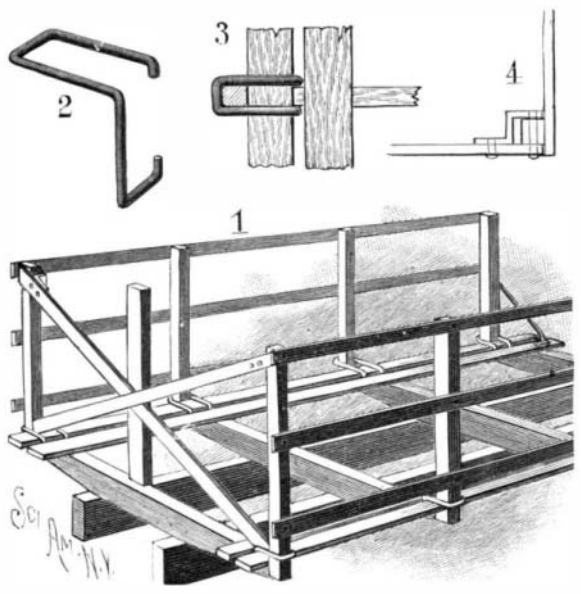
A NEW HAY OR GRAIN RACK.

A patent has been granted to John W. Bruns, of Westgate, Iowa, for a simple and strong box-rack which may be readily attached to or removed from the ordinary bed-rack of a hay or grain wagon, without employing bolts or screws.

Fig. 1 is a perspective view of the rack; Fig. 2 is a perspective view of a removable socket-loop employed; Fig. 3 is a section taken near the bottom of one of the uprights; Fig. 4 is a detail, showing the means for attaching the upper ends of the front braces.



BRUNS' HAY OR GRAIN RACK.

The rack is provided with the usual sills, crossbeams, and longitudinal strips, placed upon the crossbeams at the ends. In order to hold the uprights of the vertical side-racks in place, socket-loops of the general form shown in Fig. 2 are employed, which loops embrace the uprights and bind the crossbeams, longitudinal strips and uprights firmly together. The socket-loops are easily removed or placed in position, and form a keeper for the uprights when in position.

The side-racks are braced at the front by crossed brace-bars secured to the upper ends of the front uprights by pins passing through the braces, through the uprights, and through metal straps attached to the braces (Fig. 4). The lower ends of the braces are secured to the crossbeams and longitudinal strips, also by pins. Short brace-rods support the rear ends of the side-racks, but do not interfere with the loading of the rack.

THE NEW LOCOMOTIVES FOR THE MIDLAND RAILWAY.

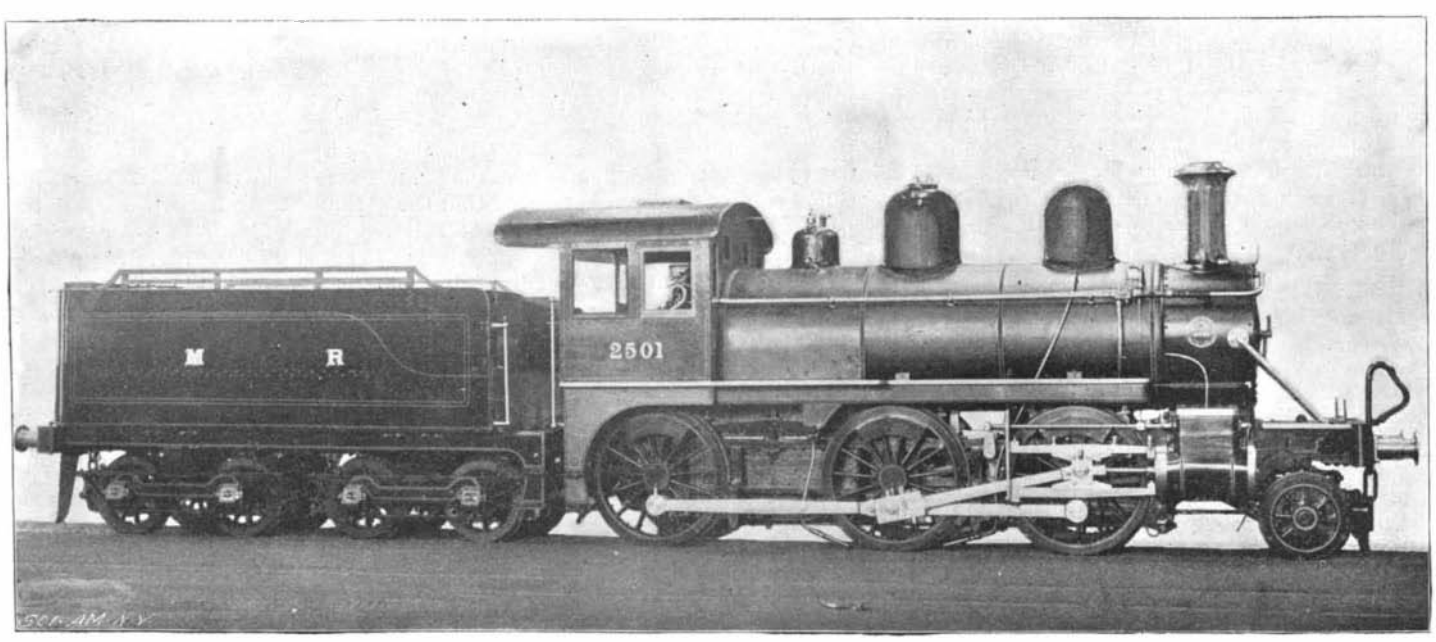
The accompanying photograph of the first of the twenty locomotives ordered by the Midland Railway, England, from the Baldwin Locomotive Works, is of special interest. It is the first standard gage locomotive to be built in this country for the regular service of an English railroad, and unless the present signs are deceptive it will prove to be the introduction to an extensive trade in this direction. American machine tools have already established themselves in the good opinion of the English engineers, and the same qualities for handiness and low cost will probably win for the American locomotive a similar recognition. At any rate, the forty locomotives now building for the Midland and Great Northern railways will have an opportunity to show what they can do in competition with the standard freight locomotives of English make, and the test will be made on a fair field and with no favor.

As will be seen from the cut, these engines differ very slightly in appearance from a standard American mogul, the only discernible difference being the absence of the bell and pilot. The former is not used on English roads and the latter is replaced by two vertical guards, one over each rail just in front of the leading wheels. As the English do not use the single central coupling, it was necessary to attach the twin "buffers" which will be noticed on the front and rear of the engine. Other minor differences are the brass top on the smokestack and the use of the Gresham steam sander in front of and behind the main drivers. The front sander connects with a sand-box on the top of the boiler and the other with a smaller sand-box located beneath the running-board.

The really radical difference from American practice is in the firebox, which together with the stay-bolts is made of copper. It is the practically universal English custom to use copper for these parts because of its durability, but its greater cost goes to offset this advantage, and is one of the causes of the increased cost of the English machine. The customary screw reversing gear is replaced by the lever, and to compensate for the absence of water scoops the tank will be of unusual capacity.

The leading dimensions are as follows: Cylinders, 18 inches diameter by 24 inches stroke; wheels, 60 inches diameter; weight on drivers, 83,100 pounds; on truck, 17,150 pounds; total for engine, 100,250 pounds; total for engine and tender, 179,550 pounds; heating surface, firebox, 120 square feet; tubes, 1,246 square feet; total, 1,366 square feet; grate area, 16·7 square feet; boiler pressure, 180 pounds per square inch.

The most striking features to English eyes will be the roomy and comfortable cab, and the method of carrying the tender on two trucks, the custom being to use six wheels on rigid axles. The cab will be certain to commend itself to "engine drivers," as they are called on the other side, especially during the severe and stormy weather to which the railroads which run to the North from London are liable to be exposed in the winter months.



THE NEW LOCOMOTIVES FOR THE MIDLAND RAILWAY.

The Bacteriology of Rum.

It might be thought impossible on the face of it that there could be any bacteriology of rum, seeing that it contains nearly 75 per cent of alcohol; but according to the results of a very interesting investigation recently made by Mr. V. H. Veley, M.A., F.R.S., of Oxford University, and his wife, there does exists an organism in rum which accounts for an apparent disease to which it is liable at times and which is known in the trade as "faultiness." The cause of this disease has long been unexplained, for it has never occurred to those concerned that it could be due to a microbe, especially as the strength of the spirit is only 25 per cent short of pure alcohol. The "faultiness" of rum is at once obvious when the spirit is diluted with an equal bulk of water, the diluted liquid either immediately or after some hours becoming cloudy and depositing on longer standing a more or less copious precipitate or showing the presence in greater or less abundance of floating flocculencies. The micrococcus which has been isolated and identified as the cause of "faultiness" is a very interesting organism. It does not, however, appear to be pathogenic or toxic according to the results of inoculating a guinea-pig. Its survival in spirit—that is, in a liquid which has hitherto been considered to be one of the best materials for preserving anatomical specimens — is remarkable. Strictly speaking, however, the organism does not flourish in alcohol, but "in its gelatinous envelope, thus living as it were in a state of siege in its own castle, through the walls of which it can obtain its necessary supplies of food in the form of sugar while keeping out its enemy alcohol." No definite information has been obtained as to the original habitation of this peculiar micro-organism. The discoverers of this new micro-organism propose to call it provisionally Coleothrix methystes, from κολεός (a sheath) and μεθυστής (a drunkard)—a name ingeniously suggested by a fellow of Corpus Christi College.—Lancet.

AN AUTOMATIC SAFETY APPLIANCE FOR RAILROADS.

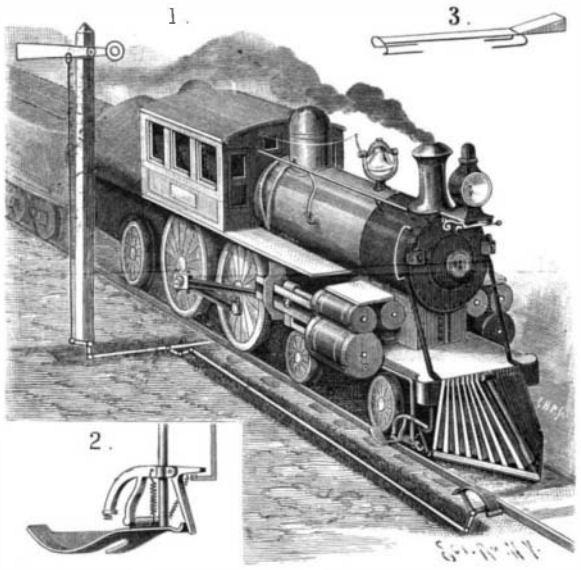
An invention has been patented by Gideon S. Jeffries, of Reading, Pa., by means of which the application of the air brakes of a train can be controlled independently of the engineer, the invention providing means whereby a device operated upon by an obstruction on the track opens a vent in the train-pipe and permits the air to escape to set the brakes.

Fig. 1 shows the invention applied to a locomotive and used in connection with a semaphore arm. Fig. 2 is a detail perspective view of the device carried by the locomotive. Fig. 3 is a perspective view of an obstruction for application to the rail.

The air-brakes can be applied either by an obstruction of the type shown in Fig. 3, or by means of an arched plate operated in conjunction with the semaphore signal.

The train-pipe is connected with the air-brake system and is braced to the truck of the pony-wheels. A bracket is secured to the train-pipe, which bracket has a supporting arm to which a lever is pivoted. This lever is provided with a valve controlling a vent in the train-pipe, and is tilted by the obstruction on the track to open the vent in order to apply the brakes. A latch is provided which holds the lever in the position to which it has been tilted. In rear of the supporting-arm carrying the lever, a downwardly-curved arm depends, provided with a spring to form a yielding abutment to cushion the lever when operated by the obstruction. The latch which holds the lever in tilted position is released by an arm operated from the locomotive cab and is actuated by a spring to force it down upon the lever, another spring connecting the lever with the bracket acting to readjust the lever.

If the various parts be in the position shown in Figs. 1 and 2, the pressure in the train-pipe will be retained and the brakes will not be set. But if the obstruction shown in Fig. 3 be placed upon the track, or the arched



JEFFRIES' SAFETY APPLIANCE FOR RAILROADS.

plate connected with the semaphore be lifted alongside the rail, the lever will be tilted as it passes over the obstruction, and the latch will be forced by its spring into engagement with a seat on the forward end of the lever. In this position of the parts the vent in the train pipe will be open and the brakes will be set. The parts may be readjusted by the engineer to the positions shown, by operating the connections which control the arm of the latch, the lever being forced by its spring to its normal position, so that the vent will be closed.

The device, besides being simple in construction, positive in action, and operating to hold the train-pipe open as long as desired, possesses the merit of being readily applied to any locomotive.

M. Secretan, of Paris, the owner of the famous Secretan collection which was dispersed some years ago, is dead. After having made a large fortune in copper, he lost his fortune and his collection was sold. He was the owner of Millet's "Angelus," which sold for $110,000.