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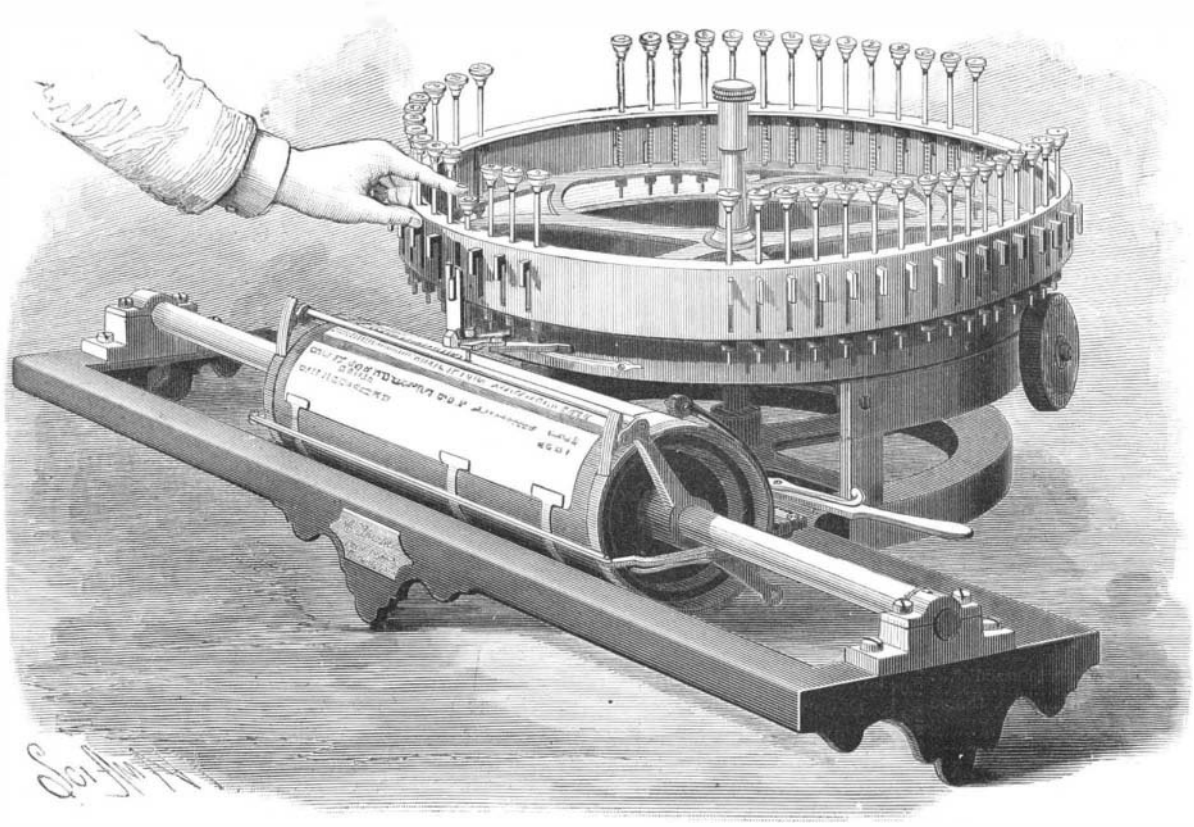
THE FIRST AMERICAN TYPE WRITER.

In the old Patent Office reports for the year 1843 may be found indexed on page 360, under the name of Charles Thurber, of Worcester, Mass., a "Machine for Printing." The date of issue is August 26, 1843. Under the system then in vogue, it was placed in class XVIII., "Arts Polite and Ornamental." Two years later, in the 1845 report, on page 1208, his name again occurs, this time as of Norwich, Conn. His second invention is termed a "Writing Machine." The patent was issued on November 18. As far as the records show, these were the earliest efforts of invention in this country in the development of a mechanical writing machine. The product of Charles Thurber's work and invention is illustrated here. It shows what may be properly called the first American type writer. The late Charles Thurber was successively a resident of Worcester and of Norwich. Early in life he became interested in the project of inventing a machine that would take the place of pen and pencil for those who were blind or otherwise incapacitated for or unable to write satisfactorily. The work was taken up at the request of a Southern gentleman of means, to whom writing was a very irksome employment. The two patents and the present machine, as far as known, are all that exists to show what Thurber did.



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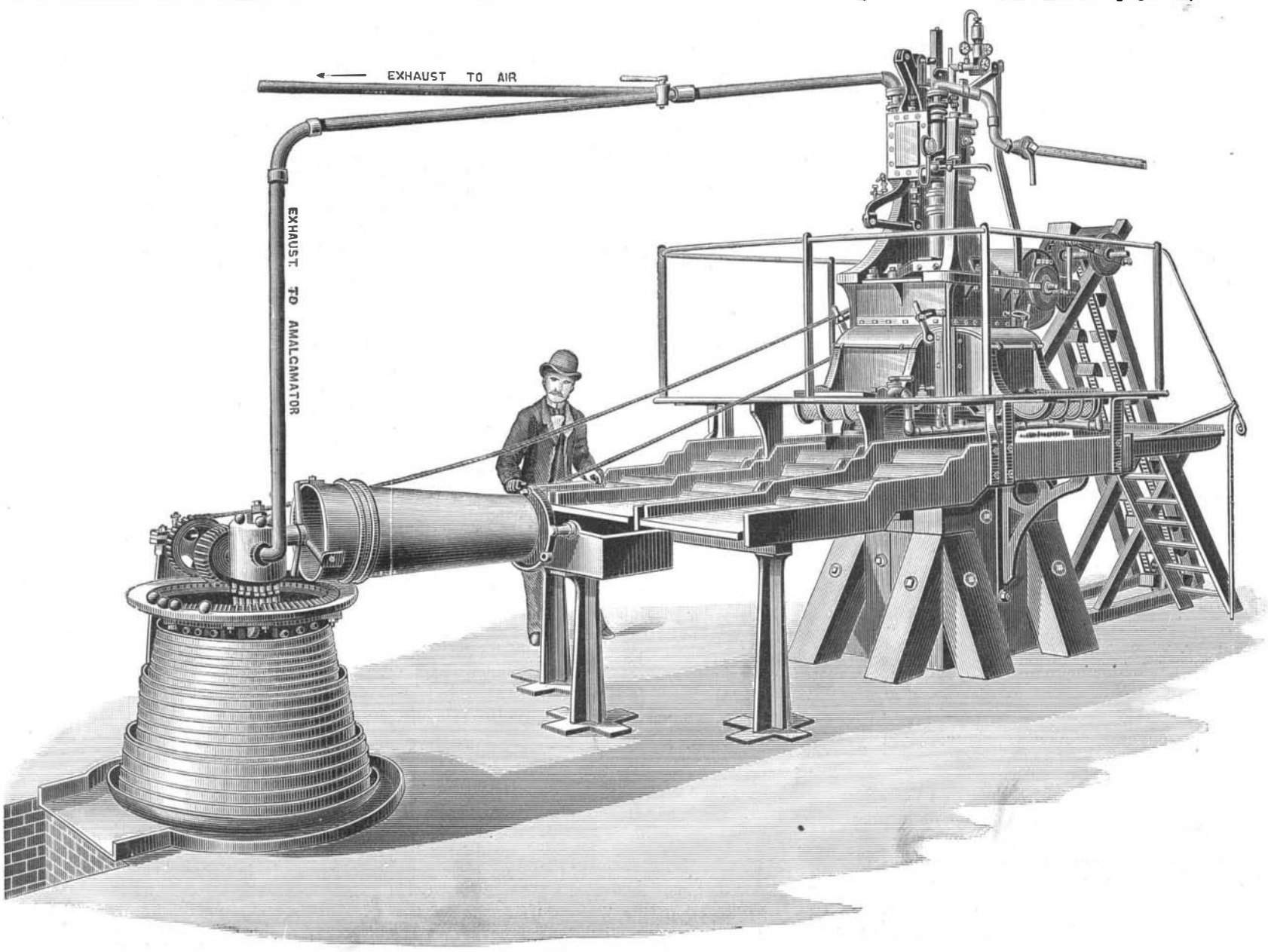
The actual machine varies in many respects from the device shown in his first patent. Many improvements were introduced, and the apparatus, as finally completed, was found perfectly efficient except as to the element of time. Its operation was so slow that it was practically abandoned, and few, if any, others were made. Thus the machine illustrated is a most interesting relic. It was not known to be in existence until within a few years. The Hon. C. B. Pratt purchased the residence and effects of Mr. Thurber at Worcester when the latter moved away. Then a search was made for the type writer, and, after many days, it was found stored away among a quantity of machinery and other apparatus. There it had lain for over twenty years, during which period no care whatever had been bestowed on it, and its massive construction is about all that saved it from total wreck. As it was, it had become badly corroded, and many parts were broken. Mr. H. R. Cummings, of Worcester, gathered up what was left of it with veneration. He had it

(*Continued on page 276.*)



IMPROVED ORE CRUSHER AND AMALGAMATOR.—[For description see page 276.]

THE FIRST AMERICAN TYPE WRITER.

(*Continued from first page.*)

cleaned, the broken parts were replaced, and it was restored, substantially, to its original condition. The idea in doing this was to enable the public to see the first type writing machine ever invented or made in this country, upward of forty years ago, by a respected citizen of Worcester.

The restorations were carried out so as to reproduce essentially the missing parts. Some minor variations were admitted, however. Thus in the original machine the keys were of bone, slightly cupped, with letters in relief, so that the blind could use it. These were found to be nearly all destroyed, and in the restoration were replaced by disks bearing printed letters. We are indebted for the foregoing particulars to Mr. H. R. Cummings, of the Worcester *Spy*, and representative of the Standard Remington Type Writer Company.

The construction and operation of the machine are clearly shown in the cut. The type are attached to the bottom of a series of rods, which can be pressed vertically down by the finger, a spring forcing them up again when the pressure is released. These rods are carried by a horizontal wheel, and are arranged around its periphery. By rotating the wheel, any desired type can be brought to the front. There a stationary guide is placed to direct the type which is making an impression. An inking roller, seen on the right hand, inks the faces of the letters.

Arranged in the front of the type wheel is a roller, to which the sheet of paper is attached by clips to it. This Thurber machine was the first one embodying a roller for the paper. Finger pawls working into ratchets at the ends of the drum serve to rotate it after each line was printed. By means of a handle, which is seen projecting from the right side of the frame, the drum is shifted longitudinally on its axis rod, after a letter has been printed. Both of these operations were executed by the operator separately. But the essential mechanism for printing successive lines was for the first time realized in this machine, namely, a paper-carrying roller, which rotated to give the line spaces, and which also moved longitudinally to give the letter spaces.

The operation of the machine was extremely slow, and was as follows: The paper was secured to the drum, and was brought into the proper place under the type-bar guide. The type wheel was revolved until the desired letter came over the guide. The key was then forced down with the finger, and the character was printed. A key was then pressed which shifted the roller longitudinally to the distance of one letter. The type wheel was then turned, and the next type was brought in place and was printed. When the line was completed, another key was pressed and the paper roller was rotated on its axis to the distance required for a new line of printing, which was then proceeded with as described.

We have alluded to the paper-carrying roller as constituting one of its most interesting features. This roller, combined with the "basket" of pivoted type keys of the Beach machine, by which rapid printing is done, constitute the two leading elements of the fast type writers of to-day.

IMPROVED ORE CRUSHER AND AMALGAMATOR.

The engraving illustrates a new machine which has been made by the Reading Iron Works Company, England, and described by the *Engineer* as follows: The machine consists of an inverted cylinder 8¾ inches diameter and 9 inches stroke, attached to a cast iron standard, and having something of the appearance of an ordinary steam hammer. To the piston rod is attached a steel head, which crushes the ore between it and the anvil beneath. The steel head and anvil are inclosed within a cast iron box or "mortar," which is provided with three mouths, within which are fixed steel grids arranged either vertically or adjustable to the angle most suitable for the ore to be treated. In front of these grids is a wrought iron removable plate, which confines the pulp that splashes through the grid when the machine is at work. Water pipes are so arranged that jets of water are directed upon the quicksilver baths and grids and interior of the mortar. The hammer or stamp is raised by the action of steam beneath the piston, which compresses the air contained in the upper part of the cylinder, the ingress and egress of the air being controlled by suitable valves. The stamp falls with a force due to its weight plus the pressure of the compressed air above the piston. Steam is admitted to the cylinder by a slide valve and sliding plate of special construction, the latter being moved by a small auxiliary cylinder, which governs the admission of steam beneath the piston, and allows for variation in the thickness of ore in the mortar. The slide valve is moved by an arrangement of levers and link attached to a prolongation of the piston rod, which works through the top cover of the cylinder. The hammer or stamp is therefore raised by steam alone, without the tappets, cams, or other arrangements used in stamps of ordinary construction, and friction is thereby reduced. The ore to be crushed, being first broken to pass through a 1¼ inch mesh, is raised by an elevator, consisting of cups fixed to an endless chain passing over a suitable wheel worked by means of friction pawls. These are actuated by a lever, which in its turn is moved by a stud upon the prolongation of the piston rod. In a report on the machine, Mr. Barnes Kinsey, M. Inst. C. E., says: "The machine was driven during my inspection by a patent nozzle vertical boiler of 10 horse power nominal, manufactured by the Reading Iron Works, and is well suited for the purpose. Indicator diagrams taken gave 7·57 as the indicated horse power. The quantity of ore crushed was at the rate of 12 cwt. per hour, equal to 14 tons per day. This result was obtained with grids having a mesh of 64 holes per square inch, and I estimate that had the grids been the ordinary mesh of 90 holes per square inch, the duty would have been equal to that of a 10 head cam stamp mill, which requires 10 horse power nominal to drive it, and will theoretically crush 10 tons per day; but being liable to clog, owing to the irregularity of feed in machines of the cam type, the blow of stamper and consequent useful effect are reduced. This cannot take place with Williams' patent stamp, the rapidity of the blow causing the water to act upon the ore in a much shorter time and thus assisting disintegration, which in the cam stamp is retarded through the stamper resting for a longer period upon the stuff. The large size of the mortar in the Williams stamp, combined with the arrangement of the anvil face below the water line, is very effective. A splash is produced each time the stamper falls, driving the crushed ore or pulp against the grids and at the same time cleaning them, and as the angle of the grids can be adjusted to the material under treatment, an excellent result can be obtained. The whole of the mortar can be cleaned in fifteen minutes. An effective arrangement has been devised by means of a tray fixed on the top of a mortar beneath the steam cylinder, for collecting any oil or grease that may run down from the moving parts or cylinder, and preventing it getting into the mortar. The wear of the anvil and stamp head is considerably less than in cam machines, and is allowed for by a screw adjustment by which the cylinder and stamper can be lowered in a few minutes. The weight of the machine is 4½ tons, as compared with about 12 tons average weight of a ten stamp mill with iron frame of ordinary pattern. The ore pulp is delivered on to three tables, which are covered with amalgamated plating; and either of them may be thrown out of use by sluice plates, and thus enable it to be cleaned without stopping the machine. Ripples are provided for collecting the mercury. The tables deliver the pulp to a patent agitator amalgamator, which consists of two parts. The first is a horizontal tapering cylinder or drum, having ripples formed within it for the reception of mercury and plating. It revolves slowly on the edge of amalgamator No. 2, which is kept in motion by a spur gear and chain worked from the automatic feed gear of the stamp. Amalgamator No. 2 is in the shape of a crinoline revolving on a vertical shaft. The top is formed into a pan about 3 feet diameter and 3 inches deep, for the reception of mercury. The sides hang down about 3 feet, and are formed with small channels for mercury, the spaces between them being filled in with amalgamated plating. The whole rests upon an iron pan, which also serves as a foundation plate. On the top of the vertical shaft is a receiver for exhaust steam, which is distributed through a series of removable pipes on to the surface of the mercury contained in the top pan. This is kept in a constant state of ebullition by the steam, enabling the mercury to come in contact with every part of the pulp, this important point being greatly facilitated by the warmth produced. The ends of the distributing pipes are fitted with copper nozzles to act as collectors, and there are also a number of hollow amalgamated copper balls which float in the top pan and act in a similar manner."

Why do not the Gastric Juices Destroy the Stomach?

Why the walls of the stomach and intestine are not themselves digested by their own fluids has for more than a hundred years been a mooted question in physiology. John Hunter, in a paper read before the Royal Society in 1772, maintained that it was because these tissues were living, or, as he expressed it, "animals, or parts of animals, possessed of the living principle, when taken into the stomach, are not in the least affected by the powers of that viscus so long as the animal principle remains. Hence it is that we find animals of various kinds living in the stomach, or even hatched and bred there, yet the moment that any of those lose the living principle, they become subject to the digestive powers of the stomach." Other theories have been advanced to explain the facts in the case, but all are unsatisfactory.

Dr. J. W. Warren contributies an article to the *Boston Medical and Surgical Journal*, in which he reviews the evidence presented by those who have maintained these several theories, and gives the results of some twenty experiments of his own, made on fifty frogs. He suspended the legs of the frogs while living in an artificial gastric juice (that is, pepsin and hydrochloric acid), and found that the muscular tissue was digested, as was shown by the presence of peptone, the frog remaining alive throughout the experiment. When acid alone was used without the pepsin, the muscle was softened and dissolved, but not peptonized, and therefore not digested. It thus appears that living tissues may be digested, and that the problem is as far from solution as ever. Dr. Warren comes to the same conclusion, but promises to investigate the subject more fully in the future.—*Science.*

IMPROVED PEACH STONER.

The accompanying engraving represents an improved peach stoner, that will cut and stone from three and a half to four bushels of clingstone peaches per hour. The cast iron supporting frame is secured by a clamping screw to the edge of a table. The upper part of the frame is formed with an extension, having vertical bearings for central and side rods which are connected together by upper and lower cross pieces. This arrangement of the rods prevents any side movement, and causes the knives to descend perfectly true and straight. To the upper end of the central rod is pivoted the operating handle, which is pressed upward by a spring arranged as shown. To the lower end of the rod is secured a flat steel spring, which is bent at right angles at its corners, and carries at its lower ends jaws whose meeting upper edges are formed with recesses, and with tongues fitting and sliding in the recesses. These tongues serve to prevent side movement of either jaw, as the jaws are moved apart when their cutters pass around the peach stone. In the lower forked free ends of the jaws are journaled circular revolving cutters, the edges of which are beveled and sharpened to adapt them to cut the peaches in halves. To the jaws, on each side of the cutters, are secured curved knives. To the lower cross bar are secured the upper ends of side knife supports, which are provided at their lower ends with auxiliary knives, which extend down on each side of the jaws, and are formed with curved cutting edges. The frame has a laterally extended shelf, having a slot formed through it, and on opposite sides of the slot are placed curved knives.

In operation, the peach is placed upon the curved knives carried by the shelf, and which cut into the lower side of the peach until they strike the stone. At the same time the handle is depressed, when the circular knives cut into the peach and strike the stone on its flat sides and at the stem end, the peach having been set so as to receive the cutters in that position. When the circular cutters meet with the resistance of the stone, they travel around the stone, the spring admitting of this movement, and carry the curved knives with them at equal distances from the stone, the peach being thus divided and cut away from the stone except a small strip at the sharp edges of the stone, which is cut away by the auxiliary spring knives, which are made of spring steel, to permit them to follow the curvature of the stone. The halves of the peach fall into a box placed to receive them, and the stone passes up between the jaws and is pushed up and out by the next stone. It will be seen that this machine is strong and simple in construction and well adapted for the work.

This invention has been patented by Mr. J. H. Smith, of Little Rock, Ark.

The Projection of Para- and Dia-magnetic Movements of Liquids.

A. Ricco, in *L'Elettricita*, gives the following simple method of illustrating the different effects produced upon para- and dia-magnetic liquids by the electromagnet. Collecting, by means of a convex lens, the rays from a candle, he reflects them from the level and plane surface of the liquid before the current is passed around the magnet. An image of the flame is thus projected, and is received upon a white screen. The current is then turned on. If the liquid is neutral or "amagnetic," no effect is produed; otherwise the image is scattered and confused. If the liquid is paramagnetic, the image can be caused to reappear by bringing the light or the screen nearer to the liquid surface, or by taking away the lens. The new image will be drawn out, indicating the formation of a cylindrical reflecting surface composed of the liquid itself. If the liquid is diamagnetic to cause the image of the flame to reappear, the flame or the screen must be withdrawn to a greater distance, or a lens of shorter focus must be substituted, thus proving the convexity of the surface.

How to Cure Warts.

Place the thumb upon the wart, and press it against the bone. Move the wart back and forth upon the bone until the roots become irritated or sore, when the wart will disappear. I have had quite a number upon my hands, and have got rid of all of them in the above manner.