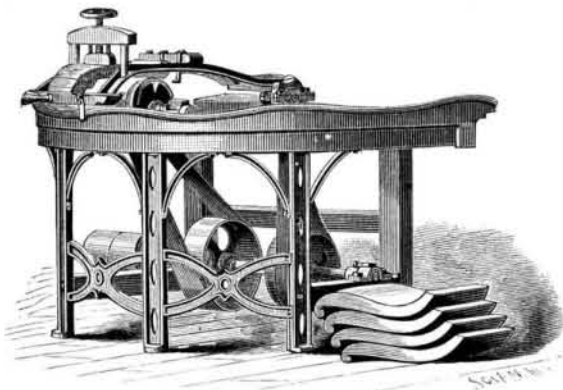


scend by degrees, and finally so nearly disappear that but a few centimeters of the blade protrude. In reality, the blade has entered into the hilt, for it possesses a solid tip that enters the middle part, which is hollow, and these two parts enter into the one that forms the base of the sword. The blade is thus reduced to about 25 centimeters, a half of which length enters the hilt. There then remain but a few centimeters outside the exhibitor's mouth, so that he seems to have swallowed the sword (Fig. 2, G and E). This is a very neat trick.—*La Nature*.

ROCKER SEAT WORKER.

We give an engraving of a very simple and efficient machine for working the seats of rocking chairs. This machine has a block carrier which is moved over a guide or form, and also over the rotary cutter, which shapes the wood uniformly and rapidly. The manufacturer informs us that this machine has a capacity of from 400 to 600 rocker seats per day. No particular skill is required to



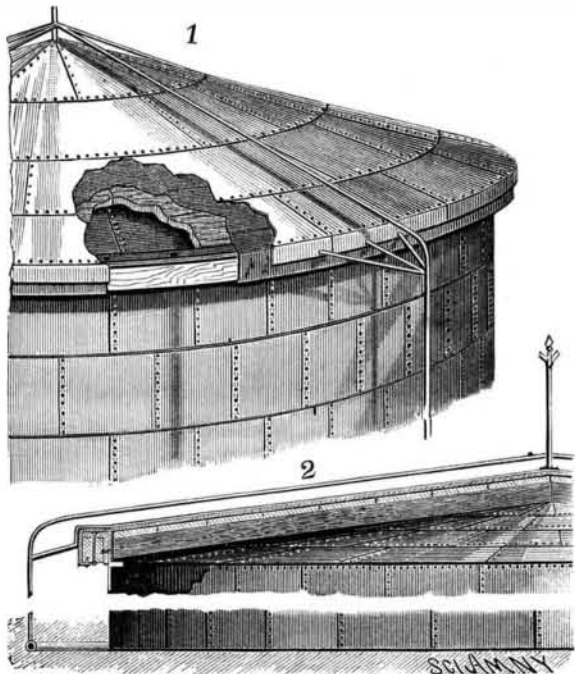
CROSS' ROCKER SEAT WORKER.

operate it. It is not liable to get out of repair, and it is not an expensive machine, considering the amount of work it will do.

Mr. S. W. Cross, of Dodge Centre, Minn., is the manufacturer of this machine.

DEVICE FOR PROTECTING OIL TANKS FROM LIGHTNING.

After almost every thunderstorm we hear of oil tanks having been fired by lightning, causing the destruction of a vast amount of property. Up to the present time there has been no very reliable means of averting this loss, although various plans have been suggested. We give an engraving of an invention intended to prevent the destructive action of lightning. It consists of a roof with wood or iron rafters, on which are secured boards extending to the outer edge of an angle iron, secured to the top of the outer surface of the tank or building. An asbestos sheathing is tacked on the boards, then lapped over the edge of the angle iron, and lapped against the outer side and bottom edge of a wooden strip held to the bottom of the horizontal flange of the angle irons by bolts passed through the flange and strips, as shown. The edge of the asbestos sheathing is tacked to the strip. The heads



PROTECTION FOR OIL TANKS.

of the bolts are below the asbestos sheathing, and are countersunk in the upper surface of the horizontal flange of the angle iron.

A sheet iron covering is placed on the sheathing and projects beyond and down over the edge of the angle iron. A series of conductors extend over the roof, and are connected with the edges of the metal covering, and are then carried down to the ground and connected to a gas pipe surrounding the tank and buried in the ground. A conductor extends from the gas pipe to suitable ground plates in marshy or other moist ground.

The asbestos insulator makes the tank fireproof, and is a non-conductor of electricity. If lightning strikes the tank and does not immediately pass down the conductors, it will

pass down the metal covering and then through the conductors to the gas pipe.

This invention has been patented by Mr. Henry C. Thomas, of Rock View, N. Y.

The Factory Numbering of Yarns.

All yarns, whether of cotton, woolen, worsted, or other material, are numbered according to their size. A No. 1 cotton yarn contains 840 yards to the pound, and a No. 10 contains ten times that amount, or 8,400 yards. No. 40 cotton yarn contains 40 times 840, or 33,600 yards to the pound, and its diameter consequently only one-fortieth as great as that of No. 1.

Woolen yarns are measured in "runs" of 1,600 yards to the pound. Two run yarn contains 3,200 yards to the pound, three-run 4,800, ten-run 16,000, and so on.

No. 1 worsted yarn always measures 560 yards to the pound, and No. 10 is one-tenth as large, and measures 5,600 yards to the pound. As a matter of fact, but little if any worsted yarn is spun coarser than No. 10, and the finest commonly made is No. 65, though some mills run as small as No. 90. No. 90 worsted yarn contains 50,400 yards to the pound, and its smallness can therefore be readily imagined. The No. 16 worsted yarn, in most common use for knitting, contains only 8,960 yards to the pound, but is generally made of very fine wool.—*Textile Gazette*.

Tile Making in Holland.

The tiles manufactured in Holland are flat, hollow, S shaped, or with a square opening in the middle to let in a pane of glass, being much used for lighting lofts and garrets all over the Low Countries. They are either red, gray, or blue, or glazed on one side only. The flat paving tiles are about 8½ inches square by 1 inch thick; they are used principally for cisterns and for bakers' ovens. The clay for tiles, it is to be noted, is in all cases more carefully prepared than that for bricks, being ground up wet in a pugmill or tub, with a shaft carrying half a dozen blades. By this means, roots, grass, etc., are got rid of. The clay comes out of the pugmill of the consistence of potter's clay, and is kept under a shed, where it is kneaded by women, with their hands, to the rough form of a tile, on a table dusted with sand. These pieces are carried off to the moulders, who are two in number, a rough moulder and a finisher. The tiles are then dried under sheds, and afterward in the sun. With regard to the flat paving tiles, they are at first rough-moulded about an inch larger than the subsequent size, and a little thicker, and then laid out to dry under a shed, until such time as the thumb can hardly make an impression on them. They are then taken to a finishing-moulder, who, on a table quite level and slightly dusted with sand, lays one of the tiles, and strikes it twice or thrice with a rammer of wood larger than the tile, so as to compress it. He then takes a mould of wood, strengthened with iron and with iron cutting edges, and puts it on the tile, which he cuts to the size. The mould is of course wetted each time it is used. The tiles are then regularly dried. In Switzerland and Alsace an iron mould is used.

The tile kiln is generally within a building, and about 16 feet long (in ordinary dimensions), 10 feet wide, and 10 feet high. The walls are from 4½ feet to 5 feet thick, secured outside with great beams, and so secured together as to form a square frame. Some of the largest of them are pierced with four flue holes, as in brick kilns; but the flues are formed by a series of brick arches, about 2½ feet wide by 16 inches high. The opening of the flue hole is about 10 inches by 8 or 9 inches high. On their upper surface, these series of arches form a kind of grating, on which the tiles are laid. The kiln is covered in at the top with a brick arch, pierced with holes of different sizes. The kilns are charged from an opening which is constructed in one of the side walls, which opening is, of course, during the burning, blocked up and well secured. The fuel used is turf, as in the brick kilns, and the fire is kept up for forty hours together, which is considered enough for the burning. Three days are then allowed for cooling, and they are afterward taken out of the kiln. Those tiles which are to be made of a grayish color are thus treated. It having been ascertained that the tiles are burnt enough, and while still red hot, a quantity of small fagots of green alder with the leaves on is introduced into each flue. The flue holes are then well secured, and the holes in the roof each stopped with a paving tile, and the whole surface is covered with 4 inches or 5 inches of sand, on which a quantity of water is thrown, to prevent the smoke from escaping anywhere. It is this smoke which gives the gray color to the tiles, both internally and externally. The kiln is then left closed for a week, when the sand is taken off the top, the door and roof holes are opened, as also the flue holes, and the charcoal produced by the fagots taken out. Forty-eight hours after, the kiln is cool enough to allow of the tiles being taken out, and the kiln charged again. Whenever any of the tiles are to be glazed they are varnished after they are baked; the glaze being put on, the tiles are put in a potter's oven till the composition begins to run. The glaze is generally made from what are called lead ashes, being lead melted and stirred with a ladle till it is reduced to ashes or dross, which is then sifted, and the refuse ground on a stone and resifted. This is mixed with pounded calcined flints. A glaze of manganese is also sometimes employed, which gives a smoke-brown color. Iron filings produce black; copper slag, green; smalt, blue. The tile being wetted, the composition is laid on from a sieve.

The manufacture of tiles is principally carried on near Utrecht, in the province of Holland, which, like most of the great cities of Holland, has facilities for the transportation of its produce by water communication all over the country.—*Glassware Reporter*.

IMPROVED FRYING PAN.

The engraving shows a novel frying pan recently patented by Mr. Oliver E. Worden, of Pierre, Dakota Territory. The design of the invention is to do away with the smoke that results from frying meat and other articles of food, and to prevent grease from spattering out of the pan.

The pan is made double; the inner one is of ordinary con-

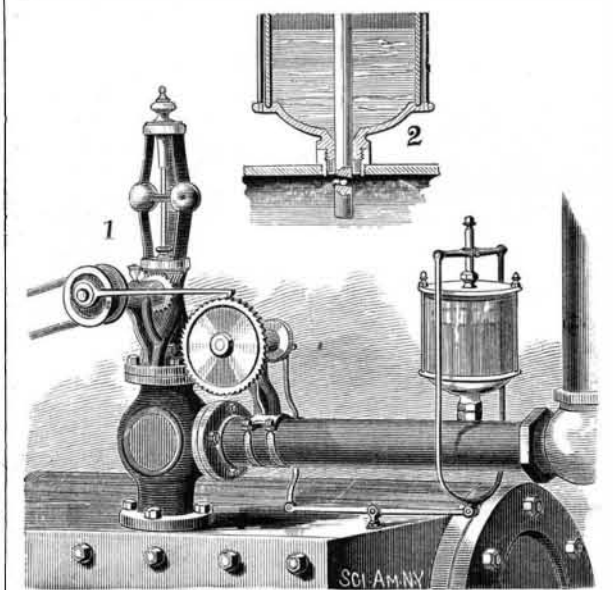


IMPROVED FRYING PAN.

struction; the outer one is made larger in diameter than the inner one and has no bottom. The inner pan is supported on a cross bar extending across the outer one, and a space is left all around to permit the smoke to escape to the fire space or flue of the stove or range. The removable cover of the outer pan covers both.

FORCE FEED LUBRICATOR.

In this lubricator the oil cup is situated on the steam supply pipe of the engine, and is provided with a plunger rod, which passes through a stuffing box in the bottom of the cup, and enters the steam pipe. This plunger rod is connected by means of a yoke with a lever, which takes its motion from a crank on the end of a shaft carrying a ratchet wheel. A slow rotary motion is imparted to the ratchet wheel by a pawl reciprocated by an eccentric in some moving part of the machine. In the present case the eccentric is placed on the governor shaft. This arrangement of mechanism slowly reciprocates the plunger rod, so that a transverse hole formed in it near its lower end is alternately raised up into the oil cup to receive oil, and plunged down into the steam pipe to discharge it. The oil is carried by the steam to the valves, piston, and internal surfaces of the cylinder.



WHEELER'S FORCE FEED LUBRICATOR FOR STEAM CYLINDERS.

This device is entirely automatic and positive. There is no steam pressure in the cup, consequently the cup can be of glass, which will permit of seeing when the oil is exhausted. The oil is supplied only when the engine is running, consequently there can be no waste.

This invention has been patented by Mr. J. A. Wheeler, of Vandalia, Mo.

THE Rev. A. P. Happer, D.D., figures out a steady decrease in the population of China. He says the present number of inhabitants cannot exceed 300,000,000. Chief among the causes of the diminution is opium. He believes that the population of India will soon exceed that of China, the latter ceasing to be the most populous country on the globe.