SCIENTIFIC AMERICAN

[Entered at the Post Office of New York, N. Y., as Second Class Matter.]

A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS, CHEMISTRY, AND MANUFACTURES.

Vol. LIV.—No. 7. [NEW SERIES.] NEW YORK, FEBRUARY 13, 1886. [$3.20 per Annum. [POSTAGE PREPAID.]

THE MARVIN SAFE.

The building of which we herewith present views of the two fronts (Fig. 3) was recently erected by the Marvin Safe Company, of this city, to replace the one destroyed by fire a few months ago. The building is a handsome and substantial structure of brick and iron, specially designed to meet the requirements of the work carried on in it, and is of unusual strength, in order to safely bear the great weight brought upon each floor. A safe, during the various stages of its manufacture, passes from the basement, where the crude material is delivered, up through the several departments to the top story, where it receives from the hand of the artist those final touches which render it ornamental as well as useful.

In the basement are the boilers and engines and the forging room. It becomes evident, when we consider the severe trials a safe is sometimes subjected to, that the frame should be of the strongest possible construction, and, to insure this, should be formed of one continuous piece of metal. A built-up frame not only presents more possible passages for the escape of the filling and the entrance of heat, but possesses less strength, and is therefore less able to successfully withstand the shock of falling, to which nine out of every ten safes are subjected to in a fire. If it were known that a safe would be called upon only to resist the effect of intense heat, and would not be dropped while hot into the cellar of the burning building, the problem of safe manufacture would be relieved of one of its most troublesome factors. Recognizing this fact, the Marvin safe is made with a continuous four-sided angle iron frame, thereby securing the strongest form of construction. The side and top panels fit within and overlap these angles, while the back frame is slotted to receive up and within it the back plate, which, after being slid to its place, is secured by a separate bottom piece, closing the gap at the bottom of the frame, and is in turn fastened to the frame by rivets. The back plate is further secured by fastenings passing through the outer angle iron frame, through the back plate, and entering an inside system of angles.

The front frame of the safe is stepped to receive the door, which is correspondingly stepped. A new and admirable feature is here introduced. A tongue and groove extends along or round the side, top, and bottom of the door opening, but not down the side against which the hinged side of the door rests. The door itself is made with a corresponding tongue and groove on like sides, so that the tongues of the frame

(*Continued on page* 100.)

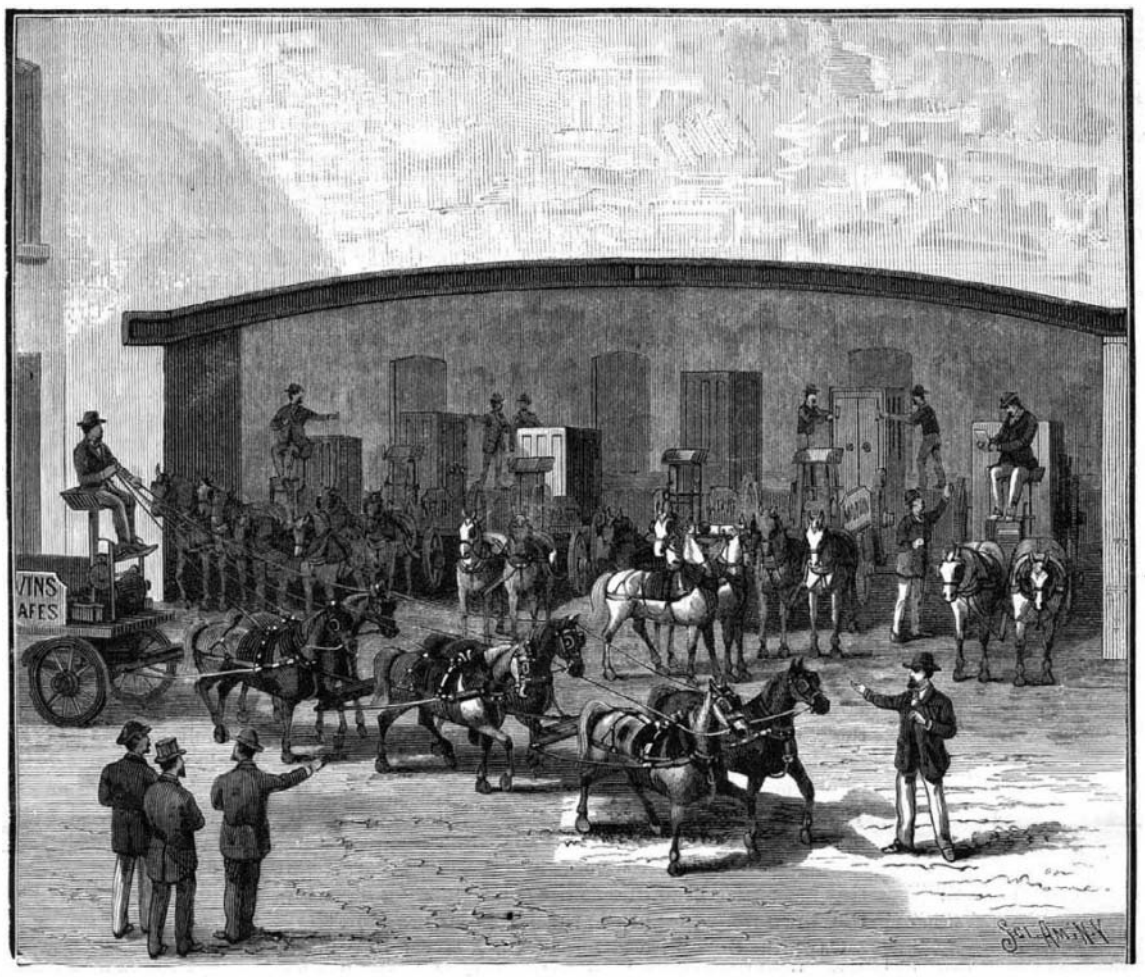

Fig. 1.—SHIPPING YARD AT THE FACTORY OF THE MARVIN SAFE COMPANY.

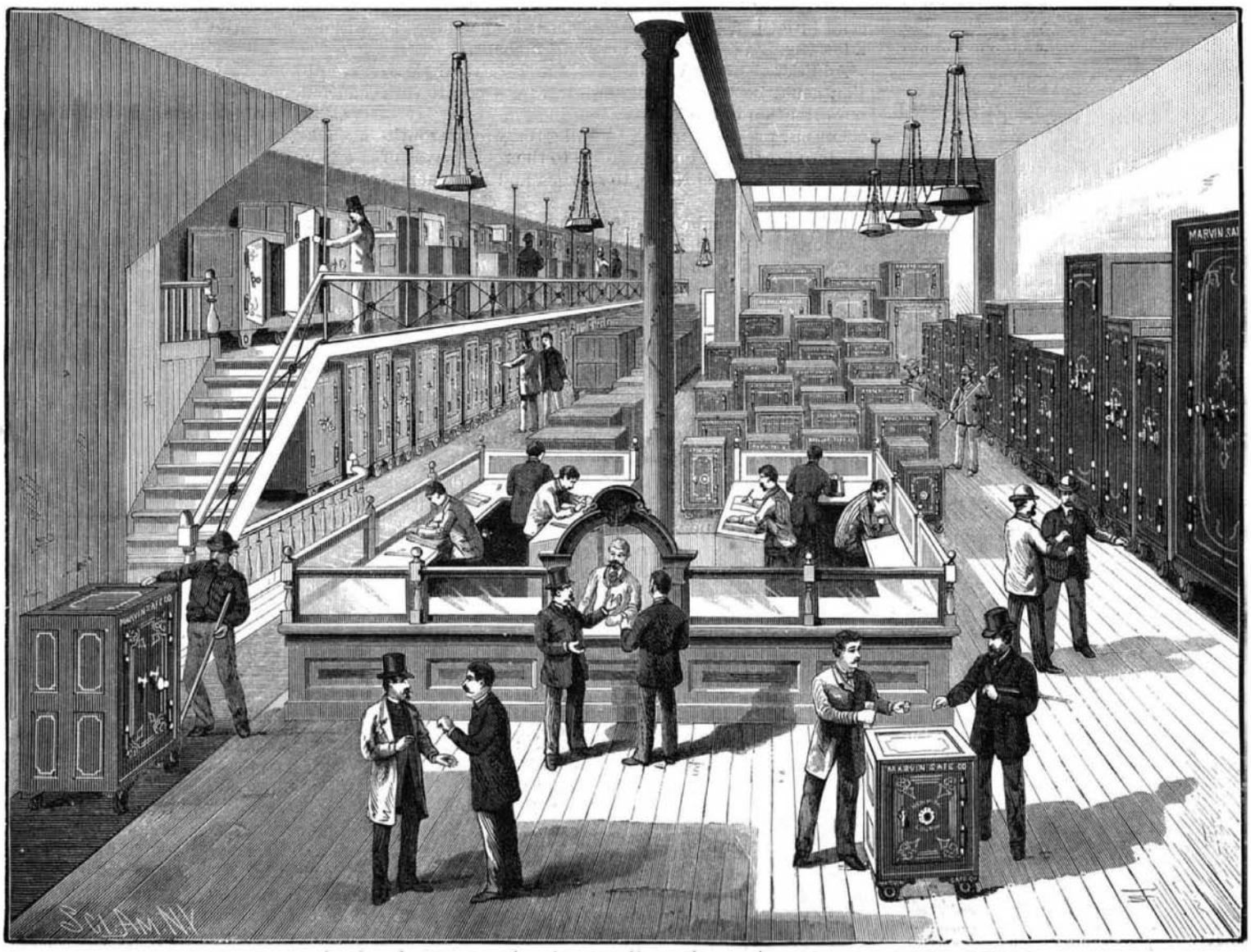

Fig. 2.—MARVIN SAFE COMPANY.—INTERIOR OF THE BROADWAY STORE.

THE MARVIN SAFE.

(*Continued from first page.*)

and the door interlock by the fit of the tongue of each one in the groove of the other, the tongues breaking joint with the frame and door. On its hinged side the door is provided with a heel tongue, or projecting flange, which extends along its entire side, from top to bottom, without a break. When the door is closed, this flange projects into a groove of corresponding size within the first step of the front frame, thus closing and breaking the entire joint between the door and frame at the hinged side. This construction acts as a protection against the action of fire, as regards the opening of the joints of the safe by the warping of its frame.

The inner face of the door is made with a recess sufficiently deep to receive within it a bookcase protector, which consists of a sheathing of material so treated as to render it highly non-conductive of heat. The protector is so placed as to form an air chamber, and thereby prevent any injury that might otherwise be communicated to the contents of the safe by the heated ironwork of the door. In order to obtain durability and strength in the hinges, they are made of annealed cast iron, and are securely riveted to the outside of the door and front plate, where they may be readily examined.

The Yale lock is placed next to the inner plate of the door, being connected with the dial on the outside by a small spindle running through a hollow tube.

These safes are usually furnished with a heavy plate iron inner door. The space between the inside and outside doors constitutes an air chamber most invaluable in preventing the induction of heat through the joints and over the flanges of the outside doors. The building of the frames and doors is done upon the fifth floor of the factory.

The most important material entering into the construction of a fireproof safe is the filling. This should be permanently effective—that is, it should not lose any of its heat-resisting qualities, no matter what may be the temperature of the office in which the safe is placed. Since, as is well known, "no injurious degree of heat can be communicated to the contents of a safe so long as the filling will give off steam at 212° F.," it follows that the property of generating steam or vapor is the most important of all considerations. The filling, which operation is carried on at the second floor, used in the Marvin safe is a mixture of asbestos, alum, and plaster, and it is to the good qualities possessed by this combination that the enviable record of these safes is largely due. Asbestos, while being indestructible by fire and highly non-conductive, can be reduced so as to retain its peculiar fibrous and interlacing or binding properties, and it is this form which is here used. It gives the required body to the plaster, enabling the latter to pack densely. It can be relied upon to bind the parts, and it affords the required clinging consistency to properly sustain the filling within the walls of the safe.

Alum is present because of its ability to give off vapor or steam; it contains over fifty per cent of water, which is liberated by heat.

Although the highly non-conductive properties of plaster make it useful here, it is introduced because of its power to absorb and retain large quantities of water. Its use prevents the dampness so destructive to ironwork of safes and to mechanism of lock, boltwork, etc., and effectually guards against the loss of fire-resisting qualities through the evaporation of the moisture from the lining.

On the fourth floor the burglar-proof work is done. This is made with solid wrought angle iron frames, welded at all corners, with alternating plates of wrought iron and five-ply welded steel and iron combined, or with an interlining of consecutive plates of welded steel and iron, making it impracticable for the burglar to drill the iron and then break away the steel. Each and every plate is confined to its place by heavy steel and iron screws, with heads pointing inward, and no two screws are placed in line with each other, all the plates being held together by heavy steel-headed conical bolts with nuts on the inside, over which the end of the bolt is riveted, thereby preventing burglars effecting an entrance by drilling or driving the conical bolts. The corners are all lapped with heavy, angle five-ply welded steel and iron. The conical bolts and steel plates are tempered drill-proof, and tested by drill under heavy pressure before leaving the factory.

Both the door and frame are stepped to fit each other, and in the face of each is formed a tongue and groove, so that when the door is closed there are two tongue and groove joints extending completely around the joint. In the bottom of each groove is a strip of felt which, when the door is closed, makes a perfectly air-tight joint. The door is hung upon double hinges, which permit each of its inner edges to be forced against the seat. Extending across the door is a bar journaled near each end in lugs projecting from the face of the door.

In the center of the bar is a handle arm, and at each extremity is an eccentrically placed pin; when the door is closed, one pin engages with a recess in a lug projecting from the frame, and the other enters a side projection on a sleeve moving upon a bolt passing through the two outer hinges. It will be seen that by turning this bar, by means of the handle, the door will be pressed into its seat. The bolts are then shot out to lock the door. The spindles of the lockwork and boltwork are made drill-proof, and are built into the doors with a steel hub, so as to make it impossible to draw, drive, or drill them, thus giving ample protection against gunpowder or other explosives.

When required, vault doors (which are made on the fourth floor) are constructed both fire and burglar proof. The outer door is then made of compound five-ply welded chrome steel and iron, two inches thick and secured by round polished bolts shooting out on all sides into a bolt frame of heavy bar iron, and locked with a Yale combination lock. The inner doors are made of heavy boiler iron, and secured by up and down bolts and Yale lock.

On the floor next to the top is the woodworking department, in which the interior of the safe is partitioned and provided with drawers, and in some cases the outside covered with cabinet work. Through the center of the building extends a shaft in which is an elevator capable of carrying the largest safe. The many fine horses which deliver the safes in and about the city are stabled on the third floor.

From the shipping yard shown in Fig. 1 the safes are taken to the commodious salesrooms of the Marvin Company, at No. 265 Broadway, this city, shown in Fig. 2.

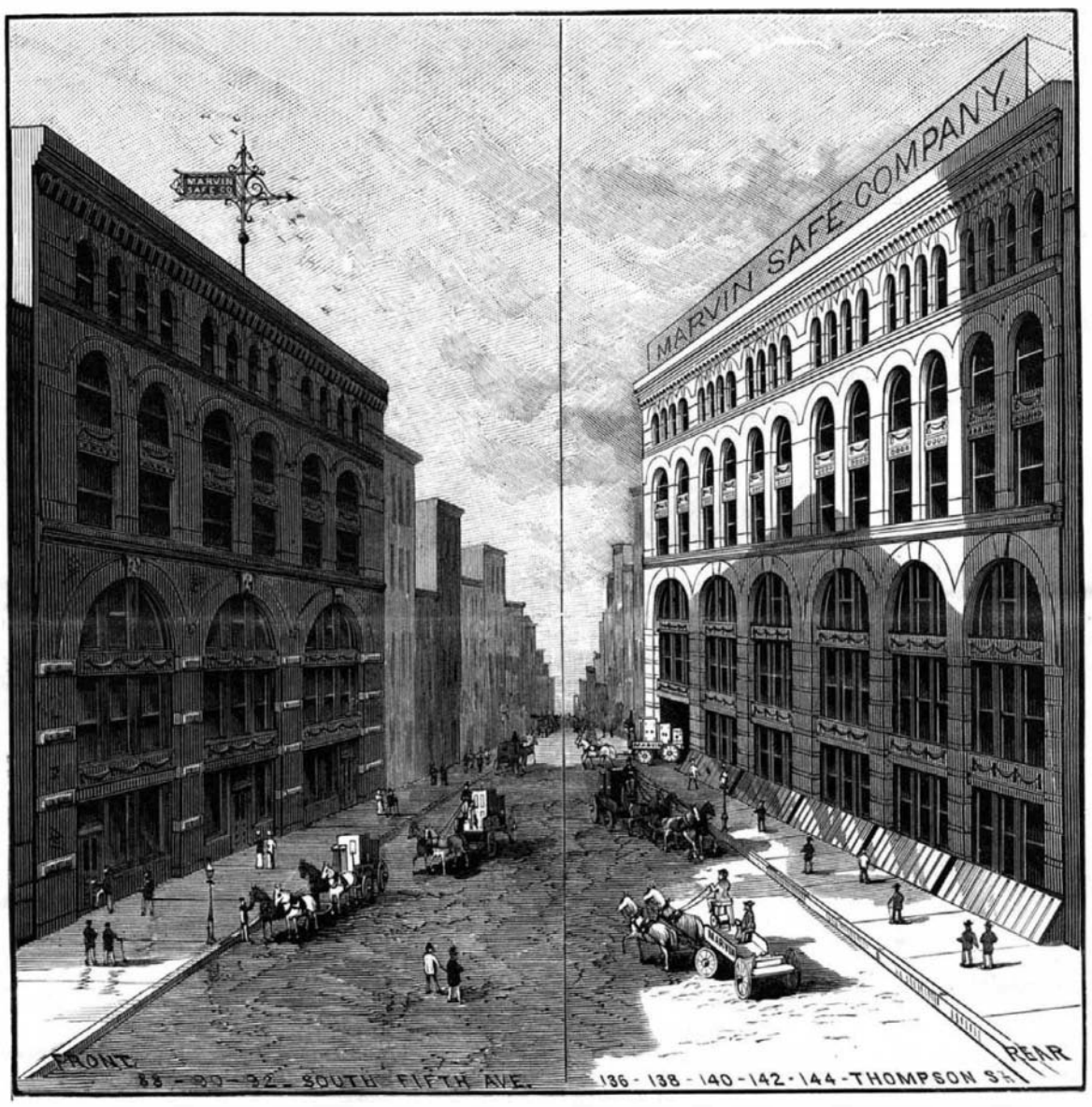

Fig. 3.—MARVIN SAFE COMPANY.—FRONT AND REAR VIEW OF THE NEW FACTORY.

Photography of a Tiger and His Prey.

A photograph of a tiger in the act of seizing his prey has, through a lucky accident, been secured by an Englishman in India. His camera happened to be focused on a buffalo which was tied to a stake some thirty feet away. A dry plate had just been put in place when a tiger leaped from the jungle, and with a single blow prostrated the buffalo. The circumstances were rather trying to the nerves of the operator, but he retained his presence of mind sufficiently to release the shutter before beating a hasty retreat. Some little time passed before he found it convenient to examine the result. Though the negative was poor, it gave a good idea of the relative positions of tiger and buffalo, and confirmed the generally accepted belief that the tiger, with his one knock-down blow, endeavors at once to dislocate the neck of his victim.

The Crank Defended.

What would we do were it not for the cranks? How slowly the tired old world would move, did not the cranks keep it rushing along! Columbus was a crank on the subject of American discovery and circumnavigation, and at last he met the fate of most cranks, was thrown into prison, and died in poverty and disgrace. Greatly venerated now! Oh, yes, Telemachus, we usually esteem a crank most profoundly after we starve him to death. Harvey was a crank on the subject of the circulation of blood; Galileo was an astronomical crank; Fulton was a crank on the subject of steam navigation; Morse was a telegraph crank. All the old abolitionists were cranks; the Pilgrim Fathers were cranks; John Bunyan was a crank; and any man who doesn't think as you do, my son, is a crank.

And, by the bye, the crank you despise will have his name in every man's mouth, and a half completed monument to his memory crumbling down in a dozen cities, while nobody outside of your native village will know that you ever lived. Deal gently with the crank, my boy. Of course some cranks are crankier than others, but do you be very slow to sneer at a man because he knows only one thing and you can't understand him. A crank, Telemachus, is a thing that turns something, it makes the wheels go around, it insures progress. True, it turns the same wheel all the time, and it can't do anything else, but that's what keeps the ship going ahead. The thing that goes in for variety, versatility, that changes its position a hundred times a day, that is no crank; that is the weather vane, my son. What? You nevertheless thank heaven you are not a crank? Don't do that, my son. May be you couldn't be a crank if you would. Heaven is not very particular when it wants a weather vane; almost any man will do for that. But when it wants a crank, my boy, it looks very carefully for the best man in the community. Before you thank heaven that you are not a crank, examine yourself carefully, and see what is the great deficiency that debars you from such an election. —*Bob Burdette.*

Digestibility of Cheese.

Klenze.—Of the eighteen varieties experimented with, Cheddar was digested in the shortest time (four hours), while unripe skim Swiss cheese required ten hours for solution. There is no difference in the digestibility of all sorts of hard cheese, or all soft cheese, but all fat cheeses are dissolved the most rapidly, because, being open by reason of the fat, they are the more readily attacked by the solvent. There is no connection between the digestibility and the percentage of water present in the cheese, but there is some connection with the percentage of fat and the degree of ripeness. From examination of the quantity of nitrogen dissolved, the author concludes that, on account of its great digestibility, cheese is the most nourishing of all foods, meat and eggs excepted.—*Jour. Chemical Society.*