

gas might have a sufficiently free escape into the atmosphere. He also suggested the free use of lime for whitewashing the walls of the warehouses, so that the acid vapors floating in the more or less confined air might combine with the lime. He exhibited a number of specimens of the goods which he had examined after they had been sent back by the London merchants, as damaged, to the manufacturers. Both in color and in strength they were seen to have suffered detriment by exposure to gaseous fumes.

IMPROVED STEAM FIRE ENGINE.

Our engraving represents one of the improved steam fire engines that have been supplied for the new chief station in the Southwark Bridge road of the Metropolitan Fire Brigade, London. The object of Captain Shaw in the construction of these machines has been to keep all the parts as light as possible, consistent with the necessary strength, so as to enable the firemen, with all their apparatus, to be conveyed quickly to a fire. To ascertain the required strength of carriage wheels, etc., Captain Shaw recently instituted a number of experiments at the vacant ground on the Thames Embankment, near Blackfriars Bridge, where the engines were tried in every possible way, and the information obtained by means of these experiments has been employed in the design of the two engines in question.

Hitherto the consumption of a considerable quantity of gas has been found necessary in order to keep up the temperature of the water in the boiler. This is now avoided by an improvement introduced by Messrs. Shand, Mason & Co., into their inclined water tube boiler, consisting mainly of an increase of the heating surface, the quantity of the water remaining the same. By this the time required for raising steam is reduced by between two or three minutes. The engine is of the makers' well known single cylinder type with bucket and plunger pump. The vertical and rotary parts are evenly balanced, so that the transverse oscillation previously noticeable has been entirely overcome, and the engine works at high speed with great regularity. The valve passages in the pump have also been enlarged, and the steam used more expansively, so that weight for weight the engine is rendered about one third more powerful than those previously in use. By these means, and without increasing the weight of the boiler, the area of the steam cylinder has been largely added to, so as to enable a jet of water to be thrown to the increased height required by the great extension of lofty buildings in London. A novel form of self-acting by-pass has been adopted, which can be adjusted so that the whole or any part of the water pumped is returned to the suction chamber, enabling the fireman di-

recting the jet to control it completely without sending messages to the engine driver. An engine of this kind forms part of Messrs. Shand, Mason & Co.'s exhibits in the Paris Exhibition. We take our illustration from the *Engineer*.

Improved Hair Pin.

Mr. Edward Kelly, of Baby's Point, Ontario, Canada, has recently patented an improvement in hair pins which is clearly shown in the accompanying engraving. The improvement consists in connecting two or more ordinary hair pins by means of an elastic cord of suitable length, so that the pins may be inserted on opposite sides of hair braids with the elastic connection passing over the top. The cord contracts and securely holds the pins in place.



Large Driving Belts.

At the Paris Exhibition, some fine main driving belts, made after Sampson's patent, are shown by Mr. Edwards, of Manchester, Eng. There is one double belt, 207 feet long, 63 inches wide, which weighs 2,962 lbs., and is made to transmit 600 indicated horse power. Another is 184 feet long, 53 inches wide, while a third is 163 feet long and 63 inches wide. These two latter weigh together 4,378 lbs., are without cross joints from end to end, and are intended for a large cotton mill, to drive direct a flywheel 30 feet in diameter, and 10 feet 3 inches on the face. The combined horse power they are made to transmit is 1,000.

American Cotton at Paris.

Colonel Balys, special commissioner from Tennessee to the Paris Exhibition, reports that Memphis not only won the leading prize for the exhibition of the best bale of cotton, but also received a grand testimonial, the bale which it displayed being said to be the best ever raised in the world. Its history is somewhat remarkable. At an exhibition in Memphis it received the grand prize of \$1,000, another first prize at the Centennial, a third at Liverpool, still another at a national fair on the continent of Europe, and now these awards at Paris. The value attached to it by its owner has been so great that in transportation abroad it has been in charge of a special messenger. It was finally bought by the largest spinner of lace goods in Paris to be kept as a souvenir. At the Philadelphia exhibition the Fiji Islanders carried away the prize for long staple cotton, but at Paris this year they gracefully yielded to Memphis. That Egyptian cotton, long staple, is to a certain extent competing with our sea island cotton is attributed to the fact that while the South has been

favoured with unusual crops, yet it has not been careful in their preparation, and consequently they have not yielded so high a price as they would have been otherwise entitled to.

ASTRONOMICAL NOTES.

BY BERLIN H. WRIGHT.

PENN YAN, N. Y., Saturday, October 19, 1878.

The following calculations are adapted to the latitude of New York city, and are expressed in true or clock time, being for the date given in the caption when not otherwise stated.

PLANETS.

	H.M.		H.M.
Venus rises.....	5 18 mo.	Uranus rises.....	1 52 mo.
Mars rises.....	5 26 mo.	Neptune rises.....	5 49 eve.
Jupiter sets.....	10 52 eve.	Neptune in meridian.....	0 38 mo.
Saturn in meridian.....	10 01 eve.		

FIRST MAGNITUDE STARS, ETC.

	H.M.		H.M.
Alpheratz in meridian.....	10 08 eve.	Procyon rises.....	11 20 eve.
Mira (var.) rises.....	8 32 eve.	Regulus rises.....	1 27 mo.
Algol (var.) rises.....	1 10 mo.	Spica rises.....	6 04 mo.
7 stars (Pleiades) rise.....	6 18 eve.	Arcturus sets.....	7 29 eve.
Aldebaran rises.....	7 37 eve.	Antares sets.....	6 49 eve.
Capella in meridian.....	3 17 mo.	Vega sets.....	1 36 mo.
Rigel rises.....	9 44 eve.	Altair in meridian.....	5 52 eve.
Betelgeuse rises.....	9 29 eve.	Deneb in meridian.....	6 44 eve.
Sirius rises.....	11 45 eve.	Fomalhaut in meridian.....	8 57 eve.

REMARKS.

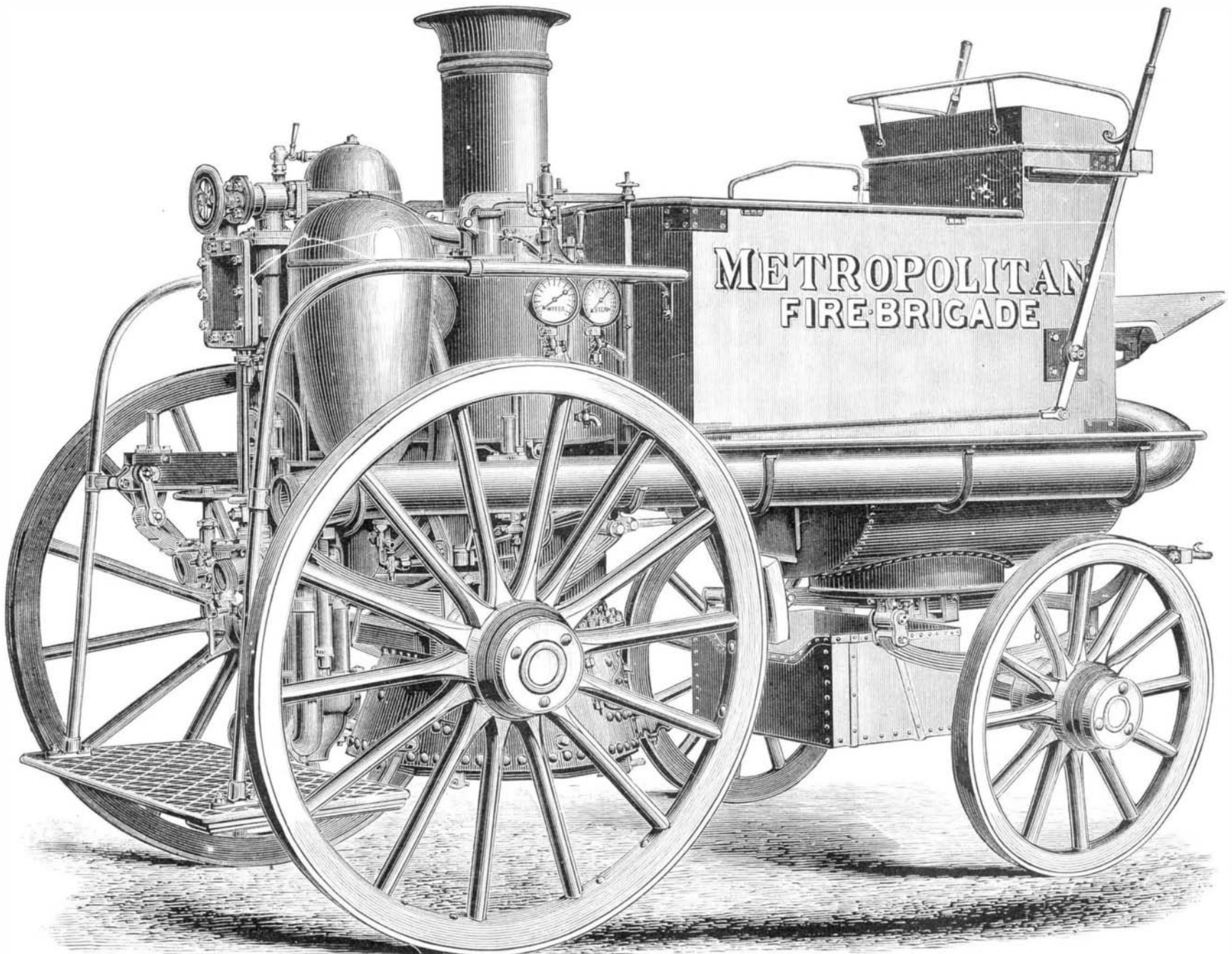
Venus and Mars will be near the moon October 25, Venus being 7° and Mars 6° north of the moon. They are in *Virgo*, near the middle of the constellation, being 5° northwest of Spica. Jupiter and Saturn are the only planets visible to the naked eye, which are at present favorably situated for observation. Jupiter will be at eastern quadrature October 21, being then 90° east of the sun. Uranus will be in conjunction with the moon October 21, being about 3° north.

ANSWERS TO CORRESPONDENTS.

F. V. Pike.—The amplitudes of the three stars which have been added to the above list since the amplitudes were published are: Fomalhaut, 41° 41m. 30 sec.—; Deneb, 68° 30m. 20 sec.—; Mira, 4° 39m. 57 sec.—. Jupiter retrograded from May 25 to September 23. Inquirer.—We have never witnessed an eclipse of one of Jupiter's satellites by another, and do not think such a phenomenon has ever been recorded, though it is possible.

Two Crops of Silk a Year.

Touching the reported improvement in the breeding of silkworms, whereby two broods a year are raised, Mr. J. J. Hessler, of Reading, Pa., informs us that it is an old practice, at least one that he has followed for many years. He has been in the business from childhood, he writes, and has always raised two yields in a year without any trouble.



IMPROVED STEAM FIRE ENGINE.