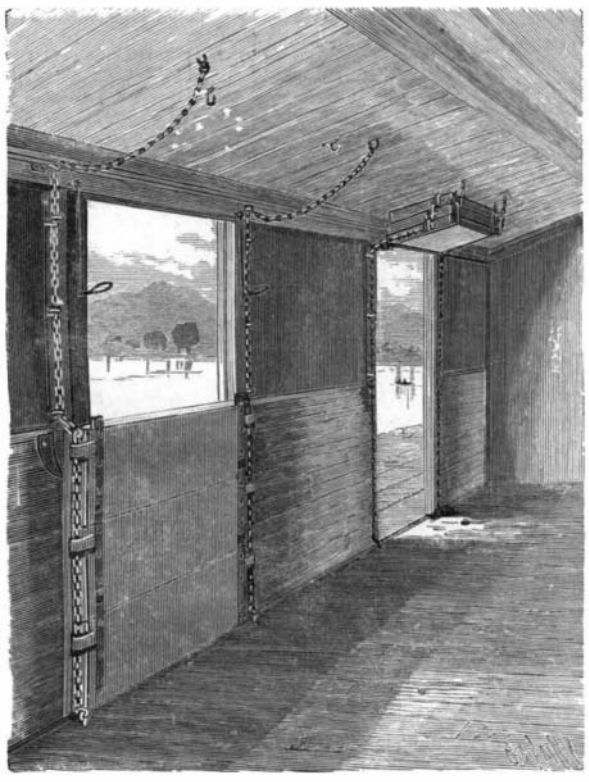
the channels of a headpiece. The spring-fingers are adapted to hold the nail firmly against the end of this channeled head. The extremities of the spring-fingers are so formed as to readily receive the nail and permit of the withdrawal of the instrument after the nail has been partly driven. A patent for this device has been recently granted to Mr. Frank Boelk, of Walton, Minn.

IMPROVED GRAIN DOOR.

It is found necessary in railroad transportation of grain that the freight cars be provided with an inner or auxiliary door to form an extra tight closure and



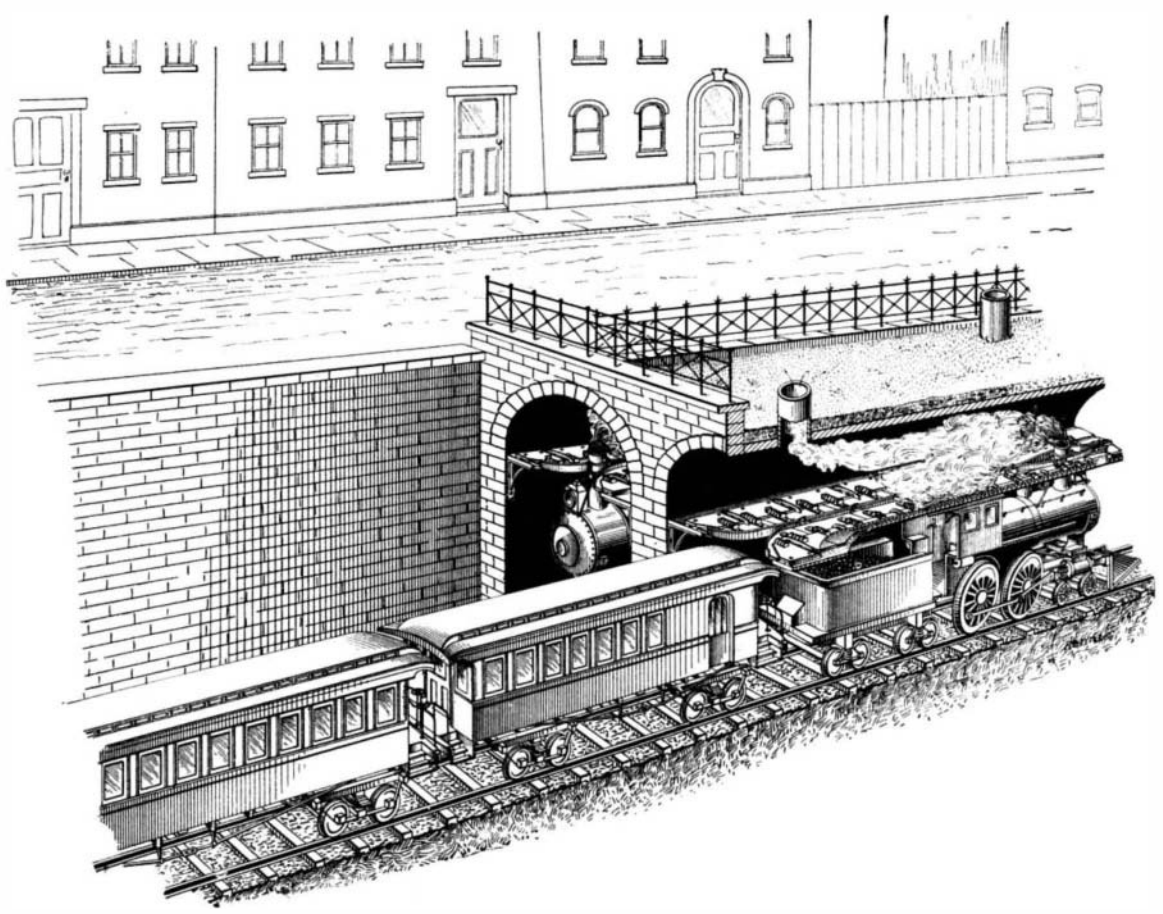
IMPROVED GRAIN DOOR.

prevent leakage of the grain. A door of this sort is provided by the recent invention of Mr. Alva T. Stark, of Geneva, N. Y. This door is composed of several sections or panels, which may be secured collectively or separately in a great variety of positions, or if desired, they may be folded up under the roof of the car, thus offering no obstruction to the door opening. Our illustration shows one of these doors in the lowest closed position and the other folded up and out of the way. The panels, which are preferably made of wood, are provided with vertical grooves at each end in which lock-plates are fitted. These lock-plates project above their respective panels, so that the upper ends of one pair of lock-plates will engage the lower ends of the grooves of the panel just above. Thus a tight connection is afforded and the grain is effectively retained. At each side of the car door is a chain, which is fastened at one end to an eye-bolt in the floor and at the other to the ceiling. The chains are provided at regular intervals with eyes which are adapted to engage hooks at each side of the door. The lock-plates on the panels are provided with guides, which loosely receive the chains and are thus held against the door posts. In order to hold the panels in the closed position indicated, it is merely necessary to draw the chains tightly and hook them onto the first hook above the highest panel, thus firmly locking the door in place. When loading or unloading the car, if it be desired to decrease the height of the door, this may be readily done. The uppermost panel is raised to the required height and locked in this position by the chains, which are hooked on the proper hooks above and below the lock-plates. When desired the next panel can be similarly raised and held, or all three of the panels may be lifted from the floor so as to facilitate the discharging of the cargo into chutes or hoppers. Pivotally fastened to the framing of the car at the top of the doorway are two arms which terminate in laterally bent eyes. These arms serve to hold the sections of the grain door in their folded position against the roof of the car, as shown at the rear in our illustration. It will be observed that when thus folded the panels all lie above the door opening and the door offers no incumbrance to the loading and unloading of the car.

SYSTEM FOR VENTILATING TUNNELS.

The main objection to crowded steam railway tunnels—an objection which was strongly emphasized by a recent disaster in New York city—is the lack of proper ventilation. Steam and smoke obscure the danger signals, thus endangering the lives on the train, and the air is vitiated by the cinders and gases so that all windows and doors must be closed—obviously a great annoyance to passengers in summer weather. Mr. John Kress, a citizen of New Rochelle, N. Y., who has daily experienced these annoying conditions, has suggested a novel method of avoiding this smoke nuisance. Since all the objectionable gases come from the smokestack, he proposes to provide a separate tunnel for the smokestack to discharge into, thus leaving the air in the main tunnel pure and uncontaminated. To this end Mr. Kress has invented the arrangement shown in our illustration. The tunnel is divided longitudinally into an upper and lower portion by a horizontal partition. This partition, which is placed at a sufficient height to clear the top of the cars, is made of two sections, which are supported by brackets on the side walls of the tunnel. Each section comprises two stationary plates, between which a series of spring-cushioned slide plates are adapted to slide. these slide-plates are provided with contact flange sections, which are interlocked with each other, so as to permit a slight play whereby an individual flange may be sprung out of its normal position without interfering with the positions of the adjacent flanges. The contact flanges of each section meet along the center line of the partition except at the ends of the tunnel, where, together with the slide-plates, they are rounded off to facilitate the entrance of the smokestack of the locomotive. The smokestack of the locomotive is provided with an extension piece fastened thereto and securely braced, which is adapted to pass in between the contact flanges. Friction bands on this extension piece serve to take up all wear from the friction of the flanges. As the smokestack passes along the flanges, the sections yield successively before the advance of the stack, but close up immediately after the transit of the same. Thus only a small elongated opening is left between the two divisions of the panel and all the smoke is confined to the upper division, whence it is drawn off by suitable ventilators, as shown, while the cinders which collect on the guide plates can be swept off from time to time into chutes at the sides of the tunnel. The air in the lower portion of the tunnel, therefore, remains pure, and there is no necessity of closing doors and windows of the cars in hot, stifling weather.

N. W. Gales, of Waterloo, Iowa, has perfected an improved disk for use in cream separators which greatly increases the efficiency of the machine. The disk instead of being plain is corrugated, and this is the essential part of the improvement. He has recently sold the right to manufacture this disk to the Clinton Separator and Engine Company for the sum of $83,000.

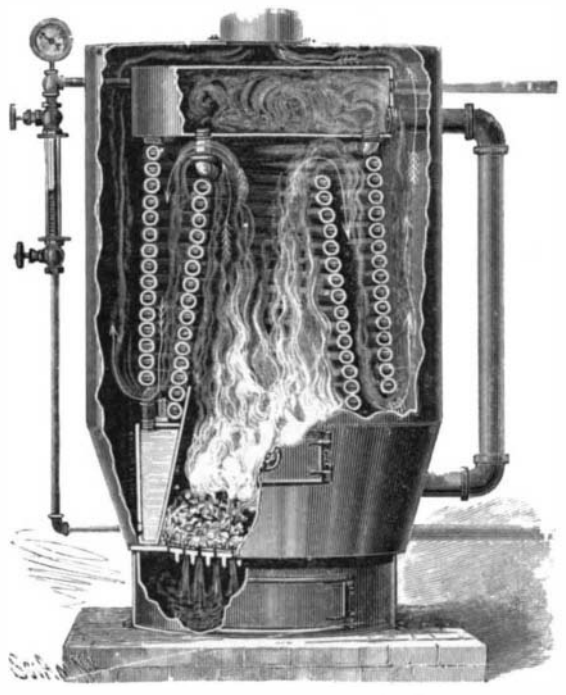


SYSTEM FOR VENTILATING TUNNELS.

HEATER AND BOILER.

An improved form of hot-water heater, which may be readily converted into a steam boiler, has recently been invented by Mr. Nathaniel B. Wales, of Braintree, Mass. The heater combines a great heating surface, a complete utilization of the products of combustion, and a simplicity of construction which obviates all danger of leakage.

The peculiar construction is clearly illustrated in the engraving, which shows the main casing partly broken away to expose the interior details. It will be noticed that the firebox is surrounded by a water chamber from which two frusto-conical coils of tubing extend upward. These tubes connect the water chamber with an upper chamber at the top of the heater. The



HEATER AND BOILER.

several turns of tubing in each coil are laid in close contact with each other, so as to form walls for guiding the passage of the hot gases from the firebox. As indicated by the arrows, the gases are forced to pass through the top of the inner coil, over the same, and down between the two coils, whence they pass out under the outer coil into the main casing of the boiler and up through the chimney. Thus it will be seen that the heat of the gases is utilized to the greatest possible extent. The inclined walls of the firebox and the coils afford a much more effective heating surface than if these walls were perpendicular. A feed, blow-off and water-return pipe enters the water chamber near the bottom, while a water-circulating pipe provides an outlet for the upper chamber.

Such is the arrangement when the invention is used as a heater, but the same construction may be used as an ordinary steam boiler by simply adding the usual steam and water gages, the pressure gage and a circulation pipe connecting the water chamber with the upper chamber. The upper chamber now serves as a steam drum, and the water level would be between the upper turn of the inner coil and this drum. The water-circulating pipe now serves as a supply pipe for the steam. All connections between the coil tubes and the iron castings are made with brass unions, so that the parts may be readily taken apart when desired, and there are no joints to spring and cause leaks.

At Westfield, Chautauqua county, N. Y., the remains of a great mastodon were unearthed. Various bones among which are the following, were found: Shoulder blade, with socket for articulation of foreleg; hip bone; section of spinal column containing four vertebræ; sections of both extremities of spinal column; knee cap, nine ribs and some other bones. The ribs are 4 feet 3 inches long and 4 inches wide. Two mastodon skeletons have been previously found in this county, one at Sheridan and one at Jamestown, but both in an advanced stage of decay.