How Rubber Boots and Shoes are Made.*

Did you ever see any crude rubber, and have you any idea how it is gathered and worked? There are twenty or thirty varieties of crude rubber, varying greatly in quality, and of all these the best is known as Para, a South American product, obtained in Brazil, about 1,800 miles above the mouth of the Amazon. It is called Para from the city of that name from which it is shipped to foreign parts. The gum is gathered by tapping the rubber trees, as we tap maple trees for sap for maple sugar. The sap is gathered into a large pot into which the native dips a flat wooden paddle, to which gum adheres. He withdraws the paddle and holds it in a smoke made by burning palm nuts, which dries and cures the film of rubber on the paddle. He then dips again, and smokes again, repeating the process until he has on the paddle a bunch of gum weighing several pounds. Then he splits the ball or roll to get the paddle out, and it is ready for market.

These native are not models of honesty, however, as these chunks of gum frequently contain palm nuts, rubber nuts, pieces of iron, or are freely mixed with sand to add weight, which often causes the manufacturer great trouble. The public, or a large share of the public, have an idea that crude rubber gum comes something like tamarac, and that it is melted and cast into whatever form is desired, but this is not true. A rubber shoe factory is not a foundry; it comes nearer being a printing office.

These chunks of rubber are sliced into steaks, you might say, by sharp knives revolving rapidly and kept constantly wetted. When one of these knives strikes an iron spike, there is apt to be "music in the air." The operators are on the lookout, however, and accidents are so thoroughly guarded against that they are very rare. These steaks are then put into a chopping machine, where they are made into an article closely resembling boarding house hash, only that this hash is the straight goods, except that it needs cleaning. The small pieces thus formed are then put through a machine which makes mince meat of them, and at the same time washes out all the dirt and sand. This (not the dirt and sand) is now shoveled into a rolling machine which compresses the mass into rough sheets. This is the first process. These sheets are then taken to another building and put into a steam drying room, where they remain about three months to free them from all moisture.

By the drying process they lose from 15 to 30 per cent of their weight. If the least moisture remains in the rubber when made up into shoes, the heat of vulcanization causes its expansion, and consequently causes blisters in the stock. The dry gum is then run between heavy iron rolls, heated by steam, and called grinders, by which it is softened to permit the admixture of the vulcanizing material.

Rubber in its natural state is unfit for use, and Goodyear's process of vulcanization by the aid of sulphur is necessary to utilize it. This mixing is done by running the ground rubber through still another series of rollers, which press the rubber and sulphur together in one soft, fine body, which is finally run through a calender, between great steel cylinders; the mass is pressed out into long smooth sheets of any desired width or thickness. Then comes the printing process. These sheets are fed through steel cylinders on the face of which is engraved the pattern for sole, heel, and upper desired to be produced, and these impressions are as clearly printed on the rubber as this type impression is on this paper.

Then the sheets go to the cutters, who cut out the different parts and send them to their respective departments. The lasting is done similarly to that of other shoes, except that the parts are all put together by rubber cement, and, before removal from the last, they are placed in the vulcanizing ovens, where they are subjected to a degree of heat that transforms the various parts into a homogeneous mass in the shape of a boot or shoe with a seam, nail, or peg. Then, if a dull finish is desired, the last is removed, and the goods are ready for market. Otherwise they are varnished to give the bright finish, and dried, when they are ready.

Electric Lights for Dwellings.

Several different systems of electric lighting are in vogue in French private houses, but, says *La Nature*, they are all somewhat costly. One of the best systems is that of Gaston Menier, in which 150 Swan lamps are used, supplied by a series of 22 accumulators. These nominally yield from 40 to 50 amperes, which are sufficient to supply 60 lamps at a time—a number more than sufficient for any ordinary purpose. The accumulators are charged each day by a continuous current Gramme machine, regulated by resistances introduced into the circuit. The machine is driven by a 5 horse power "Otto" gas engine. With a little practice, the servant who has charge of the lighting can, it is said, estimate the consumption pretty accurately, and recharge the accumulators; allowing an excess of 10 or 12 per cent for loss—possible errors. When it is necessary to use all the lamps, the direct supply from the machine is added to that of the accumulators.

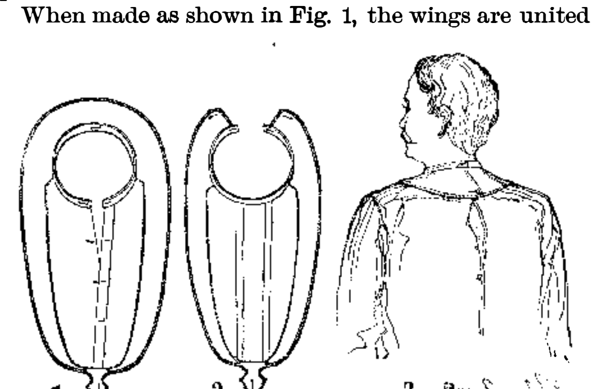
* "Cincinnatus," in Chicago *Shoe and Leather Review*.

DETACHABLE SHIRT BOSOM.

The accompanying cuts represent an invention patented by Mr. George W. Lee, of Ridgewood, N. Y., which relates to that class of bosoms which are worn on woolen or other shirts, or over ordinary dress shirts in case the bosom fixed in the shirt is soiled. The bosom is made of muslin, or other material, and is secured on a backing provided at its top with two wings, forming a cape at its upper corners. A neck band is secured to the upper end of the bosom and along the inner edges of the wings or cape. In the lower corner of one wing is a buttonhole, and on the other wing is a button. In wearing the bosoms, the wings, of uniform or nearly uniform depth, where attached to the neck band and forming a pendent cape hugging the sides and back of the neck but not extending out to the shoulders, are adjusted to their place in such a way that their ends come together on the back directly below the neck.

The front collar button or stud is passed through the shirt, the buttonhole in the neck-band of the bosom, and through the holes in the ends of the independent collar to be attached. The rear collar button is passed through the hole in the band of the shirt, through the holes in the ends of the neck-band, and through the rear buttonhole in the collar. The button on one wing of the bosom is passed through the hole in the other wing, thus holding the ends of the wings at the lower corners, the upper corners being held together by the rear collar button. The lower attached cape formed by the wings, by hugging the sides and back of the neck only, gives an excellent fit, and the bosom is not liable to be shifted or the independent collar to be displaced.

When made as shown in Fig. 1, the wings are united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LEE'S DETACHABLE SHIRT BOSOM.

at the rear, and the collar band is opened at the front. In this case the bosom is held by means of the front collar button, which is passed through the shirt, through the holes in the neck-band of the bosom, and through the two holes of the collar, and by the rear button passing through the neck-band of the shirt, the neck-band of the bosom, and then through the outer collar.

Draught of Boiler Furnaces.

The question frequently arises, What is the proper way to regulate the draught of a steam boiler furnace—by opening and closing the ashpit and furnace doors, or by means of a damper in the flue leading from boiler to chimney?

There is some difference of opinion and practice regarding this matter, which probably arises from differences or peculiarities in the constructive details of various boiler plants, which might make it desirable or even necessary to regulate one way in one case and the other way in another case.

Our own preference is decidedly in favor of regulating the draught by means of a damper placed in the uptake or pipe leading from the front end of the boiler, smoke box, or front connection to the main flue. This uptake should be made of wrought iron, and riveted securely to the boiler shell, and the damper should be fitted as close to its lower end or the tube openings as possible, and be provided with a convenient hand attachment whereby it may be set at any desired point and secured there.

There is much less liability of burning out the grates in a boiler furnace when the draught is regulated by a damper than there is when it is regulated by the ashpit door. For, let the ashpit door be closed tightly, and all circulation of air in the ashpit is stopped; there is nothing to prevent the heat from the layer of incandescent fuel being transmitted downward and overheating the grates, and overheating means warping, twisting, and cracking of the bars, and we have known them to be melted from this cause.

When, on the contrary, the ashpit doors are fully open, there is nothing to prevent the free circulation of air throughout the pit, and the bars are kept cool. We recommend omitting altogether doors to the ashpit, and making the opening through front nearly the full width of the grate, and making a water cavity or trough at least 6 inches deep in the bottom of the ashpit. This should be kept full of water, as it has a great effect upon the temperature below the grates.

For ease and certainty of regulation, a damper placed in the uptake, as described above, possesses great and obvious advantages over any manipulation of ashpit or furnace doors. Any one who has had charge of boilers fitted up in this manner can readily appreciate the truth of this statement.

There is, also, in our opinion, decidedly less loss of heat by infiltration of air through cracks in the setting walls when the draught is governed by a damper in flue than there is when the doors are used for same purpose; for, when ashpit doors are tightly closed, the draught of the chimney will draw air in through every crack and crevice in the walls, and this air entering the furnace at all points has a cooling tendency which it is most desirable to avoid. If the ashpit doors are opened, however, any leakage past the damper will readily be supplied by air passing through the fire, which is always the way air should go into a boiler furnace.

The damper should always be so fitted and adapted to the boiler that, when it is tightly closed as far as it can be by the apparatus provided for operating it, it will allow sufficient draught to just keep the fires going, and carry off any coal gas which may be generated in the furnace.

The foregoing relates more particularly to boilers used for power purposes, and those plants of such size as to require the constant supervision of an engineer or fireman. With many of the small house heating boilers where the draught is automatically regulated, it is deemed expedient by most steam fitters to regulate the draught by the ashpit door. For boilers of this type, this is undoubtedly a good plan in many cases; with the attention this class of boilers receives, there is probably less danger of filling up a house with coal gas.—*The Locomotive.*

Ballooning a Hundred Years Ago.

The 7th of January marked the centennial of the first aerial voyage—on record—ever made across the English Channel; and it was made by an American, not an Englishman, Dr. John Jeffries, of Boston. He was a successful surgeon in London, and was scientifically interested in air voyaging. He paid a hundred guineas for a balloon trip from London, to Kent, in 1784, with the French aeronaut Blanchard. This was so successful that he agreed to pay some $3,500 or more for a voyage across the channel. There were no gasometers for illuminating gas in those days, so ballooning was not an easy matter for long distances—or even short ones.

Blanchard, like some other aeronauts since, tried hard to escape his contract; even *a vest lined with lead*, sent home by the tailor to the wrong address, and which it was supposed would make their ascent difficult if not impossible, fell into Jeffries' hands. Finally they got off from Dover at a quarter past one o'clock, "the *little* hero," as Jeffries called him, "the little heroic captain," being absolutely driven to start by his scientific employer. Jeffries had studied the wind, and was more decided than the pilots were, who said it would not extend (fair) beyond mid-channel. They "had risen considerably" by half past one, and could count thirty-seven towns and villages, with "a formidable view" of the breakers on Goodwin Sands. The same formidable view of the waves continued to enliven the proceedings. They seem to have seesawed most of the way, throwing "overbasket" in their rise and fall, first, their ballast, then books, and even the brandy bottle.

They finally landed about twelve miles from the sea, in the wood of Guines, and not so far from Calais but that they reached there (after frequent hospitalities by the way) at one o'clock that night. Dr. Jeffries was made quite a hero at the French Court, and was on the best of terms apparently with Dr. Franklin, at Passy, and Mr. Jon. Williams; with Com. Paul Jones, Mrs. Bingham, "a very genteel American, from Philadelphia, and Mr. Bingham." His journal, which is given in the *Magazine of American History* for January, is second only to Sterne's in its charming and naive account of the France of that period. He "thanks God" for his safe return by sea to Dover, the end of February. Considering that eighty-six years later M. Naya, in that same Paris, could not guarantee any more than Blanchard where his balloons should land, when sent out from the besieged city during the Franco-German war, and that to-day, in the Jeffries Centennial, balloon voyaging is no more manageable than it was then for precision or utility, there is room yet for invention, and capital too, to be expended in air voyaging inventions.

New Turkish War Ship.

Preparations have been made for launching the ironclad frigate which has been nearly seven years on the stocks at Constantinople. Length amidships, 292 feet; extreme breadth, 55 feet; depth of hold, 39 feet; tonnage, 4,167; nominal horse power, 800; armor, 6 inches, 7 inches, and 9 inches, extending 5 feet below the water-line and 15 feet above it; armament, ten 8 inch Krupps, placed in a central battery arranged for both fore and aft as well as broadside firing. The ship is to carry, in addition, two 6 inch Krupps on the upper deck as ordinary pivot guns.

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