

## RECENT AGRICULTURAL INVENTIONS.

A reversible plow, arranged to swivel upon a vertical axis, and having a right and left mould board, made continuous by a connecting wall arranged in a plane parallel with the line of draught, has been patented by Mr. Lucius S. Edleblute, of Cincinnati, Ohio.

An improvement in horse hay rakes of that form in which the rake teeth project from both sides of an intermittingly rotating shaft, has been patented by Mr. Lucius S. Edleblute, of Cincinnati, Ohio. It consists in peculiar means for controlling the revolution.

An improved hay gatherer has been patented by Mr. Henry Grebe, of Omaha, Neb. It consists in the arrangement of a rake of proper size, provided at each end with a gate, that is pivoted on a post and connected by means of iron bands, ropes, leather belts, or some suitable means, so that when the sweep has arrived at its destination the gates can be swung around on their pivots and the hay or straw pushed off.

An improved sweep for cultivating cotton, which shall be so constructed that the parts subject to wear may be readily ground to keep them sharp, may be readily reversed and exchanged when one edge becomes worn or notched, has been patented by Mr. Charles E. Estes, of Columbus, Ga. It may be moved down to take up the wear, and may be replaced with new ones when worn out at small expense.

An improvement in vertical reciprocating churns has been patented by Mr. Joseph E. Taylor, of Frankfort, Ind. It consists in the construction and attachment to the churn body of the bearing for the crank shaft and the guide for the pitman or rod which connects the dasher staff and crank shaft.

A machine for distributing manure in rows at proper distances apart and in variable quantities, has been patented by Mr. Jephtha M. Chastain, of Gaylesville, Ala. It consists in an ingenious valve motion, which insures the proper discharge of the manure at suitable intervals.

An improved device for attachment to reapers for binding the cut grain into bundles as the gavels are raked from the reaper platform, is the invention of Mr. Daniel Williamson, of Sunbury, Pa. It is so constructed as to receive the gavels, bind them with their own straw, and drop them from the machine. It consists in a series of mechanical devices that cannot be readily described without an engraving.

An improved plow, which is so constructed that it may be readily adjusted to cut a deeper, a shallower, a wider, or a narrower furrow, as may be desired, has been patented by Mr. Amandes Hackman, of Blakesburg, Iowa.

## Rotten Wood as a Pest Breeder.

Commenting on the filthy condition of the rotten wood pavements of Memphis, and their alleged influence in causing the outbreak of yellow fever there, the Baltimore *Sun* says that they have been continually denounced as foci of pestilence ever since 1873. The joints between the blocks and the ruts are so deep and so enlarged that they are soon filled with filth, which in warm, damp weather offers a wide surface for putrefactive action and for the generation of noxious effluvia. The blocks themselves become water-soaked and rotten below the surface, so that when any one is taken out it is found to be no more than a black, pulpy mass of decay, upon which the sun is acting all the time, eliminating malarious gases from it.

The cause of the yellow fever which devastated Norfolk in 1856 was very largely attributed to the decay of wood shavings, which had been used to fill in a wharf. The Memphis pavements must supply a much larger proportion of poisonous malaria to the air than was given out by these decaying shavings at Norfolk. It is a peculiar property of half decayed wood in masses to retain moisture, to continue long in a state of slow fermentation, and to give off malarious effluvia. In country neighborhoods many a case of typhoid fever has been caused by a neglected wood pile near the house, where, upon a gradually accumulated mass of chips and sawdust that is fair enough on the outside, but rotted down to mould at the bottom, all the kitchen slops have been poured. It is a well known fact in sanitary works that hospital gangrene often results from washing the wood in floors of wards with water, and on shipboard new or moist timber is injurious to the health of the sailors. The damp timbers of the United States steamer Plymouth retained and were able to revive and propagate the yellow fever germs recently, in spite of the most careful fumigation, disinfection, and refrigeration during a whole winter. The decayed wood of the berth deck of this steamer could not be disinfected, so resolutely did it retain within itself the fever germs.

Memphis is paved with mile after mile of this sort of decayed wood, and every block, exposed to a sweltering sun, may nurse a fatal fever germ. These pavements were laid down from ten to twelve years ago, and are reported by Mr. Niles Meriwether, a civil engineer, as being "almost entirely gone from decay and hard usage, so that their rotten and honeycombed condition makes them so many cesspools and receptacles for the retention of all manner of street filth and noxious gases, and they should therefore be removed as rapidly as possible."

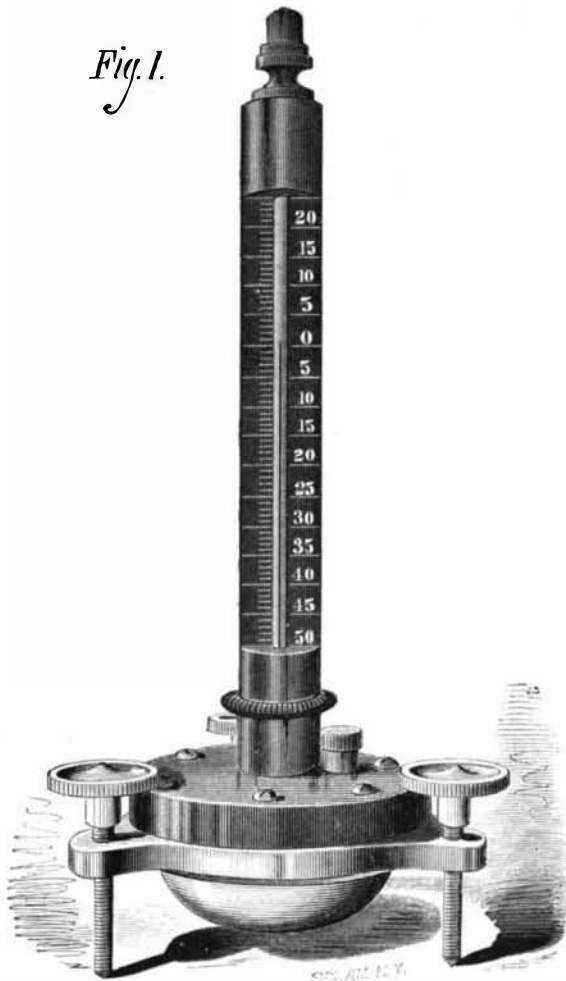
A FEW rubbing posts set up in pastures will save injury to the fences. Cattle will use these conveniences very often, and it is worth all the trouble, says an agricultural writer, to witness the enjoyment of the animals in the use of them.

## NEW MAGNETOMETER.

BY GEO. M. HOPKINS.

The instrument represented in Fig. 1 is designed for the measurement of the attractive or repulsive force of magnets; it is more especially designed to measure and indicate the variations in magnetization of the field magnet of a dynamo-electric machine.

Fig. 1.

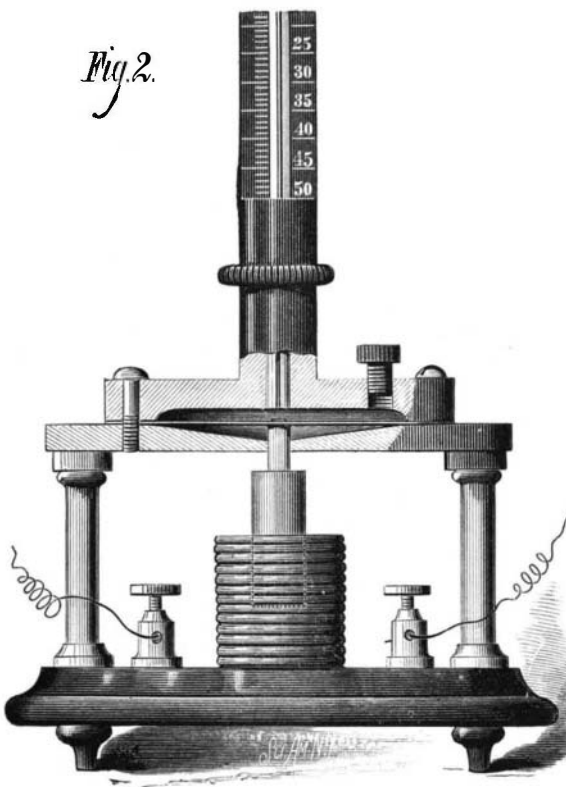


NEW MAGNETOMETER.

The changes in the resistances of the current from the modern dynamo-electric machines effect a corresponding change in the magnetism of the field magnets. An indicator that faithfully shows these fluctuations will give a correct idea of the strength of the current. The instrument illustrated does this, and it may also be used in detecting the location of the greatest magnetic force in an electro or other magnet.

The instrument shown in Fig. 2 is virtually an electrometer, as it indicates the electro-motive force of the dynamo or magneto machine when its helix is included in the elec-

Fig. 2.



ELECTROMETER.

trical circuit. These instruments are quite simple, and are exactly alike so far as the upper portion is concerned.

The horizontal metallic plate, which in one case is supported by the columns and in the other by three milled screws, is concaved in the middle and supports a steel diaphragm that is held in place by the vulcanite cap secured to the plate by several screws, so as to clamp the diaphragm tightly.

The vulcanite cap is chambered out to receive mercury,

and it has a stuffing box for holding a glass tube of small caliber. A vulcanite screw at the side of the stuffing box serves to adjust the height of the mercury in the tube. The graduations on the scale at the side of the tube represent the number of pounds of attractive force exerted on the instrument. The graduations from 0 upward indicate the degree of upward pressure when the force of repulsion is measured.

A short rod is attached to the middle of the diaphragm, and projects downward through a hole in the base plate to receive in one case (as shown in Fig. 1) a convex soft iron armature, and in the other case (as shown in Fig. 2) a cylindrical armature or core which extends into the helix.

The instrument shown in Fig. 1 may be placed upon any part of the field magnet. The rise and fall of the mercury in the tube, resulting from a deflection of the diaphragm by the action of the magnet, constantly indicates the internal condition of things in the dynamo-machine. By bending the glass tube at right angles near the vulcanite cap the instrument may be applied to the side of the magnet. It may seem that the approach of the armature toward the magnet—thereby diminishing the distance between armature and magnet—would involve an error; but the motion of the diaphragm is very slight, and in a large magnet the variation of .02 of an inch in the distance between the armature and magnet is of no account.

The diameter of the diaphragm is 2 inches; the caliber of the glass tube, .02 inch; therefore a very slight motion of the diaphragm is indicated by a considerable movement of the mercury in the tube.

When the repelling force of a magnet is to be exhibited the soft iron armature is replaced by a permanent magnet.

The instrument shown in Fig. 2 may be placed anywhere in the circuit, and will indicate the strength of the current. An increase in electro-motive force results in the drawing in of the iron core and a consequent deflection of the diaphragm and movement of the mercury column.

## Improved Stables for Horse Railways.

The recently completed stables of the Washington and Georgetown Passenger Railroad Company, at Georgetown, D. C., are pronounced unique and perfect by a correspondent of the Philadelphia  *Ledger* :

The company employ about 600 horses. Of this number about 330 are stabled at the central stables at Georgetown; the others are domiciled at other smaller stables on the car routes in Washington. At these central stables are the offices of the company, the machinery necessary to build and repair cars, elevate, store, and grind corn, cut hay, bale and press it for the supplementary stables, mix and elevate the feed, etc. Every conceivable operation is effected with ease, speed, and great economy by the ingenious application of steam power.

The offices of the company are on Bridge street, with a frontage of 90 feet. In the rear of these the commodious car house reaches 250 feet to the canal, on a level 34 feet above it. To the left of the car house stands a hospital for horses, wholly complete in itself, and isolated from the smaller stable on the east, and separated from the splendid main stable on the west by the 90 feet width of the car house. These main stables will hold about 300 horses. They are admirably divided into stalls. The floors are laid upon a solid surface, composed of a mixture of cement, gravel, and gas tar, which renders it wholly rat-proof. The story is 23 feet high, and windows everywhere admit abundant air and light. Great open ventilators run through the upper floor to the roof. A graceful and very useful balcony runs the entire length (347 feet) of the property on the canal side, whereon the bedding is sunned and aired. Across a short and wide alley at the southwest corner of the property stands the shoeing shop on the edge of the canal.

From this point an iron bridge spans the canal and enters the third story of the great building constructed on the south side of the canal for the machinery and hay department. The ground level of this building is 34 feet below that of the stables, being also on a level with the canal. The building is 302 feet long by 63 feet wide, and fronts on the canal and Grace street, from both of which stores and supplies are received.

The engine room is located at the northwest angle of this building, and is spacious and convenient. A 35-horse power engine and 40-horse power boiler supply power through long lines of shafting for the various machines employed.

Adjoining is the coal room, with its peculiar method of unloading coal from boats. On the other side is the smith shop.

The whole width of this building, 63 feet by 40 feet, is taken up by the heavy piers upon which the three grain storage bins are erected. Forty-two brick piers, 27 inches square, go down to the bed-rock and reach five feet above ground. Upon these piers are placed immense yellow pine sills, 16 by 12 inches, cross timbered above as base for these storage bins, which rise to the third floor. They contain 15,000 bushels of corn. An immense swinging elevator occupies the canal side of these bins. A single man can project this elevator through the thirty foot high doorway down into a canal boat, and discharge 4,000 bushels of corn in ten hours. From the receiving hopper, after being weighed, the corn is taken by another set of elevators and distributed in the proper bins.

Two hundred feet of this entire building at the east end is for hay storage. It is a room 200 by 63 feet by 45 feet to the eaves, and will contain 1,000 tons. Four hoisting drums