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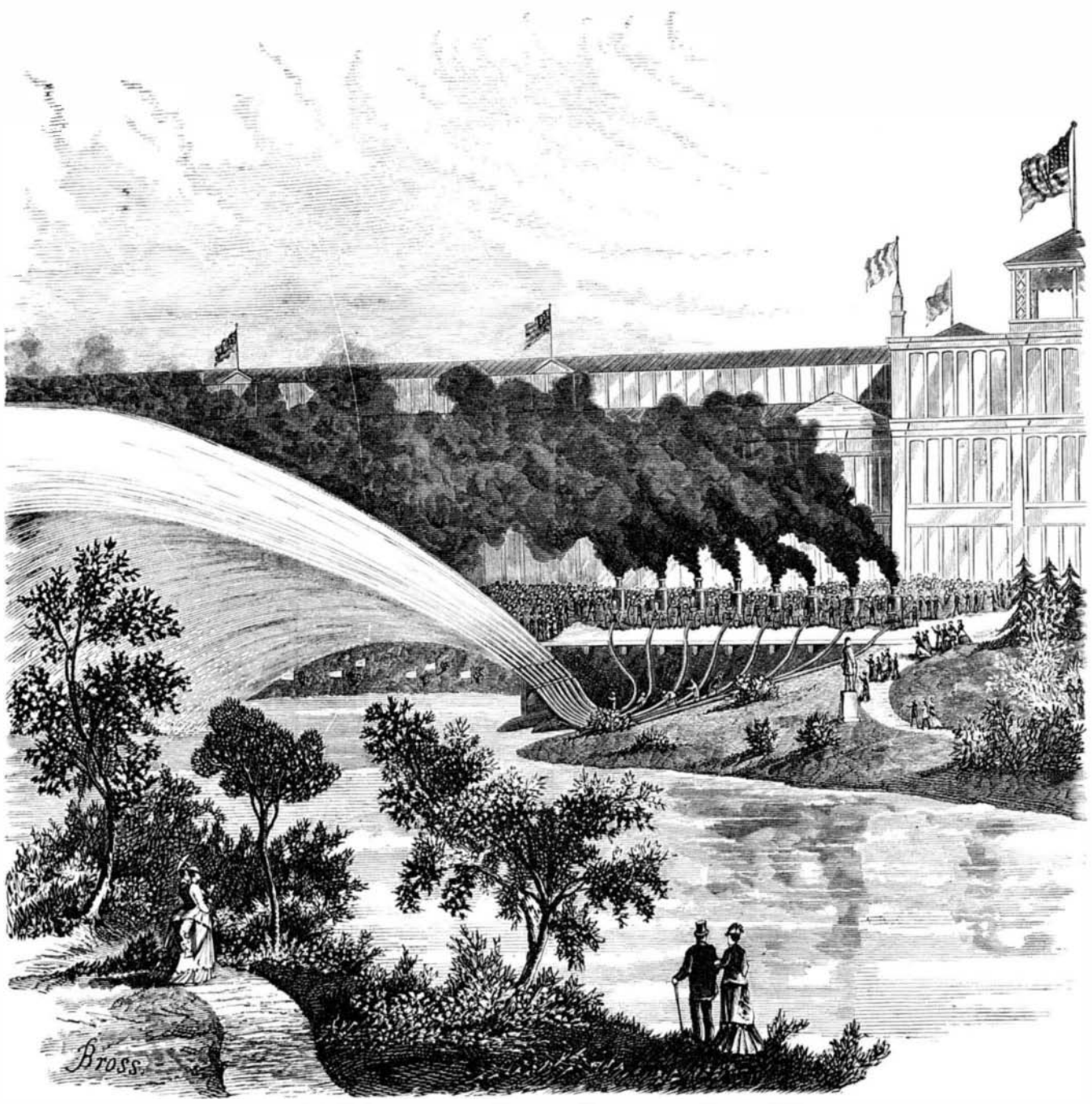
TRIAL OF STEAM FIRE ENGINES AT THE CENTENNIAL EXHIBITION.

There is probably no engine or machine in which the work done bears so great a ratio to the weight, strength, and size of the apparatus as the fire engine. The requirements of fire engines are so exacting, and the necessity for the greatest obtainable efficiency is so vitally important, that the cost is a secondary consideration. The breakage of a single bolt, pin, or casting may entail the loss of thousands of dollars' worth of property, in addition to the damage resulting to the engine; and hence it is that the material and workmanship employed in the construction must be, and are, of the very highest order. A steam fire engine is in actual use during but a comparatively short time of its period of existence, but it must always be ready to perform, at a moment's notice, its arduous and important duties; and the thorough order in which it must, therefore, be kept, makes it a fitting subject for beauty of design and ornamentation, so far as is consistent with the necessities of its construction. Thus it is that, for elegance and finish, the steam fire engine is unsurpassed in machine production.

The steam fire engines exhibited at the Centennial Exhibition are beautiful specimens of mechanical architecture, and form an attractive feature in Machinery Hall. Our illustration represents the trials of these engines, which were conducted by the judges on September 4, 5, 6, and 7. This exciting contest formed the center of attraction during those days, being attended by a large concourse of engineers and mechanics, as well as by the visiting public. The eagerness, watchfulness, and assiduity of the engineers, the restlessness of the contesting exhibitors, the gravity and coolness of the judges, the almost life-like struggle of the engines, together with the long rolling volumes of gyrating black smoke above, and the rushing stream of water beneath, formed a scene which made considerable impression upon contemplative minds.



THE CENTENNIAL.—TRIAL OF STEAM FIRE ENGINES.

The conditions of the test were made known to each of the contestants, and every precaution was taken to have every requirement clearly understood and all in readiness at the appointed time and place: ample notice being given for any preparations that might be deemed necessary by any of the contestants, each of whom employed his own engineer and assistants.

The conditions of the trials on the first day were that the engines were to be tested for capacity and endurance in delivering water through three different sized nozzles, furnished by the judges, and varying in area for each engine according to its weight with the boiler filled. The second day's trials were for distance and character of the stream thrown; and the third day's were for the character and hight of the stream. On each day, the trials were continued for three hours each. On the fourth day, the tests consisted of three runs over a course of a mile, each run followed by a play of about half an hour, in which nothing was used that was not carried over the course, the engineers and assistants making the trips with the engines. The engines were supplied with bituminous coal, the fuel used, both for lighting fires and and running, being weighed and charged to the account of each engine respectively. Each engine had connected to it 35 feet of suction and 100 feet of delivery hose, supplied by the exhibitors themselves, who had the liberty of selecting the size and kind of hose, and of using as many lines as they chose, provided that they joined into one before reaching the nozzle. The water was lifted 15 feet; and on the second and third days, the exhibitors selected their own nozzles, three of which were used, the sizes varying from the smallest to the largest used by them respectively on the first day's trials.

The engines were weighed previously to the trial, first without water and equipments, secondly with the boiler filled with water to its proper working level, and thirdly with equipments complete, ready for service. Each competitor fixed his water level and started from such level on each trial. The judges were Messrs. Charles T. Porter, Emil Brugsch, and Joseph Belknap, assisted by Mr. Wellington, of New York. From the delivery hose pipe of each engine there was conducted a hose leading to the judges' stand and connected to a pressure gage. The nozzles were connected to a fixed platform and held stationary at an angle of about 45° for the distance test and 90° for the hight test. The water in the boilers was required to be cold, and its temperature recorded; and all the fires were started at a given signal. The pressure of the steam was recorded every five minutes, and the water pressure every two minutes. Eight engines entered for the test, namely, one Silsby, one Ronald, one Gould, one *La France*, one Button, and three Clapp & Jones engines. The Button engine was disabled on the first day of the trial, in consequence of the fracture of a bracket attached to the cylinder head. The sizes of the nozzles used varied from about $\frac{7}{8}$ to $1\frac{1}{16}$ inches diameter of bore; the distance the water was thrown was about 220 feet. There are, we are informed, awards to be made to these makers independently of the data obtained from the trials, the results of which are not, as yet, fully computed by the judges. The merits or points of advantage in the respective engines are to be recognized by these immediate awards; and the results of the trial tests will be announced, and a suitable award made, at some future time. In the meantime, it is, we are informed, contemplated to secure the coöperative assistance of additional experts, in order to form a just and comprehensive decision as to the merits of the engines, as indicated by the data given by the logs of the whole series of tests.

American-made Bunting.

General Benjamin F. Butler gives the following account of the rise and progress of this industry:

"The manufacture of bunting was unknown in this country until after the close of the war, so that no American ship ever fought under a yard of American bunting. One or two attempts had been made to make it in America, which had failed. It was substantially a monopoly of a few firms in Bradford, England; and although it cost, in the war, the Englishmen to make it no more than now, they put up the price upon us to $36 gold per piece. In 1866, because I lived in a manufacturing city, I was requested by the Navy Department to examine into the subject and see if it could be made here. I consulted with some friends of mine in Lowell and interested them in the subject, and they agreed to make an attempt, provided I would furnish part of the capital, which I did. After many experiments, attended by very considerable expense, and by employing English machinery, an article of bunting was made, which, upon competitive trial with the English, was pronounced by a board of experts to be superior. The demand for the article is very limited, except in presidential years and the Centennial year. There are now three or four other establishments which manufacture bunting in the country, besides the one at Lowell. It is said by a newspaper that the tariff is more than the cost, leaving the inference that that is added to the price. The effect of the manufacture here has been that bunting is produced at $10 a piece, gold, as against $36, which our government paid for over 11,000 pieces yearly during the war."

New Weapons of War.

A series of trials of the Hotchkiss revolving cannon were recently begun at Sandy Hook under U. S. army auspices. Seventy shots were fired, at four targets, the nearest of which was placed at 2,000 yards distance. The shells burst between the first and second targets, hitting the four screens 206 times. A new magazine breech-loading rifle was also tested, and a firing speed of six shots in six seconds was attained. The cannon trials are soon to be resumed, when the capabilities of the gun will be put to the severest tests. The inventor, Mr. B. B. Hotchkiss, claims that the weapon has an effective range of 6,000 yards.