Culverts and Bridges.

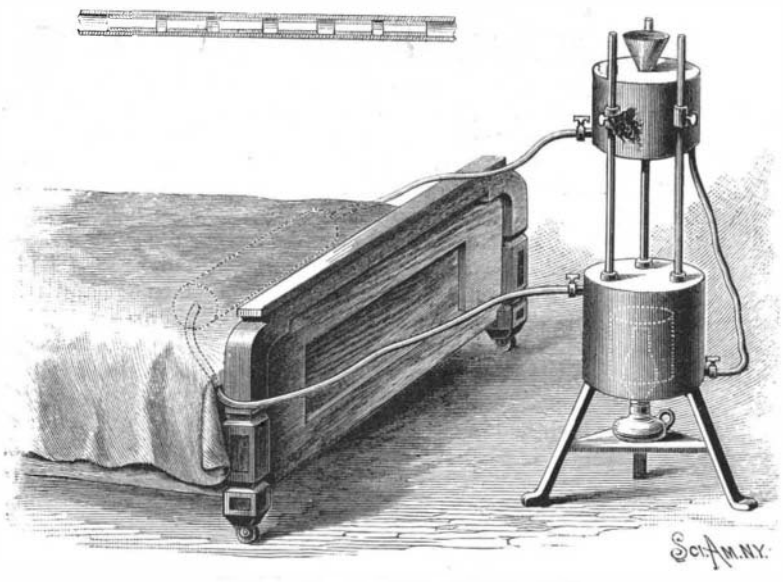
From data furnished by Mr. D. J. Whittemore, chief engineer of the Chicago. Milwaukee & St. Paul system (which had a total length of 5,688 miles on January 1, 1888), the length of open bridges on these lines was 115 91-100 miles, and of culverts covered over with embankment 39 2-10 miles. "Everything," says Mr. Whittemore, "not covered with earth, except cattle guards, be the span 10 or 400 feet, is called a bridge. Everything covered with earth is called a culvert. Wherever we are far removed from suitable quarries, we build a wooden culvert in preference to a pile bridge, if we can get six inches of filling over it. These culverts are built of roughly squared logs, and are large enough to draw an iron pipe through them of sufficient diameter to take care of the water. We do this because we believe we lessen the liability to accident, and that the culvert can be maintained, after decay has begun, much longer than a piled bridge with stringers to carry the track. Had we good quarries along our line, stone would be cheaper. Many thousands of dollars have been spent by this company in building masonry that, after 20 or 25 years, shows such signs of disintegration that we confine masonry work now only to stone that we can procure from certain quarries known to be good."

A Well of Vinegar.

A dispatch from Vincennes, Ind., says: "The mysterious vinegar well which was dug on the farm of S. W. Williams, just east of this city, has been accounted for, after much discussion by chemists and others. Some twenty years ago the farm was owned by F. M. Fay, who had an extensive orchard. The apple crop was large, and he made several hundred barrels of cider, to be converted into vinegar. While the fluid was fermenting, about one hundred barrels burst and their contents were lost. The cider sank into the ground until it reached an impervious strata of clay, where it lay until the well was dug on the same spot."

AN IMPROVED FOOT WARMER FOR BEDS.

A foot-warming apparatus designed to circulate warm water through a chamber or casing disposed at the foot of the bed, and intended to be wrapped with woolen or other cloth, is illustrated herewith, and has been patented by Mr. James A. Lewis, of St. Clairsville, Ohio. Three separate receptacles or liquid tanks are employed —a receiving tank, a heating vessel, and a foot warmer, the receiving tank resting above and supported from the heating vessel by guide clasps embracing vertical rods. From the receiving tank a hose or other suitable flexible conduit passes to the lower part of the heating vessel, from near the top of which a similar conduit passes to one end of the foot warmer, another hose connection passing from its opposite end to the supply tank, whereby a free flow and circulation is secured between the receptacles. If desired, check valves may be employed whereby the heated water will always pass in the direction from the heater to the foot warmer, etc., and be prevented from any return flow. The flexible conduits, near their connections with the foot warmer casing, have short internal re-enforcing tubular sections, as shown in the small figure, so that the pressure of the bed clothing will not prevent or retard the circulation of the heated water. The funnel-shaped outer passage into the receiving tank is closed by a removable ball valve or spherical stopper. It is designed that the lamp by which the water is heated shall have a chimney of metal or opaque material, that the room may not be lighted.

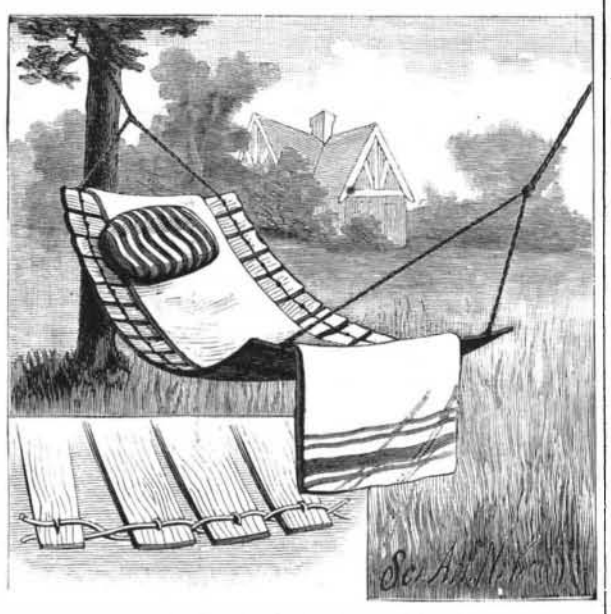


LEWIS' FOOT WARMER FOR BEDS.

Fabric and Fibre mentions an electric picking motion for looms, which is to do away with all the present mechanism called a picking motion. Should this prove true, and there is no reason why it should not, it will cause a revolution, and greatly simplify the loom.

A BARREL STAVE HAMMOCK.

We illustrate in the cut a simple method of constructing a hammock. But little explanation is required, as, owing to the simplicity, the illustration explains itself. The material used includes a number of barrel staves and some rope. The latter should be about one-half inch in diameter. It should be doubled and loosely twisted. Then a second doubling without twisting leaves it in condition for the introduction of the staves.



A BARREL STAVE HAMMOCK.

These are taken from ordinary flour barrels. Two such barrels give material for a good sized hammock. Near each end of each one of the staves a hole about one-quarter inch in diameter is bored. The ends of the staves are then inserted, as shown, in the lays of rope, between the two pieces on each side. The object of the loose twisting is to provide places for the introduction of the ends of the staves. Care must be taken to have enough twists to receive all the staves, and not to have the twisting too tight.

If preferred, the ropes may be twisted as the staves are introduced. This gives a more certain method of securing the desired mean between tight and loose twisting.

To prevent the staves from slipping out, each one is tied in place. A short piece of string is wound at each end of the stave around both ropes, passing through the hole already mentioned, and is then tied. The ends of the suspension ropes are now secured and tied or spliced into loops, and the hammock is complete.

The staves may be used of their original width, or may be split. Probably the most generally satisfactory method is not to split them. The weak point in the construction is the liability of the staves to bend and pull out of place. This, of course, is more liable to happen with split ones, which are of but one-half the normal strength.

When such a hammock is provided with a heavy rug and pillow, it surpasses in comfort the ordinary type. It can be made in a half hour, and we believe that the half hour will generally be considered well spent by the maker. Various other methods of securing the staves may suggest themselves, but the above is given as a simple and effective form.

Lightning Rods.

Some useful particulars are given in Professor Oliver J. Lodge's lectures on the "Protection of Buildings from Lightning," delivered at the Society of Arts. Referring to the tape and rod forms of conductors, it is pointed out that Faraday maintained that sectional area was the one thing necessary, and that shape was wholly indifferent; on the other hand, Sir W. Snow Harris considered that tube conductors were just as good as solid rods, and that flattened ribbon was better still. Faraday was thinking of nothing but conduction for steady currents, Harris was guided by experience. The lecturer thinks that Harris was right, and to prove this point he gives results of experiments made upon two conductors of copper of the same weight, but one in the form of wire, the other in the form of a ribbon, by which it is shown that the flattened form of conductor has the advantage over a mere round section for carrying off a charge, and with least liability to side-flash. As to the deflagration of the conductor, Mr. Preece has found that ribbon and wire are equally easy to be destroyed by a flash. Experiments have also shown that straight conductors have a tendency to side-flash, however thick they may be. No conductor, Professor Lodge says, is able to prevent it altogether, unless it is zigzagged to and fro, in which case it is found to have practically no self-induction, and side spark is nearly stopped.

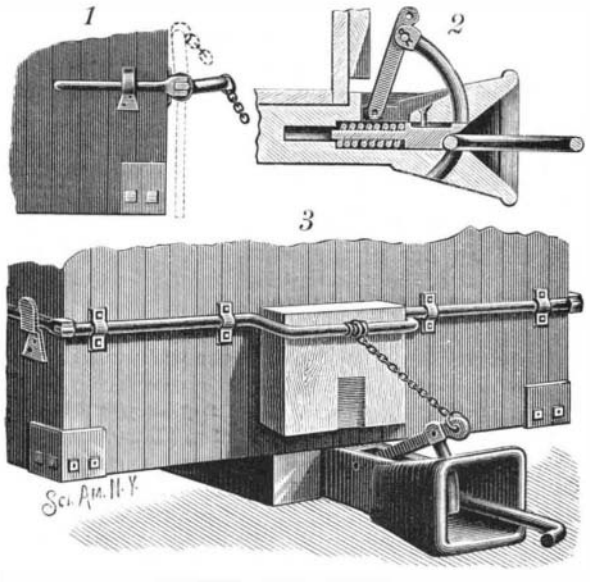
It must also be remembered that a rod of iron carries off a discharge better than a rod of copper. The discharge probably penetrates iron deeper than it does copper. Its inferior conductivity is considered even an advantage in rendering the flash slower and less dangerous. When galvanized, it can be made almost as durable as copper, and its liability to get magnetized is no objection. Prof. Lodge thinks the use of copper for lightning conductors is doomed. The lectures are full of interest for the architect. The liability of objects to be struck is shown to depend upon certain conditions—for example, whether the flash occurs from an already charged surface which has strained the air close to bursting point, or whether the flash is produced by a rush of electricity into a previously uncharged conductor too hastily for it to prepare any chosen path. These are considered, and the results of experiments given.

To Build a Chimney.

To build a chimney that will draw forever and not fill up with soot, you must build it large enough—sixteen inches square; use good brick, and clay instead of lime up to the comb; plaster it inside with clay mixed with salt; for chimney tops use the very best of brick, wet them and lay them in cement mortar. The chimney should not be built tight to beams and rafters; there is where the cracks in your chimneys come, and where most of the fires originate, as the chimney sometimes gets red hot. A chimney built from cellar up is better and less dangerous than one hung on the wall. Don't get your stovepipe hole too close to the ceiling—eighteen inches from it.

AN IMPROVED CAR COUPLING.

A coupling designed to be operated without requiring trainmen to go between the cars, and which permits of cars provided with it being also coupled with those having the ordinary link and pin drawhead, has been patented by Mr. Francis L. McNab, and is illustrated herewith. At the back end of the link socket of the drawhead is a shoulder limiting the inward movement of the link, and behind this socket is a longitudinal recess, prolonged inward by a bore, receiving a trip block and its stem, the latter surrounded by a spiral spring, as shown in Fig. 2. The forward end of the trip block is rabbeted out transversely at its lower part to provide a recess to receive the inner end of the coupling link, which thus rests beneath a tongue or lip of the block, and is held up at its outer end prior to coupling to another car, the lip also serving as a support to the curved coupling pin. The latter is pivotally connected to a pivoted drop bar, whose outer end is connected by a chain to the central cranked part of a shaft journaled across the end of the car body and provided at its outer end with crank arms, hinged to the ends of the shaft, so that when the shaft is turned to lower the coupling pin to couple two cars, the arms may be placed in latch hook supports fixed to the car body, and when lifted or disengaged from the latches the arms will swing down at the side, as shown in dotted lines in Fig. 1, the weight of the pendent arms then being sufficient to hold the coupling up to prevent coupling while shunting the cars, etc.



McNAB'S CAR COUPLING.

For further particulars with reference to this invention address the inventor, or Mr. James Playfair, Sturgeon Bay, Ontario, Canada.

THE Rosedale, an iron ocean-going steamer, has been the first to make the passage between London and Chicago, proceeding up the St. Lawrence and through the ship canal to the lakes. Though a certain amount of her cargo had to be removed to permit her to pass through the St. Lawrence Canal, yet the vessel was still drawing 14 feet on her arrival at Chicago.