Fires from Steam Pipes.

The second annual report of the fire marshal of the city of Boston for the year ending May 1, 1888, contains, among other matters, the following interesting information:

I have been able to satisfactorily trace the origin of but five fires during the year to steam pipes, and the circumstances surrounding these in no way tend to show that wood in its normal condition, *i. e.*, when free from any previous desiccation, is in danger of becoming ignited in this manner. In other words, ignition in said cases appears to be merely a certain species of what is popularly termed "spontaneous combustion," the steam pipes themselves being merely one of many indirect factors which often assist in producing such combustion. Although the subject has been discussed *pro* and *con* from the year 1846, when Chief Braidwood, of the London Fire Brigade, first addressed the House of Lords on the topic, to the present time, when the opinions of experienced persons interested in the matter seem to be somewhat conflicting, I find by far the preponderance of evidence in favor of the conclusion that wood, subjected for a number of years to the heat of steam pipes, may eventually reach such a state of carbonization as, with the addition of moisture, exposure to a draught of air, or under the influence of friction, caused by expansion and contraction of the pipes, may break into flame. As the ignition point of ordinary pine wood has been determined, by experiment, to be 700° F., it is evident that this must be reduced by some process in order to admit of its taking fire at 292°, the temperature of steam under a pressure of 60 pounds.

I have found one of the most frequent causes of fires, which are directly traceable to steam pipes, to be the self-ignition of dust, fluff, small pieces of paper, waste, etc., which seem especially attracted to the neighborhood of inclosed steam pipes through almost imperceptible crevices. In several such instances the fires have been fortunately discovered and extinguished before doing any harm. P. A. Montgomery, secretary of the Western Manufacturers' Mutual Insurance Company, in special report No. 5 of the Manufacturers' Mutual Insurance Company, refers to this same element of danger, and suggests, as a remedy, the use of a funnel-shaped casting, cast in two parts, from 3 to 6 inches in height, fitting close at the top, and screwed to the floor, where the pipe passes through; and he further recommends that a thimble of some non-combustible material should be put through the hole in the floor or partition and securely fastened on either side, in order to protect the wood from contact with the pipe.

The light sheathing by which the pipes are often covered, being obliged to constantly absorb the confined steam heat, is extremely liable to reach a dangerous ignition temperature. Sheathing reduced to such condition by being in close contact with the pipe, and so placed as to be susceptible to more or less friction, caused one of the five fires herein referred to; another was caused by lumber dust in the dry house of a planing mill sifting through the floor on to the pipes. The desirability of employing some sort of non-combustible covering for steam pipes, to prevent their contact with wood, dust, etc., is apparent. They should never be inclosed in wood sheathing. Professor Gibson, in a report to the Manufacturers' Mutual Insurance Company, gives an exhaustive and instructive treatise on the merits of the various kinds of coverings.

Protect the Boilers and Steam Pipes.

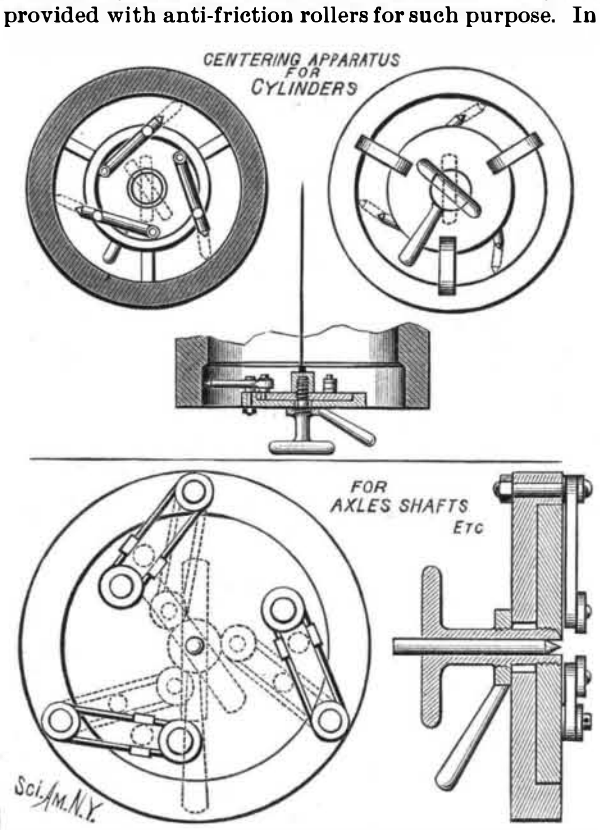
As the edge of cold weather approaches, people in this climate begin to look for suitable winter protection. Heavier clothes are put on, and an overcoat over the outside; houses are banked around, and storm doors and storm windows are put in place. All these things are done for the comfort of the individual and economy of the fuel required to keep the house warm. No one with his senses about him neglects these precautions; but what are we to think of the steam users who will leave the outside of the boiler and the steam pipes exposed to cold currents of air, and suffer a much greater financial loss by the continued condensation of steam? Certainly they cannot be in their right minds, or else they do not appreciate the situation. The loss of heat by radiation varies according to the surface exposed and the difference in temperature between the two bodies. The surface of a steam pipe is very much hotter than the windows and doors of a house, hence for the same area much more heat will be carried away. It is not the loss of the actual number of units of heat in this manner that is the principal objection, but it is the attendant results which cause a much greater loss in other ways. Condensation which takes place in a steam pipe leading to an engine has two serious features about it. In the first place, the condensation carried into the cylinder is likely to cause an accident or break down; and, in the second place, it should be remembered that only about one-tenth of the heat put into the steam is available for producing power, and it is only upon this one-tenth that radiation has any effect; hence, every bit of heat lost by radiation from a steam pipe leading to an engine means the loss of ten times as much heat from the coal pile.

This at first sight may appear astonishing, yet it is, nevertheless, true, and in the case of the commoner kinds of engines more than true, because in them the available part of the heat is often not over one-twentieth of the whole. In such cases it is not uncommon to find nearly one-half of the coal thrown away by allowing boilers and steam pipes to remain unprotected.

It therefore behooves engineers and persons owning steam plants to brick over the boilers and box in the steam pipes; or, better yet, to get a good supply of asbestos covering and apply it liberally. There are thousands of cases where the money spent in this way will all be saved in the coal bill before the winter is half over.—*Wood and Iron.*

AN IMPROVED CENTERING APPARATUS.

An apparatus for centering axles, shafts, cylinders, or other work to be operated on by tools in a lathe or other machine is illustrated herewith, and has been patented by Mr. John E. Howard, of Altoona, Pa. The face plate, as shown in the lower figures, is fitted to rotate within a recess in the outer face of the bed plate, a series of three or four arms pivotally connecting it with the bed plate, the arms being each held by a sliding connection to the head of a pivot block fitted to turn in the face plate, while the arm slips along the pivot block when the face plate is turned in or on the bed plate. The inner ends of the arms may act directly on the article to be centered, or they are provided with anti-friction rollers for such purpose. In



HOWARD'S CENTERING APPARATUS.

the center of the face plate, at the back, is fitted the inner end of a handle, with a handle or jam nut, which, when the face plate is set to cause the jaws to center the work, will be tightened to clamp the face plate and bed plate together, a centering punch in the bore of the handle being driven into the end of the work to mark its exact center. Work of any diameter, from about the diameter of the face plate to a small fraction of an inch, may be centered by this apparatus with facility and exactness. A form of such centering apparatus, more especially designed for getting the center of a cylinder, or in holding a line thereat, is shown in the three upper figures. Here the face plate is arranged for rotation in the recess of the bed plate, but the centering arms, of which there are three, are pivoted at their inner ends to the face plate near its outer margin, the arms being adapted to slide through openings in swivel bolts or blocks fitted to the outer part of the bed plate. The handle has an inner clamp nut or collar in front of the face plate, beyond which is fitted a screw or other end cap having a central hole through which a cord is passed until its end knot stops within the cap. This cord may be run through a steam or other cylinder, as is at times required in constructing or repairing engines or other machines.

Action of Products of Combustion upon Steam Jets.

Herr R. Von Helmoltz has communicated to *Wiedemann's Annalen*, so says the *Journal of Gas Lighting*, some observations made by himself upon a jet of steam. He remarks that a jet of steam escaping from a hole of 1 or 2 mm. diameter, lighted obliquely and observed upon a black background, is invisible at the lower extremity, and presents toward the top the well known whitish appearance. This aspect may be modified in many ways. If an electrified point is brought near the steam, the jet immediately becomes azure blue, or, according to the power of the electrical machine, purple, red, yellow, green, etc. These tints are intimately connected with the dimensions of the liquid drops, and hence it follows that the electrical point has the power of provoking condensation of the supersaturated vapor which is found at the lower part of the jet. The same result is obtained by bringing near to the steam jet a platinum wire made brightly incandescent by an electrical current, or silver, iron, copper, or brass wires simply made red hot in a flame, or even glass heated below the red, or an organic matter, wood, paper, etc., in a state of slow combustion. The products of any flame whatever, with the exception of the flame of pure alcohol, directed upon the jet of steam by the aid of a chimney or by simple blowing, produce a very energetic effect. Finally, traces of certain chemical substances introduced into the steam jet cause the same modification. Among these are hydrochloric and nitric acid, but concentrated sulphuric acid especially shows the phenomenon. It is known that solid dust particles provoke the condensation of supersaturated vapors, but their presence cannot be invoked here to explain the preceding facts.

The author is of opinion that they may be attributed to a molecular concussion, the effect of which may be compared to that of mechanical concussion upon superheated or supersaturated liquids. A flame, for example, is the scene of closely approximated and extremely varied movements, and the chemical atoms which are incessantly passing in it from one combination to another are found in every kind of unstable condition. These movements and changeful states of equilibrium leave their traces in the products of combustion at a certain distance from the flame properly so called, and determine the observed phenomena. The luminous effect produced at the extremity of an electrified point and the presence of ozone in its vicinity show that this point is the cause of concussions comparable to those provoked by active combustion, and the analogy between the two phenomena is found again in the fact that they both furnish means for making electricity pass through gas. As to solid incandescent bodies, they can act either through the emission of solid particles from their surfaces or by the chemical concussions which they communicate to the surrounding gases.

One Million Dollar Telescope.

The chances are that the moon will be as well known to the inhabitants of the civilized world as the interior of Africa is at the present time. The telescope manufactured by order of the late millionaire Lick for the university known by his name in California has enjoyed the distinction of being the largest and strongest in the world, but it is likely to undergo a comparative eclipse. Mr. Abram Clark, who made it, has undertaken the task of making one yet larger and more powerful. Should he succeed, as he is perfectly confident that he will, valuable additions may be expected to be made to our knowledge of the worlds by which we are surrounded. In a recent talk on the subject Mr. Clark disclosed some facts quite contrary to general belief in regard to astronomy. It has been popularly supposed that we had reached the maximum of effective telescopes.

The big ones, the leading astronomers told us, disclose little of the heavens' wonders. And they pointed out that the most important discoveries of the present century had been made by telescopes of a medium size. Hence the deduction that it was useless to bother with larger lenses. Such a theory, of course, gave us little of practical value to hope for from astronomy. With the telescopes now in use we could expect to determine more accurately the distance from the earth to the sun, or to lay bare more stars. But in discoveries of this kind the great mass of humanity could scarcely be expected to take any very great interest. It was the verdict of most of the professionals that the Lick telescope would be a failure, so far as adding anything to practical knowledge of the heavenly spheres was concerned, but in this, as in many other instances, they were mistaken. It has already been demonstrated that, properly constructed and located, a big telescope is more effective than one of smaller size. It has been shown, in fact, that there is practically no limit to the power of a telescope, and that if a sufficiently powerful one can be made, we can bring most of the planets near enough to examine their every nook and corner.

The lens of the new instrument for the university at Los Angeles is to be 40 inches diameter, and Mr. Clark claims that he is able to make one five feet in diameter—one which will bring the moon within a few thousand feet of the earth. It is simply a question of time and money—mainly money, as a telescope with a five foot lens, properly mounted, would cost a million dollars. If Mr. Clark's position is true, and there is every reason to believe that it is, astronomy, a science which has been practically at a stand for years, will take giant strides. There will be practically no limit to the discoveries it can make, and there should come from it some practical benefits. Each year we will know more of the heavens, and of all sciences astronomy will be changed from the slowest to the most progressive.—*Mail and Express.*