SAMUEL F. B. MORSE.

BY JAMES PARTON.

During the voyage of the packet ship *Sully* from Havre to New York, in October, 1832, a conversation arose one day in the cabin upon electricity and magnetism. Dr. Charles S. Jackson, of Boston, described an experiment recently made in Paris with an electro-magnet, by means of which electricity had been transmitted through a great length of wire, arranged in circles around the walls of a large apartment. The transmission had been instantaneous, and it seemed as though the flight of electricity was too rapid to be measured. Among the group of passengers no one listened more attentively to Dr. Jackson's recital than a New York artist, named Samuel Finley Breece Morse, who was returning from a three years' residence in Europe, whither he had gone for improvement in his art.

Painter as he was he was nevertheless well versed in science, for which he had inherited an inclination. His father was that once famous geographer and doctor of divinity, of Charlestown, Massachusetts, whose large work upon geography was to be found, half a century ago, in almost every considerable collection of books in America. Besides assisting his father in his geographical studies, Samuel Morse had studied chemistry at Yale College under Professor Silliman, and natural philosophy under Professor Day. After graduating from Yale in 1810, he went with Washington Allston to London, where he received instruction in painting from Sir Benjamin West. Returning to the United States in 1815, he pursued his vocation with so much success that he was elected the first president of our National Academy, and held the office for sixteen years. In 1829 he went again to Europe for further improvement; and it was when returning from this visit that the conversation took place in the cabin of the *Sully*. During all the years of his artist life he had retained his early love for science, and usually kept himself well informed of its progress. Hence the eagerness with which he listened to Dr. Jackson's narrative.

"Why," said he, "when the doctor had finished, "if that is so, and the presence of electricity could be made visible in any desired part of the circuit, I see no reason why intelligence might not be transmitted instantaneously by electricity."

"How convenient it would be," added one of the passengers, "if we could send news in that manner."

"Why can't we?" asked Morse, fascinated by the idea.

From that hour the subject occupied his thoughts, and he began forthwith to exercise his Yankee ingenuity in devising the requisite apparatus. Voyages were long in those days, and he had nothing to do but meditate and contrive. Before the *Sully* dropped her anchor in New York harbor he had invented and put upon paper, in drawings and explanatory words, the chief features of the apparatus employed, to this hour, by far the greater number of the telegraphic lines throughout the world.

The system of dots and marks, the narrow ribbon of paper upon a revolving block, and a mode of burying the wires in the earth after inclosing them in tubes, all were thought of and recorded on board the packet ship. The invention, in fact, so far as the theory and the essential devices were concerned, except alone the idea of suspending the wires upon posts, was completed on board the vessel. A few days after landing, the plan, now universally adopted, of supporting the wires was thought of by the inventor, though he still preferred his original conception of the buried tubes.

The reader, of course, is aware that the mere idea of transmitting intelligence by electricity was not original with Samuel Morse. From the time when Dr. Franklin and his friends stretched a wire across the Schuylkill river, and killed a turkey for their dinner by a shock from an electrical machine on the other side of the stream, the notion had existed of using the marvelous fluid for transmitting intelligence; and long before the *Sully* was launched some attempts had been made in this direction which were not wholly unsuccessful. Science had done her part. It remained for the inventor to devise an apparatus which would utilize scientific truth, and Samuel Morse was the individual.

An artist arriving at home after a three year's residence in foreign countries is not apt to be furnished with a great abundance of cash capital; nor is he usually able to spend any more time in unproductive industry. Three years passed before Mr. Morse had set up his rude apparatus of half a mile of wire and a wooden clock, adapted to the purpose by his own hands, and sent a message from one end of his wire to the other, legible at least by himself. He used to exhibit his apparatus now and then to his friends, and he spent all the time he could spare from his profession in perfecting it. For some time it was placed in a large room of the New York University, where, in the fall of 1837, large numbers of persons witnessed its operation.

The invention attracted much notice at the time, as I can just remember. Every one said, How wonderful! How ingenious! and boasted of the progress man was making in science; but scarcely any one believed that the invention could be turned to profitable account, and no man could be found in New York willing to risk his capital in putting the invention to a practical test. By this time, however, Mr. Morse had become fully possessed by the inventor's mania, which shuts a man's eyes to all obstacles, and forces him to pursue his project to the uttermost.

Having no other resource he went to Washington in 1838, arranged his apparatus there, exhibited its performance to as many members as he could induce to attend, and petitioned Congress for a grant of public money with which to make an experimental line between Washington and Baltimore, a distance of forty miles. It is weary work getting a grant of money from Congress for such a purpose; and it *ought* to be, for Congress has no constitutional right to give away the people's money to test such an invention. A committee reported upon it favorably, but nothing further was done during the session.

He crossed the ocean to seek assistance in Europe. His efforts were fruitless. Neither in France nor in England could he obtain public or private encouragement. It seemed out of the sphere of government, and capitalists were strangely obtuse, not to the merits of the invention, but to the probability of its being profitable. They could not conceive that any considerable number of persons in a country would care to pay for the instantaneous transmission of news. Returning home disappointed, but not discouraged, he renewed his efforts, winter after winter, using all the influence of his personal presence at Washington, and all his powers of argument and persuasion.

March the third, 1843, the last day of the session, was come. He attended all day the House of Representatives, faintly hoping that something might be done for him before the final adjournment; but as the evening wore away the pressure and confusion increased, and at length hope died within him, and he left the capitol. He walked sadly home and went to bed.

Imagine the rapture with which he heard, on the following morning, that Congress, late in the night, amid the roar and stress preceding the adjournment, had voted him thirty thousand dollars for constructing his experimental line! Eleven years and a half had passed since he had made his invention on board the ship. Perhaps, on that morning, he thought it worth while to strive and suffer for so long a period to enjoy the thrill and ecstasy which he then experienced.

But his troubles were far from being over. Clinging still to his original notion of inclosing the wires in buried tubes, he wasted nearly a whole year, and spent $23,000 of his appropriation in discovering that the plan would not work. He resorted at length to the system of wires suspended upon poles; and on the 1st of May, 1844, messages were transmitted between the two cities, and the electric telegraph was an accomplished fact!

Many years elapsed before the invention was of much advantage to Mr. Morse. Rival inventors entered the field, and rival companies spoiled the business. It was not until the consolidation of most of the companies into two or three that the business of transmitting messages by telegraph was very profitable to any one. During the last few years the inventor has been enriched; but I presume there are at least fifty persons now living who, without having contributed an idea to the invention, have made more money by it than the inventor.

What an astounding development the business has attained in the United States! We have one company the capital stock of which is $41.000,000, and the receipts during the year 1869 $7,500,000, of which more than $2,500,000 were profit. This company has 121,595 miles of wire, 3.469 stations, 2,607 instruments for reading by sound, 1,334 recording instruments, and 22 000 magnetic battery cups. It transmitted last year 40,000,000 messages, and an amount of newspaper matter equal to about 30,000 columns of the New York *Ledger*. There is one telegraphic office in the city of New York in which 125 operators are employed, and you may see them at work if you step in at the corner of Broadway and Liberty street. It is not unusual for this office to receive and send 30,000 messages in one day. Not far from the *Ledger* office there is a small sign-board over one of the cable offices, which I should suppose Mr. Morse could never read without emotion. It is this:

"Telegraphic messages sent to all parts of Europe, Asia, and Africa."—*James Parton, New York Ledger.*

The Fifth Avenue Cathedral.

The great Roman Catholic Cathedral, covering the entire square between Fifth and Madison avenues, and Fiftieth and Fifty-first streets, is rearing its vast proportions above the ground level with increased rapidity. The entire area of ground occupied by the edifice proper is one and a half acres. The huge enterprise, commenced about five years ago, during the lifetime of the late Archbishop Hughes, is now progressing towards completion as rapidly as circumstances will admit, under the direction of Archbishop McCloskey. The time estimated as necessary to finish the work is about twenty years. At present considerably over one hundred men are employed in quarrying, stone-cutting, masonry, and general labor. The marble used is quarried at Pleasantville, on the Harlem Railroad, and is brought directly on the premises by a special branch track. It is of the very best quality for building purposes, being of fine, large crystals, of an even consistency and uniform color. Some of the blocks are very heavy, weighing from ten to fifteen tuns each.

The walls have now reached a hight of fifty-four feet to the triforum, and are ready to receive the cornices and parapet. Next season the columns for the clear story and the arches, will be reared; the entire front wall will also be completed. The transepts are now finished. The large Gothic windows, some twenty feet above the ground level, are all finished, and indicate the grandeur of the flood of light that they will admit through gorgeous stained glass. The mullions, traceries, etc., are all very delicately and beautifully wrought, but are not to be compared to the splendor of the greater upper windows in the clear story, yet to be erected.

A meager idea of the stupendous work can be gleaned from these items: The distance from the floor to the ceiling is to be 110 feet. The edifice is cruciform in shape; it is 185 feet wide at the transepts, and 330 feet in length. There will be two towers and two spires, each 330 feet high—the ground length of the building.

The side walls are between three and four feet thick; the tower walls between twelve and fourteen feet thick; the clear-story walls are to be three feet thick. About $800,000 have already been expended, and $2,500,000 will be required for its completion. The grand central entrance on Fifth avenue, lately completed, is a marvel of stately beauty and architectural finish. It is seventy feet in hight, thirty-three feet in width, with opening doors twenty-five by fifteen feet in dimensions. The marble work is most elaborately wrought. Rich carvings—the archiepiscopal coat of arms, the miter, keys, etc., form the key-stone piece; lilies of the valley, grapes of Eschol, grains of wheat, wreath of ivy, myrtle, olive branches, etc., ornament the sides. Incomplete as it is in every part, already the Cathedral is a thing of wondrous and fairy-like beauty. Its grand doorway is a marvel of art, its walls like carven snow in their purity, and with infinite grace are blended in their buttresses and pillars massive strength with ethereal lightness of effect. Inside the walls the picture is a strange one. Much of the ground is grass-grown, and piles of debris, masses of carved blocks of marble, mountains of brick and cement, cover the earth here and there. Work is going on but in a lazy, dreamy sort of way. There is no hurrying crowd of workmen; there are no unseemly noises of puffing engines, creaking derricks, and shouting laborers. A single lonely-looking horse sedately lounges along a path prepared for him, slowly hoisting up bricks and mortar to the men at work upon the interior of the walls. A yoke of patient oxen and still more patient driver languidly move big blocks of marble hither and thither on a low sledge. There is no haste; the men work as those who work for all time, and propose to take all time to do the work in. One has an almost irresistible inclination to lie down and go to sleep somewhere about the place. The loudest noise to awaken him, if he did, would be the chirping of the countless sparrows flitting all about, and his dreams would inevitably be of ghostly ruins in a land of eternal rest and silence. When complete, however, it will be the finest church edifice in America.

It is contemplated soon to commence operations on two new buildings, the archiepiscopal palace, on the corner of Madison avenue and Fiftieth street, and the pastoral residence on the corner of Madison avenue and Fifty-first street. These will be very large and of elegant design; the same marble, material, and architecture in correspondence with the Cathedral style will be used.

"The Most Murderous Machine."

The *Gaulois* of Paris lately published a paragraph stating that "The man who shall invent the most murderous machine, and the one easiest to use and handle, shall receive from the French nation a prize of 500,000 francs." This offer recalls to mind a passage in Lord Buchan's life of Napier, the inventor of logarithms, born in 1550, died 1617. In a note Lord Buchan quotes from St. Thomas Urquhart's Tracts (Edinburgh, 1774), who states that Napier had "an almost incomprehensible device, which, being in the mouths of the most of Scotland, and yet unknown to any that ever was in the world but himself, deserveth very well to be taken notice of in this place, and it is this—he had the skill, as is commonly reported, to frame an engine which, by virtue of some secret springs, inward resorts, with other implements and materials fit for the purpose, inclosed within the bowels thereof, had the power (if proportionable in bulk to the action required of it—for he could make it of all sizes) to clear a field of four miles circumference of all the living creatures exceeding a foot in hight that should be found thereon, how near soever they might be found to one another; by which means he made it appear that he was able, with the help of this machine alone, to kill 30,000 Turks without the hazard of one Christian!"

Of this, it is said (continues his lordship), that on a wager he gave proof upon a large plain in Scotland, to the destruction of a great many head of cattle and flocks of sheep, whereof some were distant from others half a mile on all sides, and some a whole mile." * * * (But) "when he was most earnestly desired by an old acquaintance and professed friend of his, even about the time of his contracting the disease whereof he died, that he would be pleased, for the honor of his family and his own everlasting memory to posterity, to reveal unto him the manner of the contrivance of so ingenious a mystery, subjoining thereto, for the better persuading him, that it were a thousand pities that so excellent an invention should be buried with him in the grave, and that after his decease nothing should be known thereof—his answer was, that for the ruin and overthrow of man there were too many devices already framed, which if he could make to be fewer he would with all his might endeavor to do; and that, therefore, seeing the malice and rancor rooted in the heart of mankind will not suffer them to diminish the number of them, by any new concert of his they should never be increased." "Divinely spoken, truly," adds his lordship, and divinely say we. Yet this was precisely the sort of machine, "the most murderous and the most easily handled," at present in request at Paris.

MAMMOTH PEARS FROM SOUTH CAROLINA.—Mr. S. C. Means, of Spartanburg, S. C., has sent us a number of very large and beautiful pears, the largest of which weighs 1¾ pounds. The fruit keeps, he states, till May. As it is not in condition to eat at present, we cannot speak for its flavor, but Mr. Means states that they are excellent in this respect. He has no name for his fruit, but they clearly resemble the pears which are being brought overland from California to this market.

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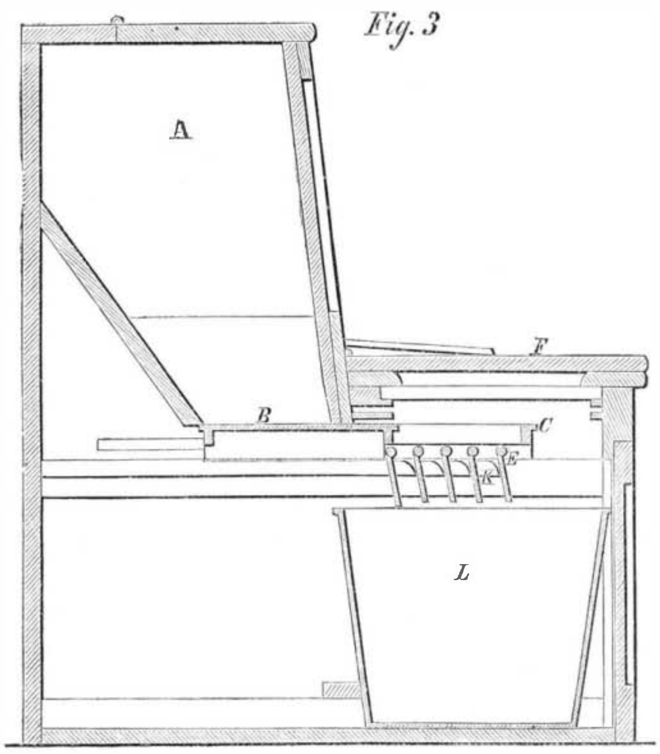
Improved Earth Closet.

The attention which has been lately given to the earth closet system, is stimulating inventive talent to devise means for more conveniently applying it to general use. We herewith illustrate a new commode, which comprises many conveniences over others we have seen.

Fig. 1 is a perspective view of this commode ; Fig. 2 a horizontal cross section made just below the seat, and comprising a plan view of the means whereby the earth is carried over and deposited upon the excrementitious matters; and Fig. 3 is a vertical section, designed to better show the operation of various parts of the device.

The earth is placed in a chamber, A, Figs. 1 and 3, the bottom of which consists of a metallic slide, B, Figs. 2 and 3. When the commode is not in use, all the parts occupy the position shown in Fig. 3, that portion of the metallic slide lying under neath the chamber being a continuous plate, fitting tightly against the bottom edges of the walls of the chamber.

The anterior portion of the slide, shown at C, Figs. 2 and 3, consists of recessed shallow chambers, D, Fig. 2, the bottoms of which are closed by pivoted slats, E, Figs. 2 and 3. These slats drop down into the position shown in Fig. 3, when the commode is not in use, and the lid of the seat is closed.

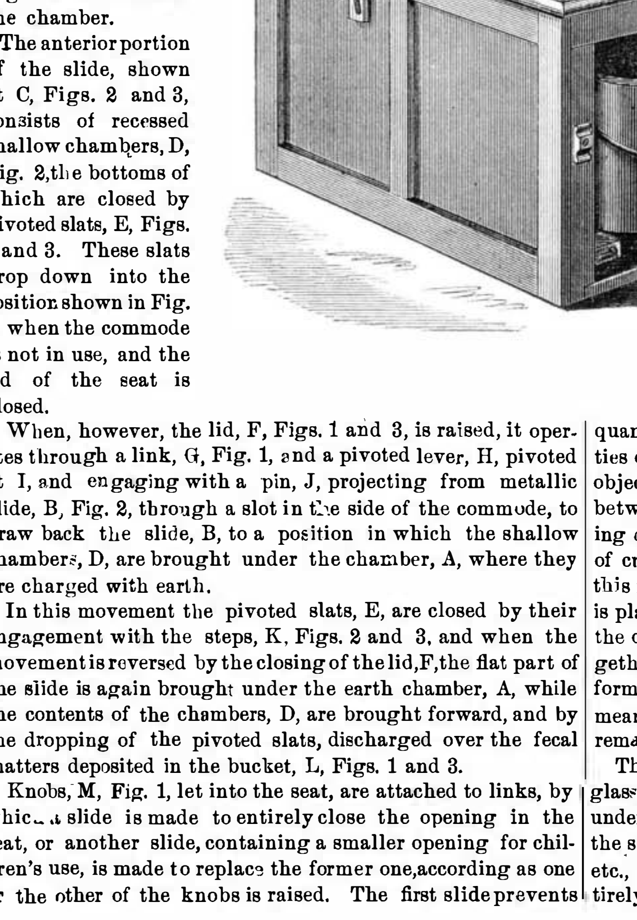


WAKEFIELD'S EARTH CLOSET.

When, however, the lid, F, Figs. 1 and 3, is raised, it operates through a link, G, Fig. 1, and a pivoted lever, H, pivoted at I, and engaging with a pin, J, projecting from metallic slide, B, Fig. 2, through a slot in the side of the commode, to draw back the slide, B, to a position in which the shallow chambers, D, are brought under the chamber, A, where they are charged with earth.

In this movement the pivoted slats, E, are closed by their engagement with the steps, K, Figs. 2 and 3, and when the movement is reversed by the closing of the lid, F, the flat part of the slide is again brought under the earth chamber, A, while the contents of the chambers, D, are brought forward, and by the dropping of the pivoted slats, discharged over the fecal matters deposited in the bucket, L, Figs. 1 and 3.

Knobs, M, Fig. 1, let into the seat, are attached to links, by which a slide is made to entirely close the opening in the seat, or another slide, containing a smaller opening for children's use, is made to replace the former one, according as one or the other of the knobs is raised. The first slide prevents



the emission of fetid exhalations, and, also, prevents the escape of dust while the earth is deposited in the bucket.

An automatic vertical metallic slide, N, Fig. 1, also operates to close the slot in the side of the case, in which the pin, J, plays, and prevents the escape of exhalations from it.

A device, not shown, for placing earth, coal ashes, etc., in the chamber, A, enables this operation to be performed without the escape of dust into the apartment in which the commode is placed. Patented May 17, 1870, by Chas. A. Wakefield. Address, for rights, licenses, or agencies, Wakefield Earth Closet Co., 36 Dey st., New York.

BUTTERMILK.—Persons who have not been in the habit of drinking buttermilk consider it disagreeable, because it is slightly acid, in consequence of the presence of lactic acid. There is not much nourishment in buttermilk, but the presence of the lactic acid assists the digestion of any food taken with it. The Welsh peasants almost live upon oat-cake and buttermilk. Invalids suffering from indigestion will do well to drink buttermilk at meal times.

How Glass Paper Weights are Made.

Every one knows those paper weights of solid, colorless glass, in a hemispherical shape, in the center of which are bouquets, portraits, and even watches and barometers, etc., but few persons know how or by what means these things are incarcerated in the center of the glass. There is a great distinction to be made, not merely between the objects, but also between the materials of which they are composed. As those representing flowers and bouquets in glass—those from which the name is derived—are the most ancient and the best known, we will begin with them.

The first thing to be done is to sort and arrange a certain quantity of small glass tubes of different colors in the cavities of a thick molten disk, disposing them according to the object to be represented. This done, the tubes are inclosed between two layers of glass. To do this they begin by placing on one side of the disk which contains the tubes, a layer of crystal, to which the tubes soon become attached. When this is done the disk is removed and a second layer of crystal is placed on the opposite side. The object being placed in the center between these two layers of glass thus soldered together, it becomes necessary to give the ball its hemispherical form, which is done when the crystal is again heated, by means of a concave spatula of moistened wood. It then only remains to anneal and to polish it on the wheels.

That a glass ornament, being covered with a layer of hot glass, should receive no injury or change of color, may be easily understood from its extremely refractory nature ; but it is not the same with objects in metal, such as watches, barometers, etc., which a far less degree of heat would oxidize or even entirely destroy. The mode of manufacture, therefore, of these latter objects is quite different from that of the first. It is easy to prove this. If we look at a paper weight, provided the interior be of glass, the upper and under part of the recipient will also be of glass. If we now examine a paper weight containing a watch or barometer, under the lower part of the ball will be found a piece of green cloth, the use of which is to keep in place the objects which, instead of only forming one body with the covering of glass which surrounds them, are only placed in a cavity made beforehand in the center of the half spherical ball. In a word, to take out the glass ornaments, it would be necessary to break the paper weight, whilst to take out the others it would suffice to take off the cloth. As for the paper weights in which are placed portraits, usually of a yellowish color, these profiles are made of refractory earth, and many thus bear well a heat which only softens glass. Manufactured successively at Venice under the name of milleflori, and then in Bohemia, these paper weights have been carried to perfection only by French artists. The sole diffi- culty in their manufacture is in avoiding internal air bubbles, which would the more deform the objects, as any defect would be much increased by the thickness of the glass.

Pin Making in Birmingham, England.

Birmingham, into which the pin-manufacture was introduced about a hundred years ago, is now the headquarters of the pin-manufacture. Then a single pin passed through fourteen pair of hands in the operations of straightening the wire, pointing, cutting into pin lengths, twisting wire for heads, cutting heads, annealing heads, stamping heads, cleaning pins, whitening, washing, drying and polishing, winnowing, paper-pricking, and finally papering up. Adam Smith, arguing on the advantages of the division of labor, can find no better illustration than that afforded in the making of a pin. "Not only the whole work is a peculiar trade, but it is divided into a number of branches, of which the greater part are likewise peculiar trades. One man draws out the wire, another straightens it, a third cuts it, a fourth points it, a fifth grinds it at the top for receiving the head ; to make the head requires two or three distinct operations ; to put it on is a peculiar business, to whiten it is another ; it is even a trade by itself to put them into the papers : and the important business of making a pin is, in this manner, divided into about eighteen distinct operations, which in some manufactories are all performed by distinct hands, though in others the same man will sometimes perform two or three of them. I have seen a small manufactory of this kind, where ten men only were employed, and where some of them consequently performed two or three distinct operations. But though they were poor, and therefore but indifferently accommodated with the necessary machinery, they could, when they exerted themselves, make among them about twelve pounds of pins in a day. There are in a pound upwards of four thousand of a middling size.

Those ten persons, therefore, could make among them upwards of forty-eight thousand pins in a day."

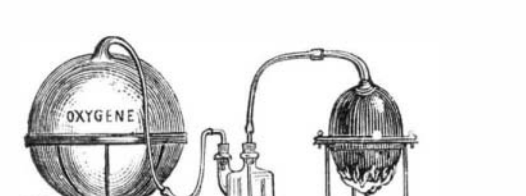
Adam Smith would now have to seek elsewhere for illustrations of the benefit of a division of labor, thanks to Wright, the American, who brought out, in 1824, a machine producing a perfect pin during the revolution of a single wheel. This machine, improved in many ways, is that employed at the largest pin-factory in Birmingham at the present day.

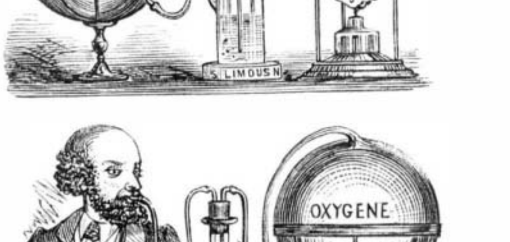
Pin papers are generally marked by means of a molded piece of wood, the molds corresponding to those portions representing the small folds through which the pins are passed and held.

The paperer, usually a girl, gathers two of the folds of the paper together, and places them—a small portion projecting—between the jaws of a vise, having grooves channeled in them, to serve as a guide for the placing of the pins. When filled, the paper is released, and held so that the light strikes upon it, when the eye at once detects every defective pin, and the ready hand removes it. One house consumes three tuns of brass wire per week in producing these ever-wasted utilities, the consumption of which in this country alone is calculated at fifteen millions per day.

APPARATUS FOR MAKING AND INHALING OXYGEN

The use of oxygen gas as a remedial agent and its administration by inhalation, have been attended with success in





certain pulmonary diseases. Our engravings illustrate a very simple apparatus, designed to facilitate the use of this remedy. Fig. 1 shows the apparatus employed to generate the gas. The material (chlorate of potassa) is placed in a retort, fixed in a convenient stand, and the heat is obtained from a spirit lamp or a Bunsen gas burner. The gas is passed through a Wolfe's bottle containing water which washes it and cools it, and it then passes into a spherical receiver, also fixed in a convenient stand. In inhaling the gas it is drawn through flexible tubes from the spherical receiver, passing in its course through a washing bottle or flask, as shown in Fig. 2, before entering the lungs. The invention of this apparatus is due to M. Limousin.

PERPETUAL MOTION.—We commence this week the publication of a series of illustrated articles on self-motors, which will be continued from week to week for several months. It will form a very curious history, and no doubt will be a painful reminiscence to some.

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