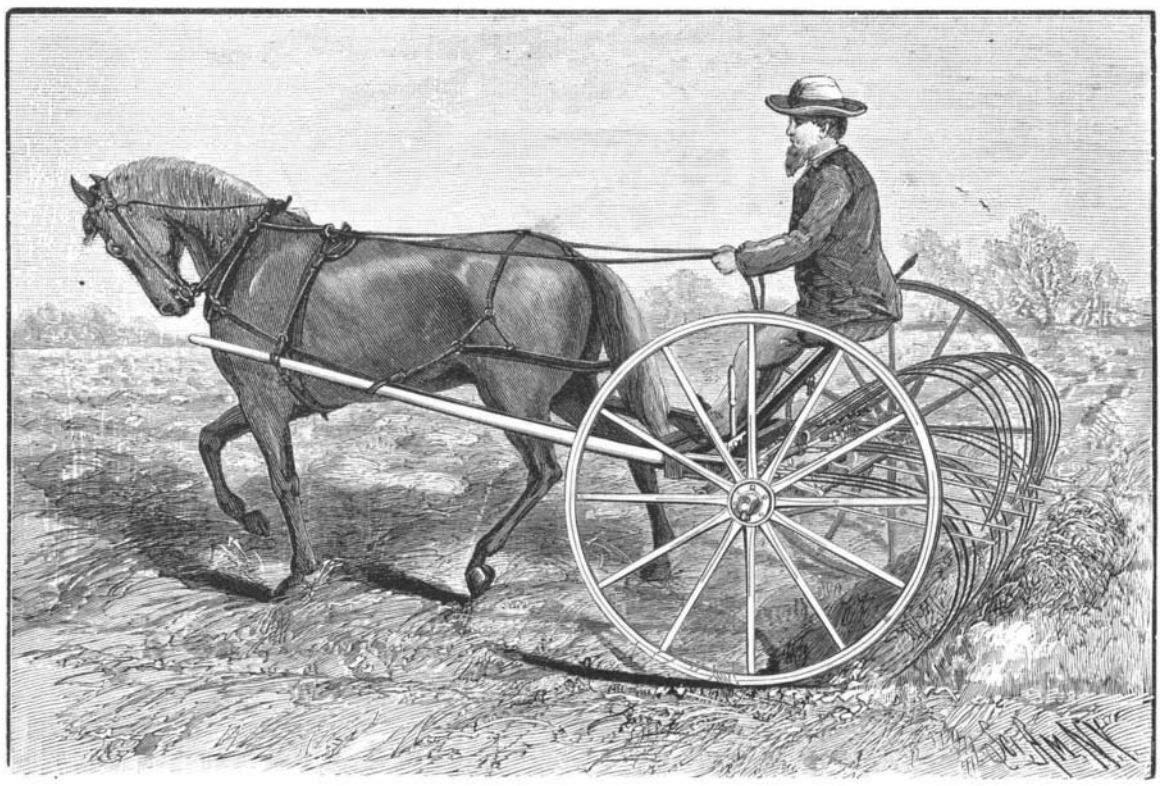
A COMBINED HAY RAKE AND TEDDER.

A machine which may be changed, at will, either to rake or ted hay, which is also light-running, without cog gearing, springs, and other unnecessary parts, and which the driver can change, as desired, from one service to the other without leaving his seat, has been patented by Messrs. Israel L. Landis and Albert and Anthony Iske, and is shown in the accompanying illustrations, one view representing the work of tedding, and the other of raking hay. The frame or truck has hangers in which is journaled the main axle, one of its wheels having a pawl lever engaging a ratchet on the shaft, to rotate it when the machine is moving forward, but allow the shaft to remain idle when backing, to prevent unnecessary turning of the tedding teeth. The pawl lever is allowed to spring laterally, and is moved back of a pin fixed to one of the spokes of the wheel to disengage the pawl when the machine is used as a rake, and adjusted front of the pin when used as a tedder. The tedding or rake teeth are arranged in sets, clamped between heads, preferably made of cast metal and semi-cylindrically recessed to set over a parallel shaft having bearings in the main frame, and turn partially thereon independent of each other. The lower portions of the heads have rearward cam projections and forwardly projecting lips, the cam extensions on the heads engaging arms on the main shaft to operate the sections alternately when the machine is employed as a tedder, but clearing the arms when the machine is doing raking duty. The main shaft has an adjustable collar, by means of which the longitudinal movement of the frame may be limited so as to bring the tappet arms into range with the respective cams, this being accomplished by a lever near the front of the main frame, while a foot rest or lock frame is provided with detents by which the lever is held in position, as the machine may be used for a rake or tedder. A lever with its handle near the driver's seat can be operated to raise the rake teeth, being connected with a longitudinal bar to hold the rake teeth to move simultaneously when desired, the bar having a weighted lever under control of the driver by which it may be operated to set and unset the rakes. A transverse bar carries clearing arms which extend rearwardly between the rake teeth, and this bar may be clamped to hold the clearing fingers at any desired inclination. The driver's seat is pivoted, and has a slotted shank which is adjustably secured to an inclined standard. The operating hand lever is used for raising and depressing the rake teeth, to gather the hay on the forks and deposit it in windrows, and in the upper head of each rake or tedder section is a spring to keep the rake teeth yieldingly down to their work. As a tedder, the machine is designed to slowly and effectually turn the hay over, separating the bunches so as to permit a free circulation of air through all parts, and facilitate its proper drying.



LANDIS COMBINED RAKE AND TEDDER—TEDDING THE HAY.

For further information relative to this invention address Mr. Israel L. Landis, Lancaster, Pa.

A Horse in Spectacles.

In the last issue of the SCIENTIFIC AMERICAN we published an account of the experiment of fitting spectacles to a short-sighted horse, in England, which had proved satisfactory, and now we have to record a similar experiment by a farmer up in Connecticut. A contemporary thus describes it:

A horse with goggles was one of the attractions at Bridgeport, Conn., a short time ago. The Manlius farmer who owned him said he discovered recently that the animal was very near-sighted, and an oculist took the necessary measurements, and, sending to New York, had a pair of concave spectacles made expressly for Dobbin. When the farmer tried them for the first time, the horse appeared to be startled, but recovering from his surprise, manifested every symptom of pleasure. They are made so as to be firmly fastened in the headstall, and cannot be worn without that piece of harness. "When I turn him out to pasture," said the farmer, "he feels uneasy and uncomfortable without his goggles, and last Sunday he hung around the barn and whinnied so plaintive like that I took out the bit and put the headstall and goggles on him, and he was so glad that he rubbed my shoulders with his nose. Then he kicked up his heels and danced down to the pasture. You ought to have seen him. I hate to let him wear specs all the time, though, for fear he will break them."

LANDIS COMBINED RAKE AND TEDDER—RAKING THE HAY.

Aluminum Bronze for Cannons and Machinery.

The extraordinary properties possessed by the aluminum alloys has for upward of a year been a subject of frequent comment. It has been suggested as a material for structures in which lightness was to be combined with strength. Recently some tests under government auspices have been made at the Watertown arsenal by the testing machine illustrated in our last issue. The alloy tested was aluminum bronze, a compound characterized by the presence of copper and aluminum. The former metal forms by far the largest portion. The tests were applied to the grade known as A 3. One sample cast in sand gave a tensile strength of 53,000 lb. to the square inch, and an elongation of 6·2 per cent before breaking. Another sample of the same metal cast in chilled moulds resisted a strain of 67,000 lb. before giving way. The elongation was 13 per cent.

These very extraordinary figures appear so favorable in comparison with steel that the new aluminum copper alloy may be adopted in the construction of machinery for the vessels of the navy. While it is true that the cost per pound of the bronze exceeds that of steel, the fact that intricate castings can be made from it counterbalances the item of greater first cost. The expense incident to forging and shaping steel will be largely saved.

But it is not only for machinery that there is an outlook for the bronze. It may yet prove the solver of the problems involved in the construction of large cannon. In spite of the work done by Krupp, Armstrong, Whitworth, and De Bange, the construction of heavy ordnance has not yet been brought to perfection. The tendency is to construct built-up cannon. But these inevitably involve elements of weakness. The jars and heating to which they are subjected strain their many joints. In service, large pieces of this construction have always proved wanting. A cast metal gun, if the metal possessed the proper qualities, would seem the perfection of ordnance.

In aluminum bronze it is possible that this metal may be found. It was the subject of a recent lecture at Annapolis, by Mr. A. H. Cowles. He began by alluding to experiments with ordinary bronze for cannon, as recently conducted in Austria. He said that for gun manufacture he would start with an aluminum compound of 70,000 lb tensile strength per square inch. Its elastic limit should be 23 000 lb. per square inch. This means that, if such a stress was applied to it, it would, on being released, return perfectly to its original contour without permanent deformation. Having cast the gun, he would next force mandrels through the bore to compress the metal near it, which would increase the strength of the critical layer of metal that first receives the strain of the explosion to 100,000 lb. per square inch. The elastic limit would be thus increased for the same layer of metal to 60,000 or 70,000 lb. Such a gun, the lecturer believed, would stand four times the strain that can be endured by a built-up gun.

There is no question that there is food for much thought in the suggestion, and that the new metal should be critically experimented with. The ordnance of Europe is far from perfect, as we have said. If it was ascertained that the bronze was all that it seems to be, if it was found that it was manageable for large castings, and was not subject to erosion in the bore, the government of this country could at one step become the equal of other lands in artillery. In using a metal that can be cast, and that is benefited by chilling, the plant would be simplified and a rapid production of guns would be insured.

Metallic Derivatives of Acetyl-acetone.

The author has shown in former memoirs that the hydrogen atoms of the central chain, CH_2, characteristic of acetyl-acetone, present remarkable analogies with the hydrogens of the acid hydroxyls. They are not attacked by the direct action of chlorine, and they can be easily substituted by sodium. He now shows that acetyl-acetone and its homologues act upon metallic salts like true strong acids, and that we may thus obtain with all the metals a new class of definite crystalline compounds, the acetyl-acetonates, answering to the general formula $(C_5H_7O_2)nM$, M being a metal of n atomicity.—*Alphonse Combes.*

VANILLIN is not a satisfactory substitute for vanilla, according to several American pharmacists. Even when coumarin is added to the essence, the flavor gradually becomes weaker.