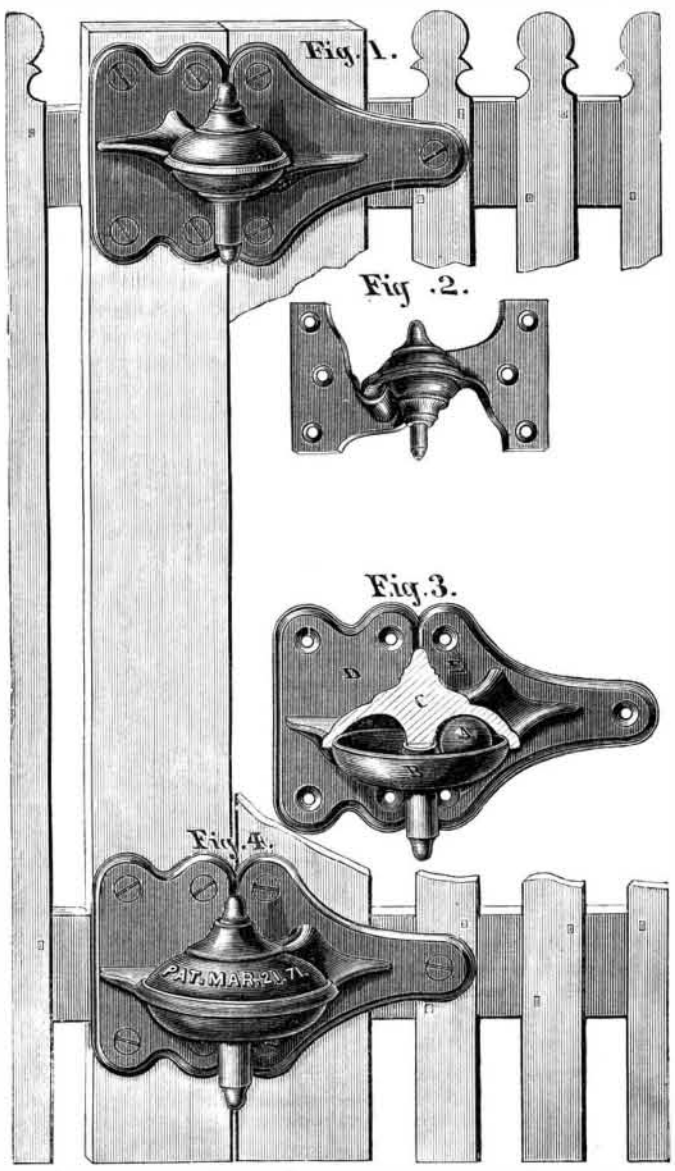
LEMMAN'S ANTI-FRICTION BALL GATE HINGE.

Perhaps there has been no greater source of petty annoyance to farmers than the sagging of gates and the loosening of their hinges. To remedy these evils, resulting in a great measure from excessive friction in the action of the hinge, and also to furnish a cheap and durable substitute for the hinges hitherto employed are the objects sought in the invention of M. R. Lemman, patented March 21, 1871, and illustrated herewith.

Figure 1 represents the upper hinge attached to the post and gate. Fig. 4 shows the lower hinge, in which the ball is placed which carries the weight of the gate, causing the latter to be opened very easily without friction. Fig. 3 shows a sectional view, a portion being broken away to show the groove and ball in place. Fig. 2 represents a shutter hinge of smaller size, and modified somewhat in form to adapt it to the purpose, but acting on the same principle.



The ball carries the weight of the gate around the pintle in an annular groove, forming a complete circle. The top part of the hinge, that goes on the gate below, has a groove, corresponding with its mate on the post that rests on the ball. When the gate is opened, the ball making its circle, takes all the friction from the hinge, saving the wear and breakage. The top part of the hinge protects the working parts from snow and ice completely, making a handsome ornamental hinge. On small gates the upper hinge is made smaller than the lower one, and the pintle being placed closer to the post, makes such gates self-closing.

For further information address the manufacturers, Lemman & Owens, Hamilton. Ohio.

Glueing.

Sherrard B. Barnaby, in the *Quarterly Journal of the Amateur Mechanical Society*, says:

The right sort of glue to use for ordinary work is "best Scotch" (inferior kinds are often adulterated with lime). This glue is sold at all good tool shops; but if it cannot be obtained choose the most transparent cakes. For fine work in light colored woods, Salisbury glue may be used; this is made in thin cakes, and is of a clear amber coler.

PREPARATION OF THE GLUE.—Break it into small pieces with the hammer, and soak for at least twelve hours in sufficient water to keep it covered even when swollen by the water it absorbs; this water must be cold. It is no use attempting to melt glue by putting it into hot water; it will always be stringy, and give endless trouble. Put the pieces of soaked glue without any superfluous water into the glue pot, taking care that the outer vessel is kept full of water, which will prevent the glue in the inner vessel from burning; this is very important.

The glue will soon dissolve; it will be thin at first, but quite strong enough; subsequent boilings will, however, improve it, so long as it is never allowed to burn; indeed, as water is driven off by evaporation, more will have to be added. If stronger glue is required, it may be made with beer instead of water, and stronger still if linseed oil is added to it instead of water, as the original water in which it was dissolved is evaporated by boiling.

Cleanliness is very essential to the well being of glue; a wooden cover should therefore be provided for the pot, and if any dust or dirt is on the cold glue, it should be just washed off before putting the pot on the fire. A scum always rises as the glue boils; carpenters generally stir this in with the brush, I prefer to skim it off, and put it in a gallipot, where it accumulates and settles with waste scrapings, and much of it may be utilized afterwards.

A wire stretched across the pot is very useful to remove superfluous glue from the brushes; this is much better than pressing them against the edge of the pot, where quite enough glue is sure to accumulate and burn.

Never use any of that old dried up and burnt glue which may be generally found in the bottom of a glue pot kept in a kitchen; have the whole concern boiled out in a saucepan before you put your nice clean glue into the pot.

HOW TO USE THE GLUE.—It must not be supposed that the strength of a glue joint depends upon the quantity used; those joints hold the best in which the pieces of wood are brought closest together. The following is a brief description of the process to be pursued:—Have the glue as hot as possible, the glue pot within easy reach, a basin of hot water, and a bit of sponge on the bench. Cover quickly with hot glue both the surfaces to be united, and rub them together, pressing out all the glue that can be got rid of; let the motion of the one piece on the other be but slight; for instance, in a three foot joint the top piece need never move more than an inch or two beyond the other, which is fixed, it is supposed, in the bench screw; it will be soon felt that they are inclined to stick together, then they must be brought at once to that which is to be their final position, and not moved again. Superfluous glue may now be wiped off with the sponge when necessary, *i. e.*, when it is in an angle or an awkward place to get at afterwards; but as a general rule, and particularly in a long joint, it should be left on till cold, for it excludes the air, and goes a long way towards making a good permanent joint.

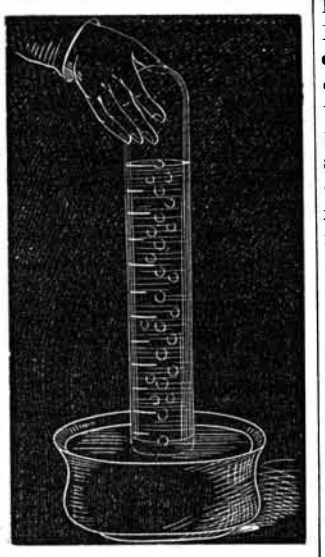
If the edges of two long boards have to be glued together, the job will require two hands. One board having been fixed in the bench screw, the other is rested against it, so that the edges meet obliquely, making a very blunt V. While one workman steadies this second board (with the help of a weight, or the jack planes on the bench to keep it from slipping), the other, holding the glue pot in his left hand, passes the brush, well loaded with glue, rapidly along the edges; he must not mind wasting his glue; there is no time now to be careful about spilling a drop or two. When the edges are quite covered, he takes one end of the loose board, his assistant the other, and they rub it up and down a time or two till it sticks, as with shorter pieces.

And here note that if you are not skillful enough to shoot a perfectly true edge on your board, make it slightly concave rather than convex; for the ends have a tendency to rise.

In glueing flat pieces of wood together, such as two or three thin pieces to make one thick, with the grain running two or three different ways, screw clamps are required. These are wonderfully useful things, for many purposes, very cheap, and not half enough used by amateurs.

NEW TEST FOR KEROSENE OILS.

At the recent meeting of the American Association, Professor Vander Weyde explained a new and excellent test for the safety of hydrocarbon oils. He takes a glass tube, closed at one end and open at the other, and fills it with the petroleum to be tested; then closing the open end with the finger, inverts it in a vessel with water, warmed to 110° by mixing hot and cold water, and keeping it at that temperature by occasionally adding hot water. If now any vapor be apparent, it will collect in the closed upper part of the tube, displacing the oil downward. The amount of this gas will be a comparative test of the different qualities of oil, and for this purpose the tube may be graduated in order to measure the amount of volatile liquid present in the same.



This method is not subject to the discrepancies found in the usual way of testing, in which an impure and dangerous quality of oil may be made to appear better than it is by slow and gradual heating; and which, if performed in a slight draft of air, will have the vapors carried off as soon as developed, so that it becomes impossible to ignite them. This new method gives freedom from the danger of using fire, more accuracy, a trustworthy means of measurement, and no chance for deception.

This test for petroleum is founded on the fact that all vapors given off by petroleum are combustible, and that if any kerosene, or other preparation from petroleum, gives off a vapor at the accepted standard temperature of 110°, it is not necessary to try whether it will burn, but sufficient to collect it in a proper vessel, by which we gain the additional advantage that we may measure the quantity of the vapor, while none of it can be lost by air currents incidentally passing over the surface of the liquid.

MASSEY'S DOUBLE COLUMN HIGH PRESSURE AND LOW WATER ALARM FOR STEAM BOILERS.

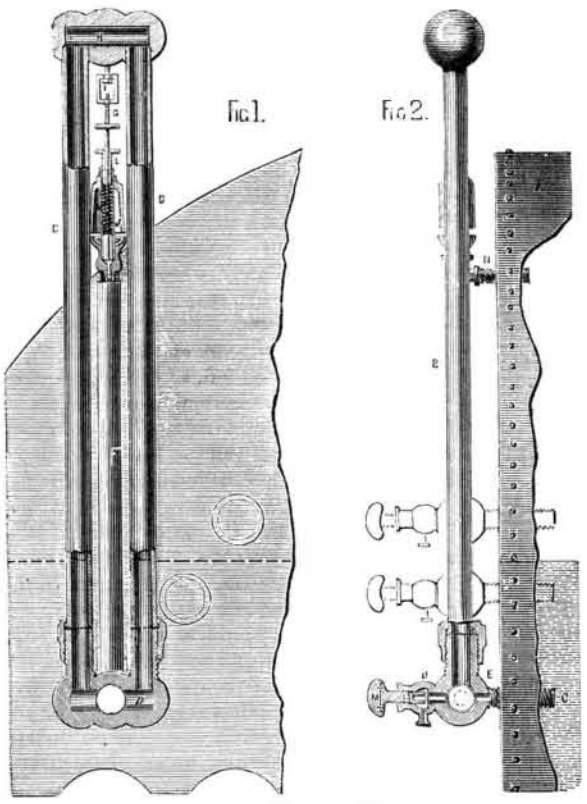
In a recent article on the *Westfield* explosion we took occasion to say that all boilers ought to be provided with both high pressure and low water alarms.

The engraving published herewith exhibits the construction of an instrument intended to perform the functions of the two instruments named, and it is claimed that it acts with unerring certainty, that it does not clog either by scums or sediment, that it is simple, easy of adjustment, and in every way free from defects that would tend to render it inoperative through the action of corrosion or any result of exposure in actual use.

We have been shown numerous certificates from proprietors and superintendents of extensive establishments, speaking in the highest terms of the superior qualities of this attachment, and vouching for its reliability under all circumstances.

Fig. 1 is a front view of the instrument as applied to a horizontal boiler, and Fig. 2 a side view, showing the gage cock and steam connections; B is a double tube: E a chamber or iron tube forming a steam and water connection with the boiler; N a steam connection with the whistle; J a hollow spindle through the whistle; K a spiral spring to hold the valve in its seat; L a screw for adjusting the steam whistle to any desired pressure; G the valve rod, and I the swivel for adjusting for low water.

When the water in the boiler and chamber is above the



lower gage cock, the communication with the detector is submerged, and both tubes filled with water, the temperature of which cannot exceed 212° Fahr.; at this temperature the detector is adjusted. When the water in the boiler descends below the lower gage cock, steam will enter one of the tubes, B, and almost instantly expel the water from the detector through the opposite tube, into the boiler, filling the space with steam, the increased heat of which will expand the tubes, raising the valve, and sounding the alarm. Over pressure of steam in the boiler may be indicated by adjusting the spring, K, to the desired pressure, by raising or lowering the screw, L. To adjust to high pressure, the safety valve is set to the desired maximum pressure, and steam raised until it blows off; the screw, L, is then raised or lowered at the top of the whistle, until steam escapes through the whistle at the moment the safety valve raises, or a few pounds higher if desired. It will be seen that when the pressure of steam exceeds the power of the spring as adjusted, the valve will be raised and the whistle sounded. To adjust for low water, the milled wheel attached to the valve rod, G, is held, and the swivel, I, turned until it rests firmly on the head of the screw at its upper end, when the least expansion or lengthening of the tubes will raise the valve of the whistle against the power of the spring and sound an alarm.

After adjusting the detector for low water, the jam nut in the swivel is tightened, so that the adjustment may not be altered except by design.

An alarm being sounded, an examination of the gage cock will determine whether it was occasioned by high pressure or low water.

This ingenious invention was patented through the Scientific American Patent Agency, by Gideon B. Massey, of New York, Aug. 23, 1870, and another patent will issue Sept. 5th, of the present year. For further particulars address Massey Low Water Detector Company, 56 Broadway, New York city

A FORMATION, in ledges, of Labrador spar has been discovered in New Hampshire. This mineral was not previously known to exist in New England, although it is not uncommon in the Adirondack mountains. Professor C. H. Hitchcock, of the New Hampshire Geological Survey, brought the fact to light.