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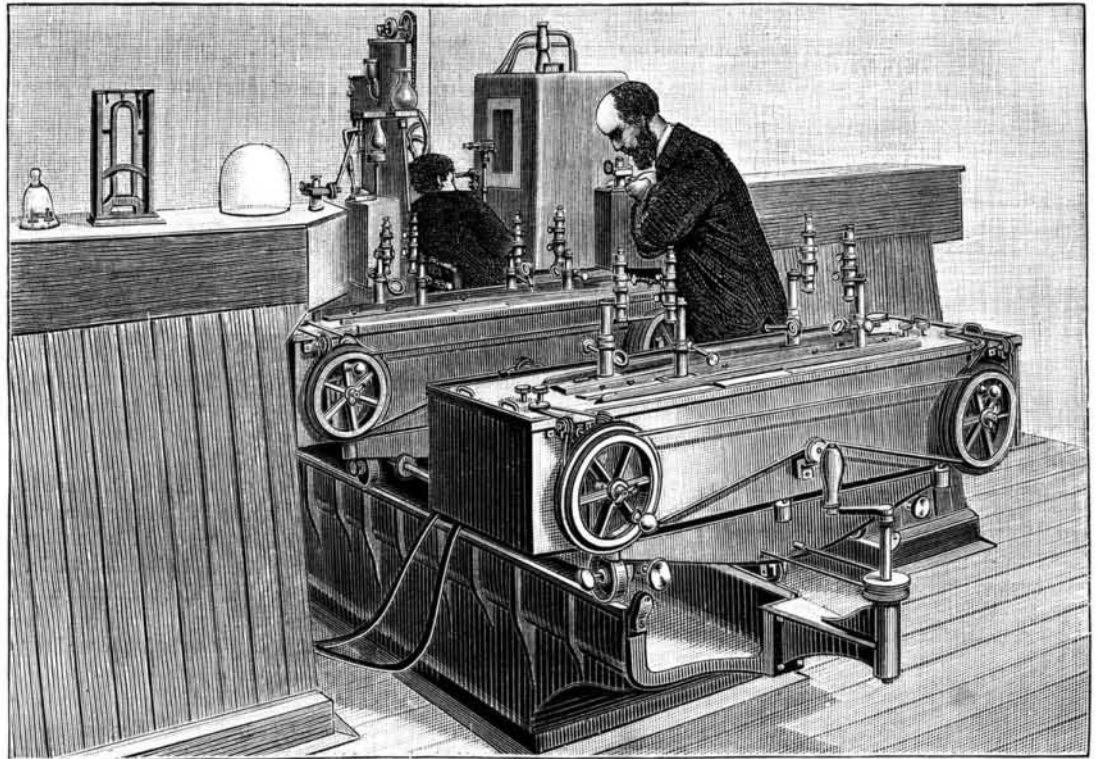
## BLAKE'S COMPOUND STEAM PUMPS.

We illustrate one of Blake's compound high and low pressure steam pumps, manufactured by Messrs. S. Owens & Co., of White Friars Street, London, E. C. It has been constructed for the Southwestern Railway Company of Russia, and is capable of forcing 4,500 gallons of water per hour to a height of 500 feet through 10,000 feet of piping, with a boiler pressure of 80 pounds to the square inch. Our cuts and description are from *Engineering*. As will be seen from the perspective view below, the two steam cylinders are arranged tandem wise, their diameters being 8 inches and 16 inches respectively, while their stroke is 24 inches. The low pressure cylinder has two piston rods, which pass through long passages cast on each side of the high pressure cylinder, so that all the glands are close together. The three rods take hold of a common crosshead to which the piston rod of the pump cylinder is connected. This cylinder is 5½ inches in diameter and is brass lined. Its valves are of gun metal and have spindles projecting upward and working in heavy gun metal caps, each of which contains a spring. The valves are faced with the best oil dressed hydraulic leather secured by a central screw, and they bear on flat faces five-eighths of an inch wide. The steam valves are operated from the crosshead through a rock shaft worked by a vibrating arm. Upon the rock shaft is a lever, which by means of a connecting rod moves a sliding block backward and forward between two tappets on the rod of the auxiliary valve. The office of this valve, as is well understood, is to control the admission and exhaustion of steam to and from the double pistons above it, which move the two main valves of the steam cylinders. The steam from the boiler is admitted to the interior of the valve of the high pressure cylinder, and after expansion it exhausts into the valve box and proceeds to the larger cyl-

inder, which has an ordinary D valve. The piston, which is shown nearly at the end of its stroke toward the right, is prevented from striking the covers by the use of supplementary exhaust passages, which can be more or less throttled at will. When the piston has covered the main exhaust

## THE OBSERVATORY OF THE INTERNATIONAL BUREAU OF WEIGHTS AND MEASURES.

As a consequence of an international convention held on the 20th of May, 1875, there has been created at Paris, says *La Nature*, an international bureau of weights and measures



INSTRUMENTS FOR MEASURING EXPANSION.—INTERNATIONAL OBSERVATORY FOR WEIGHTS AND MEASURES.

, the remainder of the steam is confined and a cushion luced.

he pump is provided with an independent air pump and lenser, which are shown beside it in the perspective r, while the condenser is to be seen in section in Fig. 3 re. The connections are very clearly shown in the rs; in the interior of the condenser hangs a copper float, irected by a rod to an air valve above it. When the in- of water to the condenser exceeds the amount removed he pump the ball rises and, opening the valve, destroys vacuum.

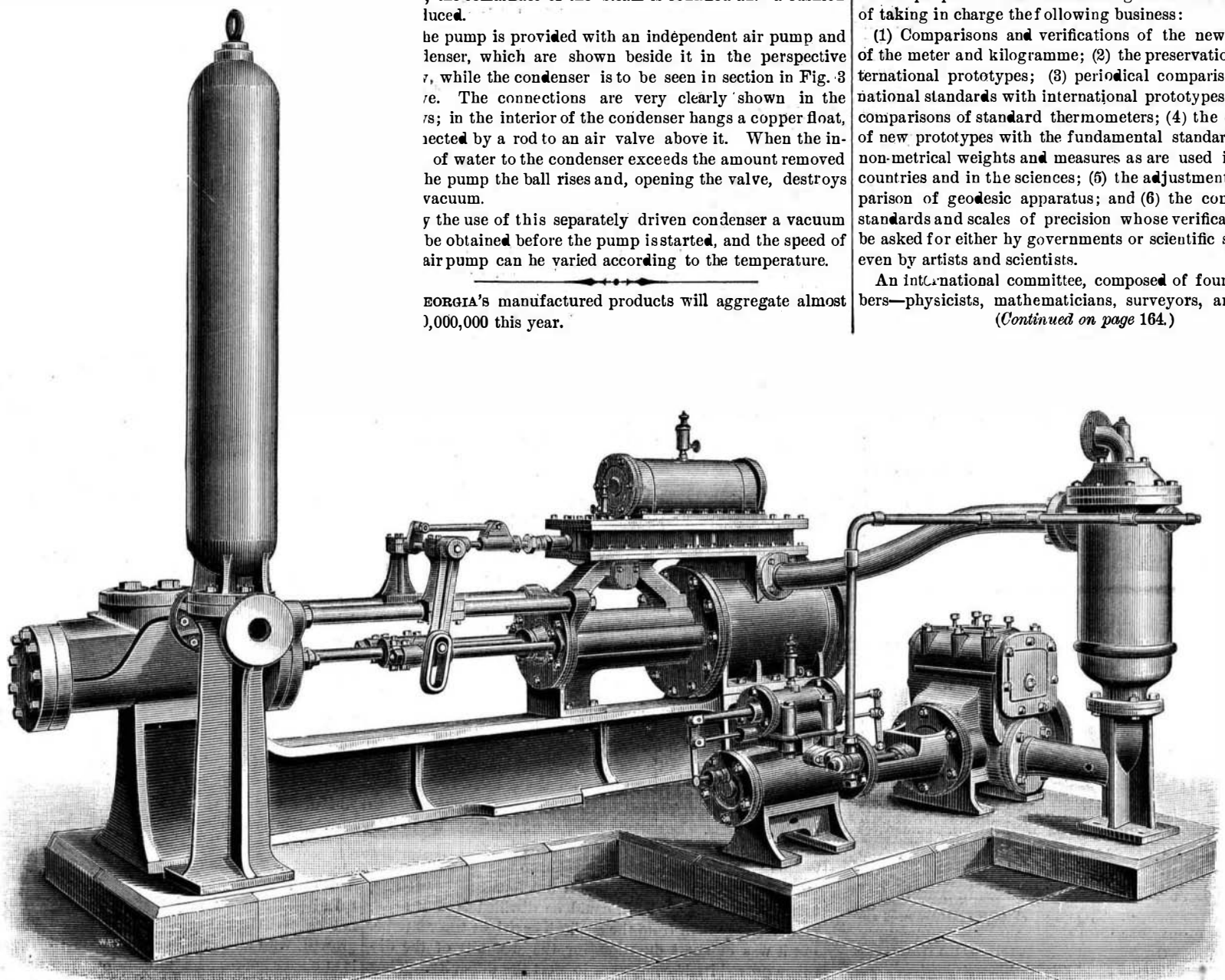
y the use of this separately driven condenser a vacuum be obtained before the pump is started, and the speed of air pump can be varied according to the temperature.

GEORGIA'S manufactured products will aggregate almost ,000,000 this year.

for the purpose of internationalizing the metric system, and of taking in charge the following business:

(1) Comparisons and verifications of the new prototypes of the meter and kilogramme; (2) the preservation of the international prototypes; (3) periodical comparisons of the national standards with international prototypes, as well as comparisons of standard thermometers; (4) the comparison of new prototypes with the fundamental standards of such non-metrical weights and measures as are used in different countries and in the sciences; (5) the adjustment and comparison of geodesic apparatus; and (6) the comparison of standards and scales of precision whose verification might be asked for either by governments or scientific societies, or even by artists and scientists.

An international committee, composed of fourteen members—physicists, mathematicians, surveyors, and astronomers—(Continued on page 164.)



COMPOUND BLAKE STEAM PUMP WITH CONDENSER.