and the heads themselves were eaten away at the places of contact. Thus, the coating of tin seems to be the best preservative of the tubes, and as no falling off of the vacuum took place from the lower conducting power of that metal, another example is brought forth to prove the statements made by Mr. Pirsson in regard to his condenser. (See *Jour. Frank. Inst.*, vol. xxxvi., 3d Series, page 234.)

COMMITTEE ON SCIENCE AND THE ARTS.

Report on J. W. Fawkes' Steam Plough.

The Committee on Science and the Arts constituted by the Franklin Institute of the State of Pennsylvania, for the promotion of the Mechanic Arts, to whom was referred for examination "a Steam Plough," invented by J. W. Fawkes, of Christiana, Lancaster Co., Pennsylvania,

REPORT:—That they have examined the machine and witnessed its operation in the field.

The plan of construction appears to be as simple as the case admits. A pair of horizontal engines connected on one shaft by cranks at right angles, propel the machine over the ground, by means of a double gearing, which reduce the velocity of the driving-wheel to one-sixth that of the cranks. The steam cylinders are 9 inches in diameter, and 15 inches length of stroke.

The driving-wheel is a strong drum, six feet in diameter, and six feet long; the large surface of which enables it to run on soft ground. The steering wheels are $3\frac{1}{2}$ feet diameter and 15 inches wide, and are placed 54 inches distant apart.

The axle on which they are placed is guided by a steering wheel geared into a tangent screw.

The ploughs, eight in number, are suspended by chains from a framed outrigger projecting in the rear of the machine, and can be raised entirely out of the ground, by chains working over small barrels, which can at will be connected to the engine by sliding clutches.

The arrangement of the ploughs is such as to allow them to follow in a regular succession at the proper lateral distance for the furrow.

When working at a speed of about three miles an hour, the eight furrows were turned with great ease and completeness. The work was not as smooth as to satisfy a Pennsylvania ploughman, owing to the form of the ploughs, which is such as is said to be preferred for breaking up prairie land, for which this machine is especially designed. It appears to be capable of breaking up land at the rate of three or four acres per hour.

In the opinion of the Committee, its great simplicity of plan and efficiency in working, entitle it to strong commendation, and make it worthy of the Scott's Legacy Medal, the award of which is accordingly recommended.

By order of the Committee,

Philadelphia, August 9, 1859.

WM. HAMILTON, *Actuary.*