with redoubled activity.

#### POWER AND HEAT IN PIPES.

As the San Francisco Steam Company, therefore, will soon, it says, commence tearing up the streets and putting down mains, by which every small manufacturer may become his own engineer, and every housewife manage her own steam radiator, a brief description of the enterprise at this time is of public interest.

The idea of conveying steam under ground for the purpose of supplying power for operating machinery and heat for warming houses is about eleven years old. The system of devices by which the steam is transmitted is covered by patents to Birdsall Holly and Charles E. Emery of New York, which are owned by the American District Steam Company, from whom the San Francisco Company has obtained the right in San Francisco. In New York city four plants are in operation, one having fourteen miles of pipe, and another of 20,000-horse-power is being constructed. The system is either in operation or being made so in twenty-seven other cities. In some of them difficulty has been found, owing to various impediments not necessary to mention, to make the system work successfully, but these are being gradually overcome, and although in New York city the scheme is not so popular for heating as for transmitting power, its introduction is gradually being accomplished.

#### THE HOLLY SYSTEM.

A nutshell description of the plan proposed to be put in operation here by the San Francisco Steam Company is as follows: A battery of boilers will be established at a point convenient for fuel and water. From them large mains will be run through the principal streets, smaller pipes connecting with engines and heaters in the adjoining houses. The supply of steam and engines is, of course, regulated by throttle valves and that to heaters and radiators, or for cooking, by convenient valves. In both cases the steam passes through meters and the consumer is charged only for the quantity used. The San Francisco Steam Company expects to start with a 10,000-horse-power plant and supply with motive force most of the stationary engines located in the small manufacturing district along what is known as the "city front." This comprises about fifty-six blocks extending from Francisco street on the north to Beale street on the south. Substantially all the small manufacturing in the city is done in that district. The reason is found in the fact that the supply of coal reaches San Francisco in ships, and in order to avoid the expense of transporting it, the manufacturers gather around the wharves. Nothing can illustrate the close economy which pervades business life more than this curious fact. The engineers of the steam companies were the first to discover and point it out.

The "heating district," so-called, comprises a section of territory lying between Pacific street on the north, Webster on the west and Howard on the south. It is estimated that there are 390,000,000 cubic feet within this territory to be heated. The statistics gathered by the engineers in ascertaining this, develops another curious comparative fact, viz.: that the blocks of San Francisco average a greater number of cubic feet than any city in the East. The reason is that our building squares are uniformly larger, and cut up by fewer streets.

#### MINERAL WOOL.

The public generally and many scientific men particularly were long puzzled to know how by the Holly system of steam heating it was managed to convey steam long distances without loss. For a long time some of the most eminent engineers in the country refused to believe that steam could be carried without a loss so great as to make the scheme impracticable. The solution of the problem was very simple. The pipes are packed in "mineral wool." This material, the invention of which was an accident, is one of the most curious things known to the scientific world. Some years ago a party of workmen, operating a pig-iron blast furnace, were astonished when the air pipe running under one of the receptacles burst and transformed the slag into wool. The stuff was picked up and examined by scientific men. It was found to be an almost perfect non-conductor of heat, and its manufacture to be used as a non-conductor at once began. There was not sufficient slag in the country to supply the demand, and experiments followed. It was found that molten stone, if subjected to the same blast of air as had led to the discovery at the pig-iron furnace, would also be blown into the same queer woolly substance. The wool is said to be far superior to any non-conductor of heat known. Unless subjected to tremendous fire it will not burn, and when packed in it the steam pipes of the New York Company are said to show a loss of heat amounting to but 3 and 4 per cent.

#### THE AUTOMATIC CUT-OFF.

Another interesting feature of the Holly system is the thermostat, which is attached to the heating apparatus of dwelling-houses. It is merely a sensitive bar, which is so constructed as to be controllable. Placed in a room wherein the temperature is regulated at 70°, for instance, if the steam pipes produced a greater heat, the thermostat would expand and connect an electric circuit, which in turn would automatically cut off the steam.

In making his investigations in this city, Mr. Prentiss found that San Francisco ranks, in proportion to population, very high among the manufacturing cities of the United States. The cause, of course, is our isolation from the large manufacturing centers of the East and the Protective Tariff imposed by the long overland railway. He also discovered that the average annual cost per capita for coal in this city is \$13.14 more than in New York. The reason is that, while the heat required in our houses to keep us warm is not so great, we need a little warmth through the whole year and the fuel costs us more. Connected with the Holly system of boiler batteries there is an automatic coal-feeder which enables the furnaces to so thoroughly consume all the coal used that scarcely an atom of it is left. The cheap coal of this coast is composed largely of lignite and to consume it a very high temperature must be maintained. The officers of the San Francisco Steam Company calculate that the automatic feed of the Holly system, by preventing the entrance of air into the furnaces and maintaining a high degree of white heat, will consume this cheap coal to great advantage. They have figured it all out on a scientific basis, and estimate that they will be enabled to furnish heat and power so cheap in this city that it will not take long to introduce the system. Mr. Prentiss estimated that a plant, with a battery of boilers of 10,000-horse-power and room to enlarge, would cost here \$100,000. Six miles of pipe extending into the residence portion of the city, with one mile of 15 inch would cost \$100,000 more. The company will start with a smaller plant than this, however. President Dickinson states that it will not be many months before operations will be commenced.