

and will enable a fireman to breathe in a smoke-laden atmosphere for a period varying in duration from thirty minutes to an hour and a half, depending upon the violence of his exertions. In this apparatus the oxygen is regained from the exhaled carbonic acid and water vapor and produced at a rate proportional to the rate of their production in the body, so that the time during which respiration can be maintained is a function of the work done. This automatic power of adaptation to the demand for oxygen is one of the most important advantages of this system.

Other systems have been invented which have also been successfully used, and which limitations of space forbid our mentioning here. The fact remains that among a dozen appliances for successfully enabling a fireman to fight his way through choking gases and smoke, one must surely be found which can be used by the New York fire department.

**THE AMERICAN MUSEUM OF SAFETY DEVICES AND INDUSTRIAL HYGIENE.**

BY WILLIAM H. TOLMAN, PH.D., DIRECTOR.

As early as 1867 Dolfus, a French industrialist, aroused by the increasing number of accidents to labor in factories and workshops due to the fact that there was little or no attention paid to the safeguarding of dangerous machinery, organized an association for the prevention of accidents, and founded what was the beginning of a museum of safety devices. To-day some of these original models may be seen in an honored section of the Paris Museum of Safety Devices. In 1890 a museum of safety devices was opened in Vienna; in 1893 a second in Amsterdam, followed by similar organizations in Munich, Berlin, Moscow, Zurich, Paris, and Milan.

As a member of the International Jury in Social Economy at the Paris Exposition in 1900, I studied

the attention of the American public to the necessity of doing something to lessen the causes of accidents to American life and labor by means of a permanent museum of safety devices, where all problems of safeguarding life and limb can be studied in their working details, and to stimulate the need of invention of new devices to meet new conditions of danger and peril.

The committee of honorary vice-presidents included ex-President Grover Cleveland, Hon. E. C. Stokes, governor of New Jersey; Hon. C. P. Neill, United States Department of Labor, Washington, D. C.; H. C. Bumpus, director American Museum of Natural History; Hon. Curtis Guild, Jr., ex-governor of Massachusetts; Hon. Henry Roberts, governor of Connecticut; Hon. T. P. Sherman, labor commissioner of the State of New York.

A ladies' committee was organized, under the honorary chairmanship of Mrs. Douglas Robinson, including Mrs. Joseph H. Choate, Mrs. Grover Cleveland, Mrs. W. Bayard Cutting, Mrs. Charles E. Hughes, Mrs. Seth Low, Mrs. George B. McClellan, Mrs. J. Pierpont Morgan, Mrs. Levi P. Morton, Mrs. William J. Schiefelin, Mrs. Lorillard Spencer, Mrs. I. N. Phelps Stokes, Miss Amy Townsend.

As a result of the first international exposition, an advisory council has been organized under the chairmanship of C. Kirchoff, of the Iron Age, and the vice-chairmanship of T. Commerford Martin, of the Electrical World. The other members are F. S. Halsey, of the American Machinist; H. W. Desmond, the Architectural Record; J. R. Dunlap, the Engineering Magazine; W. R. Ingalls, Engineering and Mining Journal; C. W. Baker, Engineering News; J. M. Goodell, the Engineering Record; A. Spies, Electrical Record; C. W. Price, Electrical Review; F. Webster, Insurance Engineering; F. E. Rogers, Machinery;

tory operative, while a second allegorical figure conveys the supreme honor of a laurel wreath. Our engraving also shows two somewhat similar designs. The middle one has been accepted with slight modifications as to modeling. A committee of nine has been appointed by the executive committee to award this medal, having full power to limit the field of award and establish such conditions as seem necessary. Three new members are to be appointed to this committee each year, taking the places of three who will retire. The conditions of the competition will be announced very soon. A second gold medal has been offered by Francis H. Richards, the inventor, for the best invention to be exhibited at the museum for safeguarding life and limb, the field of effort for this award to be limited to automobiles and motor boats. Dr. L. L. Seaman has offered an annual prize of \$100 for the best essay on the subject of safeguarding life, intending that the essay shall be a study of existing conditions and methods for their improvement. One check for \$5,000 has been received from an anonymous giver, from a city outside of New York.

The following jurors, recommended by the advisory council, were unanimously appointed by the executive committee of the American Museum of Safety Devices:

Jury for the SCIENTIFIC AMERICAN Medal: H. H. Westinghouse; John Hays Hammond, president of the American Institute of Mining Engineers; Samuel Sheldon, president of the American Institute of Electrical Engineers; Prof. F. R. Hutton, president of the American Society of Mechanical Engineers; Cornelius Vanderbilt; Stuyvesant Fish, George Gilmour.

For the Richards Medal, for the best safety device in the field of automobiles and autoboats: Colgate Hoyt, president of the Automobile Club; Edward J. Schroeder, president Motor Boat Club of America; Dr.



Tentative Design.

The Accepted Design.

Tentative Design.

**THE SCIENTIFIC AMERICAN MEDAL FOR SAFEGUARDS FOR LIFE AND LIMB.**

the exhibit of the Amsterdam museum of safety devices and familiarized myself with this new movement for safeguarding life and limb. Becoming deeply impressed with the significance in preventing fatalities and casualties in the industrial world, I felt convinced that its practical application in our own factories and workshops would be the means of saving many lives and limbs. Through the medium of the American Institute of Social Service, the idea of this new kind of museum was introduced into America, and became a part of its plan to work for the establishment of such an institution in our country. Lectures were given, articles written and conferences held to arouse the public to the necessity of an American museum of safety devices.

Through the co-operation of Morris K. Jesup, president of the American Museum of Natural History, one of the exhibit halls was placed at the disposal of the American Institute of Social Service from January 29 to February 12, 1907, for an exposition of safety devices and industrial hygiene. There were some 200 entries of devices for safeguarding the lives and limbs of workmen and preventing accidents under the ordinary conditions of life and labor to which the general public is exposed. There were many "live exhibits," that is machines or devices in operation, models of actual or reduced size, and photographs; wood- and metal-working machinery; polishing machines; presses; safeguarded elevators; safety lamps and non-explosives; fire safety devices, and railway appliances.

The section of industrial hygiene included improved dwellings; first aid to the injured; prevention of tuberculosis and other dread diseases harmful to the life of workmen; respirators and devices for supplying and maintaining pure air and industrial betterment.

It was the object of this first exposition to direct

S. S. McClure; F. R. Low, Power; W. H. Boardman, Railroad Gazette; A. Sinclair, Railway and Locomotive Engineering; A. A. Hopkins, SCIENTIFIC AMERICAN; H. W. Blake, Street Railway Journal; E. F. Roeber, Electrochemical and Metallurgical Industry; G. Gilmour, the Travelers' Insurance Company; James H. McGraw, president McGraw Publishing Company; Charles T. Root, president Textile Publishing Company; H. M. Swetland, president of the Automobile.

One of the most encouraging signs of the moral uplifting of the race is the unmistakable growth in these later days of the humanitarian sentiment. The dignity of the human body, the sanctity of human life, are swiftly emerging to their full and proper recognition. The reproach has lain too long at our doors that, as a people, we were so madly bent on the pursuit of wealth that we cared little who might fall by the way, if only the goal were swiftly and grandly won. To the question: "How much then is the life of a man worth more than a sheep?" we have made answer by rolling up a record of over half a million annual maimings and killings that may well put us to the blush. Therefore it is gratifying to realize that the movement set on foot by the American Institute of Social Service for the promotion of an American museum of safety devices is meeting with marked success.

In view of the fact that a very large percentage of the accidents is absolutely preventable, the editors of the SCIENTIFIC AMERICAN decided to offer a gold medal, annually, for the best device for the protection of life and limb produced during the year; this award to be given by the American Museum of Safety Devices after the board of experts have passed upon the devices submitted. The medal, shown in the center of the group, will be 2 3/4 inches in diameter, and shows on the obverse the genius of invention rewarding the inventor of some device for saving the life of a fac-

S. S. Wheeler; Caspar Whitney, and A. G. Batcheller, editor Automobile.

For the award of the \$100 prize offered by Dr. Seaman: Dr. Josiah Strong; Dr. A. C. Humphreys, president of Stevens Institute of Technology, and James A. Hill, president of the Hill Publishing Company.

The museum will open in the autumn, in the new 39th Street building, having rented the entire third floor from the McGraw Realty Company. From there, it is the hope that it will soon have a building of its own, where there will be room, not only for devices of all kinds, but rooms for instruction, lecture hall, and a laboratory where safety device ideas can be worked out practically in accordance with the requirements of American needs, that is, simple, cheap, and those that in no way interfere with the high speed of the machinery.

As was recently remarked in an editorial in a technical journal, "the initial step has been taken, and it only remains to obtain funds to make it of instant and permanent benefit. It is estimated that the very modest sum of \$25,000 would cover the expenses of the first year's campaign, and when this amount has been raised and expended, it is reasonably expected that the growth of the work will be assured, and further funds for its maintenance contributed without much soliciting. For the present, however, means are scarce, and the support of all who can be reached is earnestly solicited. An appeal is now being made to manufacturers and operators of industrial plants and public utilities through the papers they read, to give their material assistance as speedily as possible, in amounts from the smallest to the largest they are inclined to give. The return from the investment scarcely needs to be pointed out. The humanitarian side will be justification enough to the majority, but there is the additional and more direct pecuniary reward in the reduction of liabilities to damage suits."