THE CHILDREN OF MECHANICS.

The home is the center of human happiness, so far as happiness concerns our brief earthly life. Any thing that destroys home is inimical to happiness. Home, comprising wife, children, friends, with the domestic castle, is essential to the proper development of the best qualities of our nature and to the well being of all who have the least amount of civilized human feeling. The influences of home, more than the state of the market, the rate of wages, the condition of business, affect the workman. He can withstand the lowering of the price of his productions, the temporary depression of profits in his business, or the unforeseen fluctuations of the market, if he is sustained by the influences of home, and if he can be assured that his children can avail themselves of advantages which will enable them to retain their position and provide for themselves and those dependent upon them when he shall have left them. Then the future is humanly secure—for the present he can provide.

But what if there is a perpetual struggle at the present, with a gloomy uncertainty of the future. The man is deprived of all his vigor of mind, his enterprise, his pride. Yet such is the condition of thousands of industrious men in England. A correspondent of the *Pall Mall Gazette*, who has visited some of the iron furnaces in the "black country" of Staffordshire and Worcestershire says:—

In the mills and forges boys of all ages, from eight and upward, may be found, amid the labyrinth of machinery and the coils of heated iron, engaged by day and night in tugging long, red-hot seething bars. Their activity is very great, owing to the nature of their work, which requires rapidity of movement, and contrasts strangely with their otherwise jaded and worn appearance. In addition to the labor of dragging along the iron, each of these little fellows has to run, in short stages, a distance of more than eleven miles every day, in an oppressive atmosphere, thick with dust and steam. Owing to the quick and uncertain movements of the hot iron bars in their passage through successive rolls before having time to cool, the occupation of these boys is attended with some danger—a serious burn being an almost every-day occurrence.

Standing in the midst of an extensive forge, a few years ago, I was alarmed by a cry of terror at the further end of the works. There was a general rush to the spot, and I shall never forget the horrible and sickening sight that met our view. A large rod of seething iron, in coming from the rolls, had somehow twisted aside, and had literally pierced through the body of a little fellow some ten years old. For a while the roar of the machinery was suspended, and two or three brawny puddlers carried the hapless creature home; but when the first thrill of horror had passed away the wheels were again set in motion and all went on as before.

The lives of these boys are almost entirely spent in the forges, except the hours allotted to sleep. They have their meals there, and in the snatches of leisure it is their play-ground. In most of the works is the arm or basin of a canal, the water of which is kept in a state of chronic fever, and in which, despite its inky color, they delight to bathe, both in winter and summer. So constant are they in their ablutions that they often come out parboiled, like a washerwoman's thumb. Some of the proprietors of these works have provided night schools for the instruction of the children in their employ; but, as a rule, they are in mind and body alike neglected, and the densest ignorance prevails. They have no home training, most of their houses being locked up all day, the parents and all the children being out at work; and returning home fatigued at night, nothing but bed or a carousal in the "Fox and Dragon" is acceptable.

Returning home late one evening, I saw two little children, a boy and girl, lying asleep upon a door step, which proved to be that of their own home. On awaking them they told me that they were waiting for their mother to come out of the neighboring tavern, and open the door. They had no father and had been hard at work all day. The boy worked in a forge, the girl in a foundery, and the mother in a japanning factory, and though thus separated all day, there seemed no bond of affection to bind them when they met together.

In such a state of affairs there can be no legitimate home influences. The father and mother, all the children whose infantile strength can be utilized, are employed at hard labor, day after day, and week after week, too wearied, after performing their allotted task, to exert themselves to make home happy. Life to them is an endless and exacting treadmill. The gentler virtues, which give a charm to feminine character, make childhood loveable, and civilize and elevate coarse, masculine humanity, cannot grow in such sterile soil. What do our mechanics think of such an exhibit as the following:

West of Dudley is a strange wild region known as the "nailing district," composed of scattered hamlets, to all the houses of which is attached what appears to the stranger a blacksmith's shop. The manufacture of wrought nails is, and has been for a century or more, the great staple industry of the district. It is carried on by the nailers in their own houses. In few trades of the district does the employment of women and young children assume a more objectionable form than in this. The women seem to have lost all traces of the modesty of their sex, and from childhood are addicted to swearing and smoking resembling as far as possible the other sex in their habits and deportment even to the wearing of their coarse flannel jackets. They mostly marry very young, often at fourteen, and seldom later than eighteen or twenty. With such women for mothers, it is not difficult to judge of their children. From tenderest ages, often from five or six years, they are trained to that round of labor in which their lives are doomed to be spent. The first stage is "blowing the bellows," and next they are taught to forge the smaller kinds of nails.

The hours of labor are dreadfully prolonged, often exceeding sixteen hours per day; the rate of remuneration is very low, and the houses are consequently wretchedly poor. Entering one of them lately, I saw the father, mother, and eight sons and daughters, all toiling in a small ill-ventilated dirty hovel. It was growing late in the evening, and I inquired, "Is it not time to cease your day's work?" "Oh, noa maister," rejoined the mother; "we've a noit's work afore us yet, or there'll be no bread o' the loaf o' Sunday." It was Friday night, and it was, as I learnt, a practice to work from Friday morning until Saturday afternoon, without having more than short snatches of rest for meals. While I lingered, a little fellow, who could not have been more than eight, fell from his work, apparently exhausted, but his father, on observing it, threw at him a hammer handle, telling him with an oath, to recommence his work. He took no part in our conversation, having, like his two eldest daughters, a short pipe in his mouth, which seemed to him and them "the calumet of peace."

American mechanics and laborers should feel grateful that neither they nor their children are consigned to such a hopeless and dismal slavery as this. The child of an American mechanic is treated as a child until it has assumed the virility of manhood. Home influences, schools, good air, God's glorious sunlight, and freedom, educate the child into a character above that of a human brute. These influences are absolutely necessary to the development of a rounded, manly character. Home is the primary school for such education, and when it cannot exist with a proper provision for its inmates, it is proof positive "there is something rotten in Denmark."

[For the Scientific American.]

THE STEAM ENGINE INDICATOR.

Perhaps nothing connected with steam engineering of such acknowledged importance receives so little attention among builders and owners of steam engines. Its use to the constructing engineer is of the most vital importance. Without it he works in the dark. His engine may be well and properly proportioned, yet hidden defects may exist in the steam passages by the falling or washing of cores which reduces or distorts the passages, yet are not easily detected by the eye.

The writer remembers during a somewhat extended experience many instances of this. In two cases he has found the exhaust passages entirely closed, and yet it was not detected until the engine had steam on it and an attempt was made to have it move. Other cases have come under his notice where the passages have been but partially closed—here the indicator reveals it at once. The writer knew of an engine 16×40 inches made by a popular firm for a party to put in a large building for the purpose of supplying power to tenants. The machine was got up with great care from new patterns, and being in a good location to show, it was intended as a model engine by the makers.

It proved to be, however, a very expensive machine to run. New and improved boilers were put in but without materially reducing the amount of fuel consumed. The engine was overhauled repeatedly by the makers, who did everything within their knowledge to improve it, but without effect. The power generated cost too much. The landlord lost money and failed; the same result followed his successors, and finally the engine was thrown out and its place supplied by another with good results to the owner of the property.

The old engine was offered for sale, and sold to go in an armory in an adjoining State. It was overhauled and put in good condition so far as could be seen, and put at work, but with the same result—a large consumption of fuel for the power available. After all other expedients had failed, the indicator was applied, when it was found that with an initial pressure of 60 pounds there was a back pressure of 15 pounds! Here, then, was revealed the cause of the trouble. On examination, the exhaust passage was found obstructed; the cores had not met properly, and the exhaust steam had to pass through an aperture of about a square inch in area. On cutting through the side pipe and removing the slight obstruction the engine performed a duty due to the fuel consumed.

On another point of great importance to the well working of the steam engine the indicator is invaluable—the setting of valves. Most engineers think they can set their valves by the eye, but an experience, somewhat extended, with the indicator has shown the writer that as a rule this is a fallacy; valves have to be set by the eye when the engine is not under steam, hence the expansion, the springing of the various parts, which cannot with certainty be ascertained, consequently it is seldom that they are right. The indicator, then, is the only way known by which valves can be perfectly adjusted.

Until the year 1862, the instrument in use previous could not be used on engines of quick motions with any satisfactory result. At the great exhibition of that year, in London, an indicaton was exhibited, invented by Mr. Charles B. Richards, of Hartford, Conn., by which diagrams, correct and entirely reliable, are taken under any attainable speed; hence locomotives and any other quick-running engines are indicated with equal accuracy as the large slow-moving marine engine.

Another important fact is proved by the indicator—the exact amount of power exerted by the engine; this, compared with the fuel consumed, enables the engineer to compute with exactness the cost per horse-power, also the quantity of power used for certain work or by different tenants. About this there is no guess-work; it is absolutely weighed and measured.

The custom of renting power by a belt of given width and velocity is fallacious. It is easy to tell what power a belt should transmit, yet it is utterly impossible to tell how much it will transmit; so many contingencies arise, some of which follow the quality and condition of the belt, the condition of the pulleys, the amount of contact with pulleys, the position—whether vertical, horizontal, or diagonal; which side is the draft on; whether the grain or flesh side is in contact with the pulley, the tension, the condition of the atmosphere, etc. The only reliable mode is to measure the work by the indicator. By it we can ascertain the comparative value of different kinds of fuel, also of lubricants, the ability and faithfulness of the engineer and fireman. In fine, all elements which assist in making and using steam efficaciously and economically.

F. W. B.

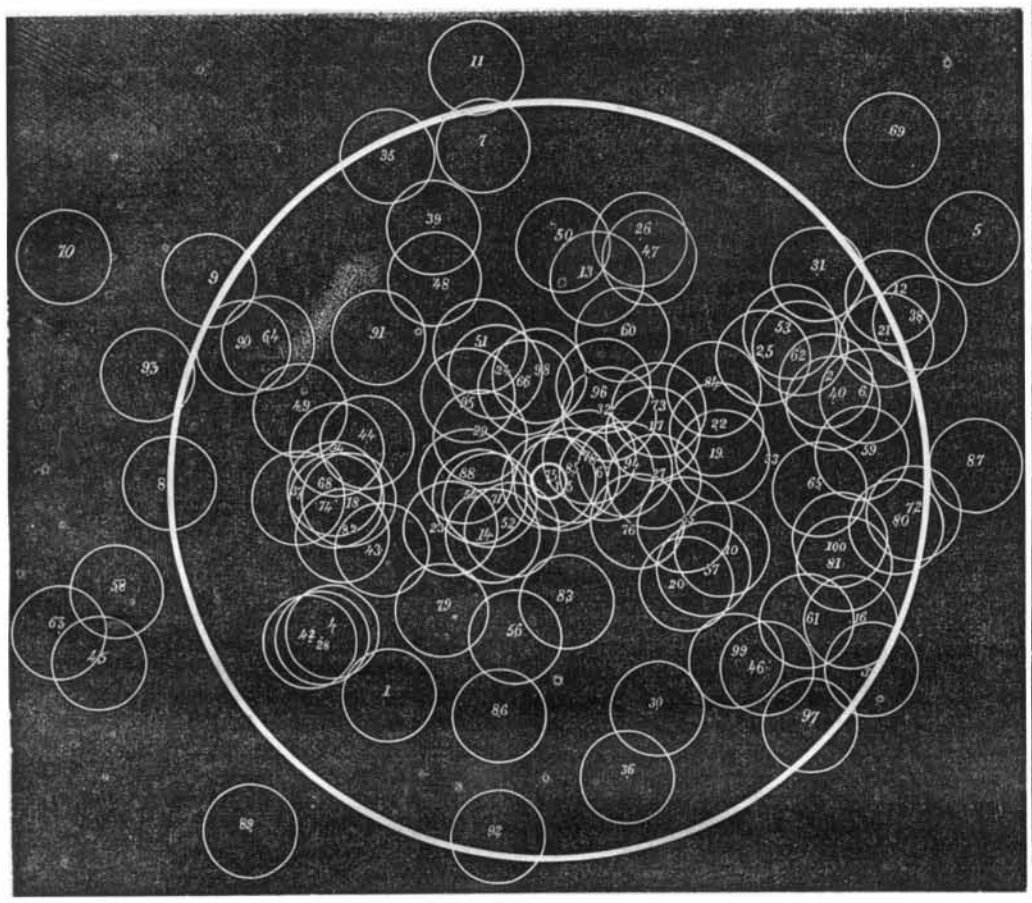
LARGE INDIA-RUBBER BALL VALVE.—Some india-rubber ball valves, five inches in diameter, have recently been manufactured by the New York Belting and Packing Company. These are the largest valves of the kind made in this country, and are preferable to brass by reason of their noiseless action, uniform tightness, and lightness.

THE Secretary of the Treasury, upon a question submitted to him, has decided that iron, whether imported or domestic, to be used in the construction of steam boilers for vessels, must be stamped in the manner required by law, otherwise the makers or users will be subject to a penalty.

It is stated that the method of protecting gunpowder by mixing it with ground glass, patented in England by Mr. Gale, is of no practical utility, as the sharp particles of the glass cut the grains of the powder and reduce it to meal in the process of separating the two substances. This report lately appeared in a foreign journal.

Rifle Shooting.

Mr. L. H. Simmonds, of San Francisco, Cal., has sent us a lithographed diagram of a target recently shot at in that city. The distance was 40 yards and the marksman was Dr. E. H. Pardee. The diameter of the bull's eye was 4 inches, and the string made from the center of the bull's eye to the center of the bullet hole was 131/8 inches. The Doctor's worst shot measures 2 1/16 inches from the center of the bull's eye. The engraving published herewith shows the target as it appeared at the end of the contest.



Facts are wanting in this statement to make it perfect. These are, whether the shots were fired off hand, what kind of a rifle was used, whether a target rifle with telescope sight, or an ordinary one; also, what the force of the wind was and its direction with relation to the target. Correspondents should endeavor to give all the facts when writing for publication.

An Immense Temple of the Muses.

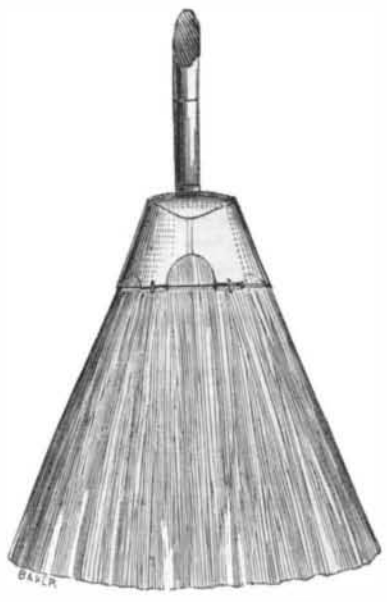
Louis Napoleon is building in Paris the largest structure of modern times designed as a place of amusement. It is an opera house which will rival in extent and grandeur the Coliseum at Rome. It will cost about $5,000,000, and will be constructed entirely of stone, brick, and metal. Nothing combustible will enter into its composition. It will cover seven and a half acres and be two hundred feet in external hight. The auditorium, however, is calculated to seat only about three thousand persons. Every box will have its separate saloon attached, fitted up like drawing rooms, and a carriage way will be constructed to the second story from the street. The most successful and celebrated artists of France—painters, sculptors and architects—will be employed in its ornamentation and erection. It will be entirely unapproachable in finish and richness by any structure at present existing.

Removing Hyposulphites.

The last traces of hyposulphites of soda can be eliminated from paper pictures by means of electrolysis. The method is due to Dr. W. Reissig, of Vienna, and consists in placing the proofs between two sheets of metal, binding them together, and passing the current from a Bunsen's battery through them. The delicacy of this way of detecting minute traces of hyposulphites is well known, and I hope its application to the decomposition of the deleterious salts will be found practicable. The manipulations required will not be at all difficult—far less so than rolling a number of proofs. Without previous trial, I should suppose a good way of proceeding would be to place a sheet of polished metal at the bottom of a shallow dish, and attach to it a wire proceeding from the positive pole of a battery. On the metal arrange a number of well-washed prints, and upon the prints place another sheet of metal connected with the negative pole, cover the plates with distilled water, and let the current pass. I do not think the plates need to be made of silver. Metal that coach-lamp reflectors are made of, composed of silver and copper rolled together in varying proportions, would probably be found to answer. The first cost of this process for destroying the hyposulphites would be the greatest, and that would not be much. The battery might cost 7 s. 6 d., and the metal 6 s. or 7 s. per pound.—*British Journal of Photography.*

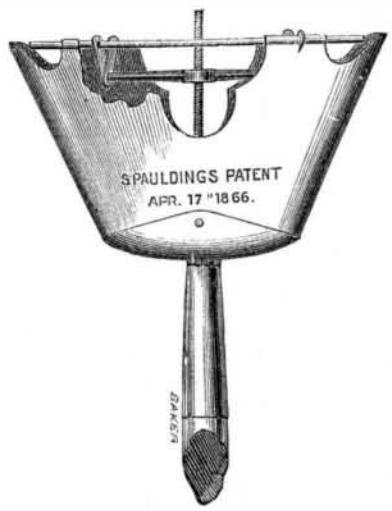
SPAULDING'S PATENT BROOM HEAD.

Many of our farmers raise broom corn, and they have been in the habit of utilizing such portions of the product as did not find a ready market, by forming it into brooms which serve a temporary use. In



this they have been assisted by our inventors, who have contrived receptacles for the broom, so that it was an easy matter to construct an efficient implement for the practice of the virtue "next to godliness," and still preserve the head for another reception of broom corn.

The engravings annexed show one of these improvements. The head is formed of metal, and is attached to a metallic shank for the reception of the handle. The shank carries a screw which passes through a cross bar, to the extremities of which are attached arms pivoted to stiff wires in the web of the metallic case, at the lower edge, forming a toggle joint. By turning the shank to the left these arms are released, and the shell is allowed to expand, when it can be filled by the broom. Then the shank



is turned to the right, screwing up the arms and contracting the sides, when the broom is clamped tightly between the sides of the shell. It seems to be a very efficient device for the object sought.

Patented April 17, 1866. Manufactured by Lakin & Hall, sole agents, Brodhead, Wis., to whom all orders should be addressed.

The Queen's Portrait for Mr. Peabody.

Photography is, we understand, chiefly employed as the aid in producing the portrait of Her Majesty to be presented to Mr. Peabody. It is entrusted to Messrs. Dickinson, of Old Bond street. Though only half-length, the painting is 14 inches long by nearly 10 inches wide. For the first time, for the presentation of her portrait to a private individual, Her Majesty sat in the only robes of state she has worn since the death of the Prince Consort—the costume in which she was attired at the opening of the present Parliament. This was a black silk dress, trimmed with ermine, and a long black velvet train similarly adorned. Over her Mary-Stuart cap is the demi-crown, while the Koh-i-noor and one rich jeweled cross, presented by Prince Albert, form her only ornaments. To complete this portrait, Her Majesty gave Mr. Tilt several long sittings, and has now expressed her unqualified approval of the water-color shown at Mr. Dickinson's. This, however, is but the commencement of the process. The portrait is to be done in enamel by Mr. Tilt, on a panel of pure gold. In these enamel paintings, to bring out all the brilliancy of their colors, they have to be burnt in a furnace at least five and generally six times. The heat to which they are subjected is so intense as to be only short of that which would fuse gold, and the most exquisite care is necessary neither to let the picture heat too soon, nor, above all, cool too rapidly, as in either case the enamel would crack. So large an enamel portait has never been attempted in this country. After being submitted to the Queen on its completion, it will be forwarded to Mr. Peabody, who intends to deposit it where it may be best seen in a large institution which he has founded in Boston, his native town.—*Photographic News.*

[The *News* is mistaken in the place of Mr. Peabody's nativity. He is a native of Danvers, Mass.—[Eds.

THE New Haven *Courier* says that during a recent thunder storm in that city, an old hoop skirt, lying in the middle of the street, caught the electricity, and in spite of rain falling at the time, burned and smoked away all there was combustible about it.

THE Paterson (N. J.) *Press* says that the falls are destined to be almost entirely done away with, under the constantly increasing demand for water power from the mills.