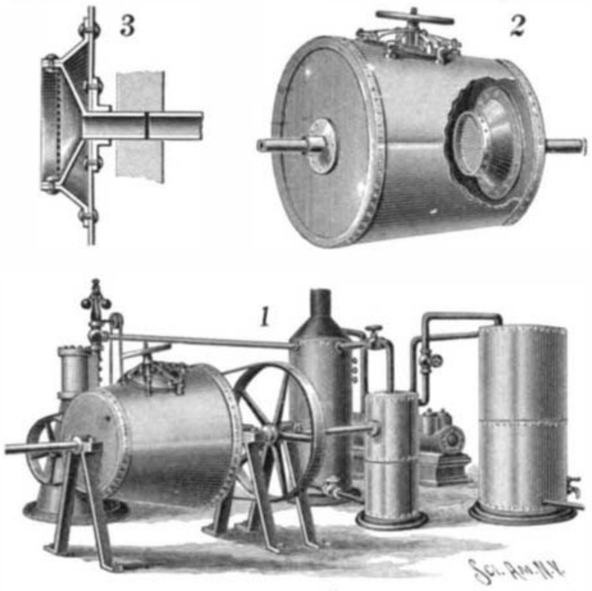
AN IMPROVEMENT IN DRIERS.

An invention has been patented by Mr. John Waterhouse, a consulting engineer of 71 Broadway, Manhattan, New York city, which provides a machine for drying meats, fruits, sand, and earthy matter containing precious metals or stones, by the use of heated compressed air.

Mr. Waterhouse employs an air-compressor which forces air to a receiver, water-jacketed to condense the moisture in the air. This dried air is passed through a valved pipe to a reheater in which a coiled pipe is arranged, connected at the upper end and lower ends



A DRIER FOR MEATS, SAND, FRUITS, ETC.

with a boiler, so that steam is constantly received from and returned to the boiler. After having been heated in its passage about the steam-coil, the air is conducted through a pipe connected with a tapered tumbler. As shown in Figs. 2 and 3, the tumbler is provided with hollow journals, one of which is connected with the pipe leading from the reheater and the other of which is joined to a discharge-pipe. In the smaller end of the tumbler is a funnel provided with a sieve. The material to be dried is poured into the tumbler through an opening which is closed by an air-tight cover held firmly in place by means of levers coacting with a handwheel. The tumbler is rotated by a driving-pulley connected by a belt with an engine. The boiler used for supplying steam to the heating coil drives this engine as well as the air-compressor.

The dry, heated air from the reheater enters the tumbler, absorbs the moisture in the material to be dried, carries it through the funnel-screen, and into the discharge-pipe. When ore-bearing sands are to be tried, and the moisture has been sufficiently removed, the earth and fine sand are blown out, leaving the heavier metal behind. The drier, it is evident, can be used in removing the moisture from almost every kind of material.

EXPERIMENTAL TRAIN FOR TESTING ATMOSPHERIC RESISTANCE.

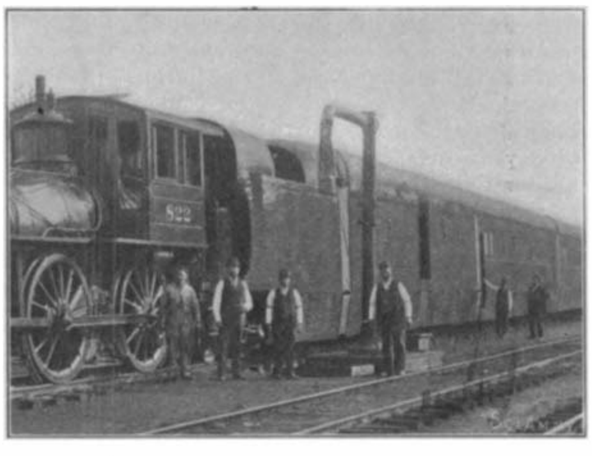
The Baltimore and Ohio Railroad Company is engaged in a series of experiments upon the atmospheric resistance to railroad trains, which cannot fail to throw considerable light upon a little understood and too much neglected problem. The special train of six cars shown in our illustration has been "sheathed" and otherwise altered, under the plans and directions of Frederick U. Adams, and on Saturday, May 26, it made an experimental run from Baltimore to Washington, which in respect of speeds attained, relative to the grades and curvatures and the relative weight of engine to train, is the most remarkable on record.

The Adams theory of train resistance has been explained and a description of his train given in previous numbers of the SCIENTIFIC AMERICAN. Briefly stated, Mr. Adams contends that the pressure of the atmosphere, due to the speed of the train, constitutes the greatest form of resistance at all velocities exceeding forty miles an hour, and that this friction steadily increases as the square of the velocity. The sheathed train is built with the view to reduce the number of surfaces and projections, such as car ends, trucks, ventilators, etc., which serve to hold the air and oppose the free passage of the train through the atmosphere. It is argued that after the locomotive has opened up a path, as it were, for the train, the roof and sides of the latter should be as smooth and continuous as possible, with a view to reducing what might be called the "skin-friction" to a minimum, the train sheltering behind the engine as a bicyclist behind his pacing machine. The trial train is made up of six passenger coaches, such as are used on suburban service. They are provided with four-wheeled trucks, 33-inch cast iron wheels and 3¾-inch journals—not an ideal equipment as compared with the standard six-wheeled truck, with 36-inch turned wheels with axles running on 4¾-inch journals. The total weight of the train, exclusive of engine and tender, was 325,500 pounds. With the passengers carried on the Baltimore-Washington test, the weight of the train was about 170 tons.

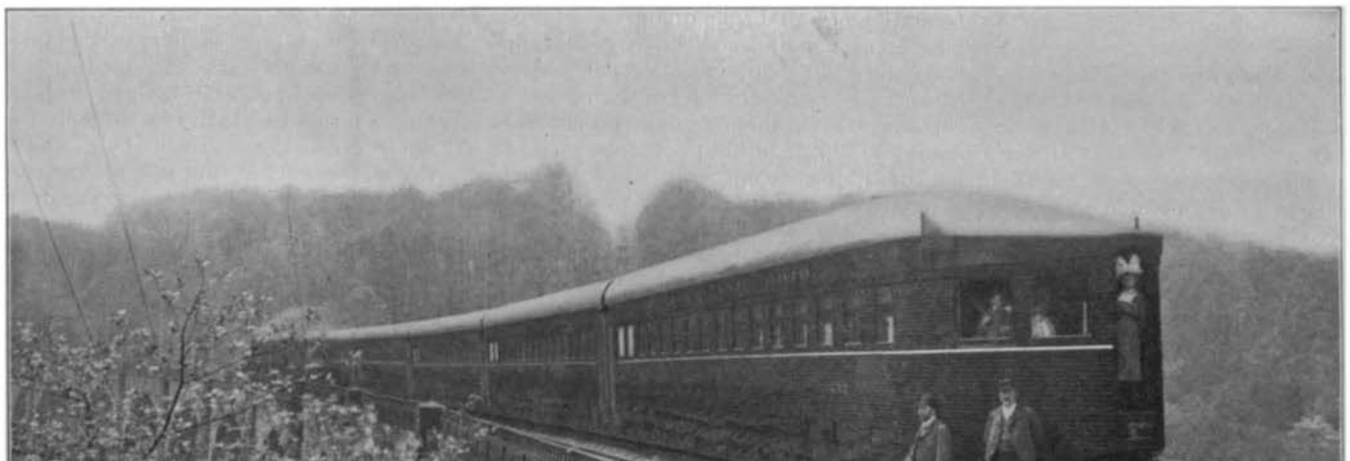
In preparation for the test all external obstructions have been removed from the train. The roofs of the cars are arched; the windows set out flush with the sides of the cars; and the sheathing is laid lengthwise instead of perpendicular as in other cars. The sheathing extends down to within eight inches of the track and completely houses the trucks. Suitable openings permit access to the axle boxes, and a sliding door leads into the substructure at opposite sides of the car center. When the cars are coupled, two diaphragms meet and inclose the space between the cars, from edge to edge of the roof line. The platform doors consist of roller curtains which drop to the steps and are flush with the sides. Flexible spring curtains complete the vestibule from the roof to the bottom of the car. When the train is coupled, it presents the appearance of one long, sinuous and flexible car. The tender is of peculiar construction, and continues the unbroken line from the engine cab to the baggage car, to which it is vestibuled. In its entire construction the train complies with the varied demands of practical operation. While the plans call for the partial sheathing of the locomotive, it was decided to make the first tests with remodeled cars only, in order to prove how far the existing system of car construction is responsible for the atmospheric resistance of trains.

It is 40 miles from Camden Station, Baltimore, to the depot sheds at Washington. For two miles out of Baltimore the curves and switches and the city ordinances prescribe a low speed. The same is true of the two miles into Washington. At Relay, nine miles from Baltimore, there is a curved viaduct which must be crossed at a speed not exceeding 20 miles an hour. For the entire distance there is no tangent equal to 2½ miles in length. The road-bed is in first-class condition, but the conditions named should prevent any phenomenal running. The best time which had previously been made on this line was a few seconds less than 39 minutes, on which occasion the train consisted of four Pullman cars hauled by engine No. 1313, weight about 85 tons, carrying 190 pounds of steam, and rated as the fastest and most powerful passenger engine belonging to the company. The time was taken from a running start at May Street, and very fast time was made through the city limits.

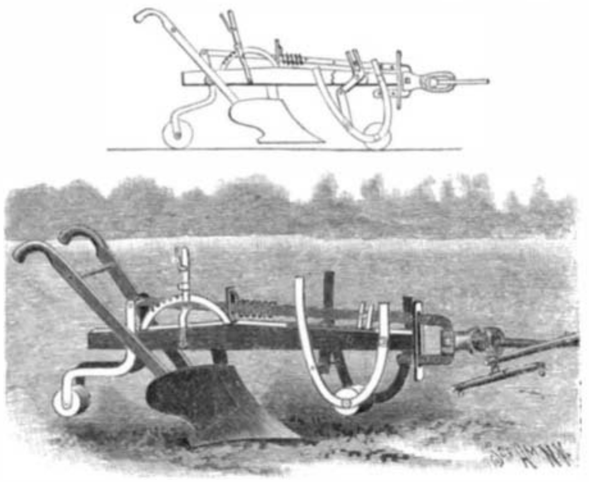
The sheathed train, consisting of six cars and hauled by an engine weighing 57 tons, made this run in 37 minutes and 30 seconds. One mile was made in 40 seconds, and two miles in 81 seconds. From Beltville to College, a distance of 4½ miles, the time was 3 minutes and 10 seconds, a sustained speed of 85 miles an hour. By far the most remarkable run, however, was from Annapolis Junction to Trinidad, a distance of 20·1 miles in 15 minutes and 20 seconds, at an average speed of 78·6 miles an hour. The first seven miles of this run was up a grade of from 25 to 55 feet to the mile, and it was covered in a fraction over 6 minutes; while the last 5 miles on the down grade from Alexander Junction to Trinidad was covered in 2 minutes and 55 seconds, a speed of 102·8 miles an hour. The locomotive has cylinders 20×24, with four coupled 78-inch drivers. The boiler carried 165 pounds of steam. With ordinary firing the steam never dropped below 160 pounds during the entire run.



SHEATHING AND VESTIBULE CONNECTION OF TENDER



EXPERIMENTAL SHEATHED TRAIN FOR TESTING THE ATMOSPHERIC RESISTANCE.



JONES' PLOW.

NEW PLOW ATTACHMENT.

To prevent a plow from jumping out of a furrow, Mr. John E. Jones, of North Bridgewater, N. Y., has devised the attachment pictured in the accompanying engraving. The attachment comprises a frame having two U-shaped side pieces, the forward arms of which are pivoted to the plow-beam, and the rear ends of which engage and slide against the sides of the beam. A roller is journaled in these side-pieces. A frame is mounted to swing on the rear portion of the plow-beam, and is likewise provided with a roller. The two frames are simultaneously operated by a draw-bar connected with the frames in the manner shown. A shifting-lever is pivoted to the draw-bar and to the plow-beam to lower the rollers by hand.

The rear roller follows the bottom of the furrow, thus affording more leverage and solidity to the rear end of the plow than usual, and preventing any tendency of the share to jump when the point strikes an obstruction. But should the plow by any means become displaced, the draft-team is merely backed so that the draw-bar is spring-pressed and pushed to the rear, whereby both rollers are lowered, as shown in our small diagram; it is therefore unnecessary to pull the plow back by hand. When it is desired to draw the implement along without plowing, the rollers are lowered by means of the shifting-lever. The depth of the furrow can be regulated by means of the shifting-lever and by adjusting the front end of the draw-bar.

The pole is connected with the draw-bar by a universal joint. The inventor has subjected his plow to very severe tests, with gratifying results.