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The Pedespeed.

Mercury, the messenger of the gods in ancient mythology, had winged feet. Some three thousand years hence, some antiquarian digging for relics among the ruins of American cities, will discover that the Yankee Mercury had his feet furnished with wheels, and that he probably made faster time than the Greek Mercury by odds.

A few mornings since a quiet gentleman and a handsome youth walked into our sanctum, bringing with them a queer looking package. The queer looking package was no matter of surprise to us, for our eyes are familiar with nearly all the forms into which the genius of inventors can torture wood and metal. But while the elder of the two gentlemen entered into conversation with us the younger undid the package, disclosing a pair of wheels some fourteen or fifteen inches in diameter, to which were attached some stout hickory stirrup-like appendages, in the bottoms of which were foot pieces, shaped like the woods of common skates.

On one side of the stirrup-like appendages were firmly fastened metallic plates each having a short axle or bearing projecting from its center, upon which the wheels above mentioned turned. The stirrup-like appendages were made of flat strips of wood about three inches wide in the broadest portion, bent so that one side was nearly straight, while the other was made to meet it about midway to form a sort of loop. In the bottom of this loop were placed the foot-pieces above described, provided with toe straps and a clasp for the heel. To the upper end of the stirrups was attached a piece of wood to fit the outer and upper conformation of the calves of the legs.

In less time than it took us to note these points, the young gentleman—who was subsequently introduced to us as the son of the inventor of this singular device—had strapped on the wheels and commenced rapidly gliding about among chairs and tables with singular swiftness and gracefulness. A space being cleared he proceeded to execute with seemingly perfect ease, the inside and outside roll, figure of eight, etc., etc., amply demonstrating that the "pedespeed" has all the capabilities of the skate, both in the variety and grace of the evolutions that can be performed with it.

THOMAS L. LUDERS' PEDESPEED.

Our engraving gives an excellent representation of this invention. Of course no mere carpet knight accustomed to roll about on the common parlor skate, can use these at the first attempt. They require practice; but when skill is once attained, there is skating the year round. Had the pedespeed been introduced on our rinks this winter during the long period stockholders have prayed in vain for ice, their stock would have stood higher in the market than it does at present.

The pedespeed is light and strong, and is capable of use on surfaces where the ordinary parlor skate would be useless The inventor, a large and heavy man, informs us he can use it constantly for two hours without fatigue. For gymnasiums, colleges, and parts of the country where no ice ever occurs, it affords a delightful, healthful, and graceful pastime at all seasons of the year.

When used by ladies, shields may be employed to cover the top of the wheels so as to protect the dress.

Thomas L. Luders, Olney, Ill., is the designer of this new appliance for locomotion, and of him further information may be had.

Improved Fan Blower.

The fan blower has held a position as a standard machine for about forty years, the first having been built by Ericsson & Braithwaite, in 1829.

The high speed at which it has to be driven, and the consequent great consumption of power and excessive wear and tear, have justly been considered serious objections to it. Notwithstanding the many attempts made to overcome these defects they still exist.

Clark's "Multiplying-Pressure Fan Blower," illustrated in the accompanying engravings, attains the desired end. It gives the requisite pressure without high speed, and yet has all the simplicity of the ordinary fan blower.

The illustrations represent two forms of the blower, and also a longitudinal sectional view, enlarged, of one of the bearings, and the adjustable device connected therewith. The same letters refer to similar parts in all the cuts. Fig. 1 shows one of these blowers that multiplies the force of the blast four times. Fig. 2 shows one that doubles the force of the blast with the same speed required by an ordinary blower of the same diameter of fan. Fig. 3 is an enlarged view of the bearings with an improved mode of adjustment.

The blower is made in compartments, each of which is formed exactly like the others. In fact each compartment is a well constructed fan blower, receiving the air at the center and delivering it at the circumference, where it is forced over the edge of the disk, C, through the annulus between the disk, C, and the shell or case, A, in the direction of the arrows, and thence down between the disk, C, and the opposite side of the shell, A, to the center of the next fan, by which it is received and delivered exactly as in the first, and so on through the whole series, whether the number be four or more.

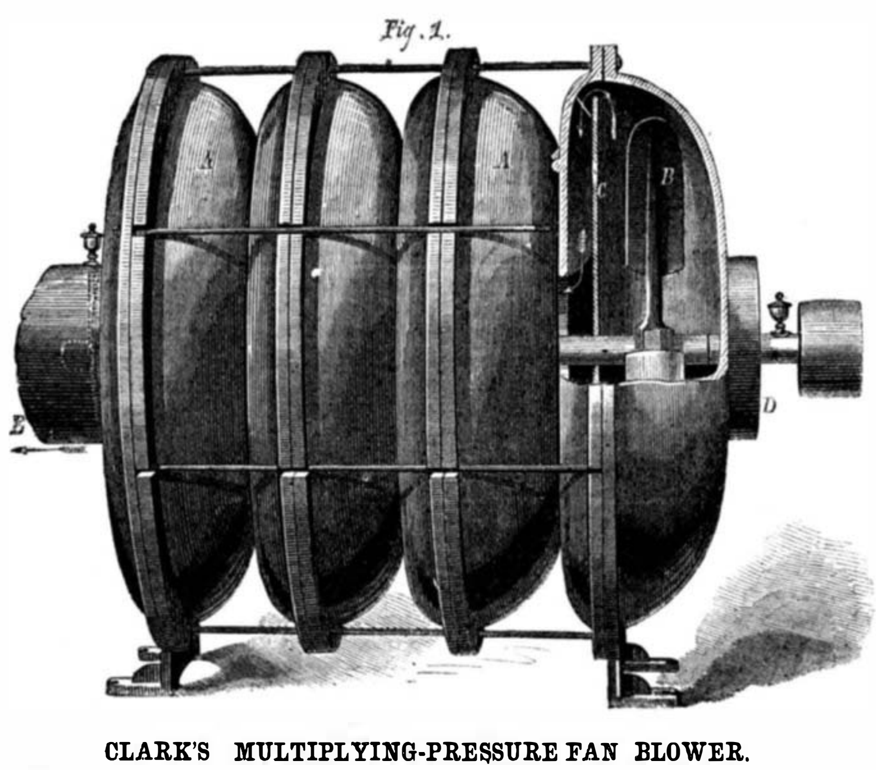
The passages leading from one compartment to the next may seem tortuous and difficult for the passage of the air, but they are made in all cases eight times greater in area than would be required to deliver the air under pressure at the point of final delivery, and as the resistance to the flow of aeriform fluids diminishes in the ratio of the square root of their velocity, the loss from that source being only one sixty-fourth, becomes insignificant.

Fig. 2, which only doubles the force of the blast, consists of two of the above described sections—one at each end delivering the air into the center of a fan that is common to both. This form makes a cheaper blower than Fig. 1, and answers well for many purposes where a very high pressure is not required; such as small forges, steam boilers, puddling and heating furnaces, and melting holes for cast steel. For cupola furnaces, where great pressure of blast is so essential, Fig. 1 is decidedly preferable.

Fig. 3 shows a device by which the shaft may be moved lengthwise, so that in the event of the fans in either compartment touching the side of the shell they may be easily adjusted. The journal box (Fig. 3) is a hollow tube lined with Babbit metal; a plano-convex ring fits over this tube; this ring is cut in the line of its axis, so that by compression it may be made to gripe the journal box. A hub, so formed as to receive one half the plano-convex ring, is held in the center of the central opening by the three arms, as shown. Another hub, made to fit the other half of the plano-convex ring, is secured to the first one by bolts. When the bolts are slack the journal box may be moved endwise, but when they are tight it is held firmly in place.

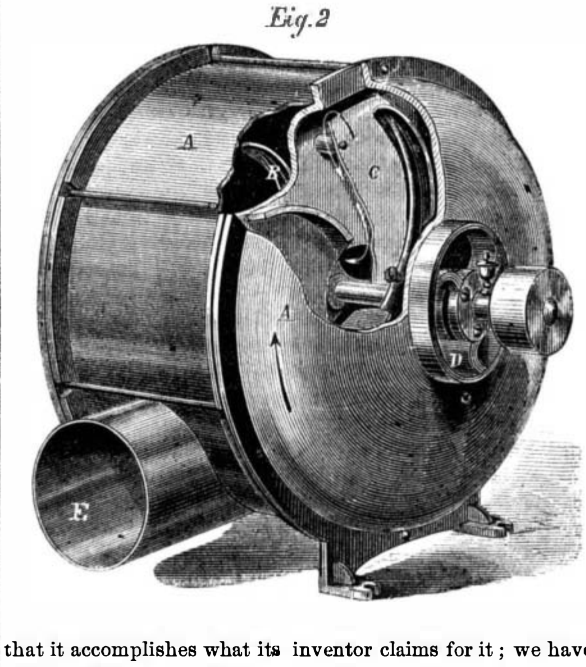
We have seen this blower tested, and can assure our readers that it accomplishes what its inventor claims for it; we have seen it with a pressure gage on each compartment, and invariably the gage on the fourth one indicated a pressure four times greater than that on the first. We have been shown very flattering testimonials from some of the best founderymen and machinists in the country, respecting this blower. It is no longer an experiment.

Fig. 1.



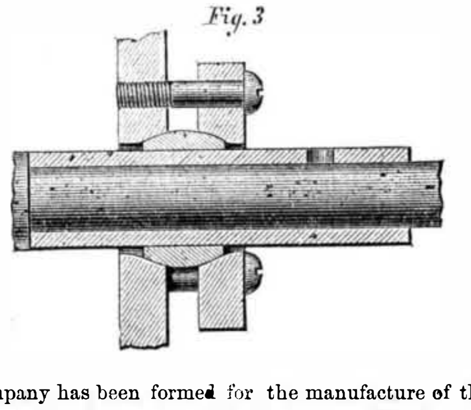
CLARK'S MULTIPLYING-PRESSURE FAN BLOWER.

Fig. 2



This invention, which we regard as one of much interest, both in a scientific and practical point of view, is covered by two patents, dated, respectively, Oct. 23, 1866, and Dec. 22, 1868. A patent has also been secured in England through the Scientific American Patent Agency. The inventor, Patrick Clark, of Rahway, N. J., is well known in the field of mechanical invention.

Fig. 3



A company has been formed for the manufacture of these blowers, under the name of the "Rahway Manufacturing Co.," at Rahway, N. J., to whom all inquiries should be addressed.

VISIT TO A STEEL MANUFACTORY.

A writer in the *Atlantic Monthly* for March gives a very graphic account of the manufacture of steel by the Bessemer process, which we copy.

"Our entire party thronged the building, some passing directly to the floor of the casting house, while others mounted the high platform of the cupola furnaces, to see the beginning of the famous 'Bessemer process,' used in the manufacture of steel at this establishment. For me, who knew nothing of steel-making except by the old-fashioned, roundabout methods, this new 'short-cut,' as it is fitly termed, possessed a surprising interest. Laborers were casting into one of the furnaces barrow-loads of coal and pig, each fragment of which had been carefully examined, for not every quality of iron and anthracite can be used in this process. The molten metal was run off into a huge bucket, weighed (for precision as to proportions is also necessary), and finally poured like some terrible, fiery beverage, a soup of liquid iron, into the stomach of a monster with an egg-shaped body, and a short, curved, open neck, resembling some gigantic plucked and decapitated bird. In place of wings a pair of stout iron trunnions projected from its sides. Upon these it was so hung that it could be set upright or turned down on its belly. It was down, receiving its pottage, when we first saw it. Presently it was full-fed—five tuns of molten iron having been complacently swallowed. Then, moved by an invisible power, the creature, slowly turning on its wings, sat, or rather hung, upright. 'Now they are going to blow,' said our guide.

"In the casting-room below, immediately beneath the monster, was a semicircular pit, round the side of which was ranged a row of smaller iron vessels, reminding me of Ali Baba's oil jars, each capable of containing a bandit. Or, if we regard the large bird as a goose, these may be called goslings. They were all sitting on the bottom of the pit, with expectant mouths in the air, waiting to be fed. But the mother's food was to undergo a remarkable change before it could become fit nutriment for them. Iron ore, besides containing silicium, sulphur, and other earthy impurities, is combined with a large proportion of oxygen. The smelting furnace burns out the oxygen, and removes a portion of the impurities, but only to replace them with another interloper—carbon, absorbed from the coal. Cast iron contains from four to five per cent of carbon; steel, only about one quarter as much, or even less, according to its quality. To refine the crude cast iron, eliminating the excess of carbon, and yet retaining enough to make steel—or to reduce it first to wrought iron (or iron containing no carbon), and then to add the proportion required for the tougher and harder metal—seems simple enough; yet the various processes by which civilized men, from the time of Tubal Cain, have aimed to produce this result, have hitherto been slow, laborious, and expensive. Bessemer's method of doing this very thing on a simple and grand scale was what we were now to witness.

"The moment the monster was turned upright he began to roar terribly, and to spout flame in a dazzling volcanic jet, which even by daylight cast its glare upon the upturned faces of the spectators grouped about the floor of the casting-house. As we had seen only molten metal enter the 'converter'—so the huge iron bird is called—the appearance of such furious combustion was not a little astonishing.

"'In the bottom of the converter,' said our guide, shouting to make himself heard above the roar, 'there are tweers which admit a cold blast of sufficient force to blow the molten iron all into spray. This brings the oxygen of the air into contact with every minute drop of the metal, and what took place in the smelting-furnace is reversed; there the carbon helped to burn out the oxygen of the ore, now the oxygen comes to burn out the carbon.'

"'But what,' we shouted back, 'prevents the oxygen from playing the same trick the carbon played before?'

"'That is just what it will do if the blast is continued too long—the iron will oxidize again. But the oxygen has a stronger affinity for the carbon and other impurities than it has for the iron, and doesn't begin on that till those are burned out.'

"'I see: you shut off the blast at a moment when just enough carbon remains to make steel.'

"'Not exactly, though that is what Bessemer spent a great deal of time and money trying to do. But he found it impossible always to determine the time when the blast should be stopped, and often too much or too little carbon left in would spoil the product. So he changed his tactics. You will notice that we first burn out all the carbon; that is done in about fifteen minutes. You see that man in green glasses, on the little platform over in the corner, watching the flame from the converter? The instant he sees it lose its dazzling colors and become pale, and decrease, he knows the last of the carbon is burning, and the blast is shut off.'

"Meanwhile it seemed very wonderful that molten metal should contain fluid enough to make so furious a fire; nor was our astonishment diminished when we were told that the cold-air blast actually raised the temperature of the mass from 3,000° to 5,000° Fahrenheit during the brief process.

The blast shut off, the converter was turned down on its belly again, in order to prevent the metal from running into the tweers, now that the pressure was removed. 'The iron,' said our guide, 'is left by the blast decarbonized, and in a slight degree reoxidized. It also contains a little sulphur, after all its doctoring. Now we add a certain quantity of pig iron of a peculiar quality—either Franklinite or Spiegeleisen will do—containing a known percentum of carbon and manganese.' The dose was poured into the monster's throat, and a violent commotion in his stomach ensued, accompanied by a copious outpouring of smoke and flame. After a minute or two all was quiet. The new ingredients had burned out the oxygen and sulphur from the mass—just enough of the freshly introduced carbon remaining unconsumed to take up its permanent lodging in the metal and make steel.

"The contents of the converter were now poured into a huge ladle swung up under it by the long arm of a crane worked by invisible power, and afterwards discharged into the open mouths of the smaller monsters in the pit. These were, of course, merely molds; and into each was cast an ingot of steel weighing some six hundred pounds. The metal was discharged from the bottom of the ladle, and thus kept separate from the slag, which floated on its surface and was retained until the last. In twenty-five minutes from the time we entered the building we had seen five tuns of pig iron 'converted,' and cast into six hundred-pound ingots of steel.

"Having given one glance at Bessemer's method of lining his ladles and converters, to enable them to resist the intense heat of the charge, and another at the hydraulic machinery by means of which a lad on the little platform in the corner could rotate the converter, and lift ladles and ingots, doing the work of fifty men, we passed on to the rolling mill, where each ingot is heated and hammered (the enormous steam hammer coming down upon it with a resounding thump), then reheated, and rolled out into a rail, to be sawed off red hot at the right length (twenty-five feet) by a pair of shrill circular saws that do their work neatly and swiftly, as if the steel were soft pine, and the pyrotechnic spark-showers thrown out mere sawdust. Lastly, we saw the strength of a rail tested under repeated blows from a V-shaped tun-weight of iron dropped upon it from a hight of eighteen feet; and came away inspired with a high respect for Bessemer, both as an inventor and a public benefactor."

Soft Solder Silver Plating.

The art of plating metal upon metal, or, so to speak, metallic veneering, is very widely practiced, and is of great utility, both in the industrial and ornamental arts. The variety of metals capable of being plated on to the surface of other metals is very great, and the methods of applying them differ accordingly. Silver is the most universally applied metal in plating, and I propose to give a short, practical account of two of the least known methods of silver plating.

The four principal methods of silver plating, placed in the order of their cost and durability, the first being the cheapest and least durable, are (1) electro plating, (2) rolled-metal plating, (3) close plating, and (4) hard solder plating.

Electro plating is generally so well understood, that it would be superfluous to enter into that subject here. Rolled metal plating can be dismissed in a few words, it being simply brazing together a thin ingot of silver and a thick ingot of the metal desired to be plated, and rolling them out in the usual way of rolling sheet metals. Close plating, or soft solder plating, is an art which is very little known or understood beyond the trade itself and its immediate connections. The work is of such nicety, and requires such a high degree of manipulative skill, that not more than four out of every ten who are apprenticed to it make thoroughly good workmen. Silver plating is not an unhealthy occupation, although until of late years the workmen were not remarkable for steadiness and sobriety; several attempts have been made to establish a provident society among them without success, but it is to be hoped that this will soon cease to be a matter of reproach to them. The principal seats of the plating trade are Birmingham and Walsall, the operative silver platers in London not numbering more than fifty. The tools required are few and inexpensive, and the workshop space limited in extent, but the materials, of course, are very expensive.

The articles plated by the soft and hard solder processes are now confined mainly to coach and harness furniture. Cutlery and spoons were plated by these processes formerly, but the introduction of electro plating took that part of the solder plater's trade almost entirely away.

The article intended to be "soft" plated, termed the rough, is first prepared from the forging or casting (as the case may be) by means of files of successive degrees of fineness, which produce a smooth surface. It is next "tinned" by being immersed for a short time in a solution of sal ammoniac in water, or diluted muriate of zinc, and then dipped into a melted amalgam of tin and lead, taken out, and smartly shaken, a little finely powdered sal ammoniac being sprinkled over it the while, which "flushes" the tin, and causes it to have an equal thickness all over the article, which is next dipped as suddenly as possible into clear cold water. This completes the tinning process, and it is now ready for the silver.

The silver used is usually in the form of sheets 4in. or 5in. wide, and of an indefinite length, which, being very thin, cannot be measured by mechanical gages; the thickness is, therefore, determined by the length per ounce, assuming the sheet to be 4in. wide; so that a piece of sheet silver, 18in. long by 4in. wide, and weighing 1oz., is No. 18 gage.

This is cut out with scissors to the proper size and shape, and "stuck" to the article, by passing a well-tinned heated copper bit over it with a slight pressure; the heat passing through the silver, melts the tin, and thus causes it to "stick." It is then hammered with a leaden hammer, clothed with kersey or woolen cloth, called a madge, which lays it closer to the article, and next skillfully worked into the crevices of the work, great care being required in this stage to avoid cracking or splitting the silver; when it is sufficiently worked down, the heated copper bit is rubbed closely and evenly all over the parts of the work that the silver is applied to. This finishes what is called the "getting on," that is, supposing the work to be one-sided, or plated on the front only; but if it is required to be plated all over, this operation has to be repeated on the back, and the two edges of silver neatly brought together, forming what is termed a joint. This "all-over" work is only intrusted to the best workmen, it being much more difficult than the "one-sided."

The next process is "soldering," and is effected by the work being held over a clear coke fire, and plentifully sprinkled at intervals with powdered black resin, first removing it from the fire for that purpose. As soon as it is sufficiently hot to cause the resin to ignite, it is rubbed with a cotton rag, saturated with oil, care being taken to rub from the lighter toward the heavier portions of the article; this rubbing is continued, with gradually increasing pressure, until the article is sufficiently cool for the substratum of tin below the silver to solidify. The effect of the soldering is to equalize the thickness of the tin, and to expel the air, thus insuring the "soundness" of the work.

We now come to the "rubbing," which is a sort of burnishing with a rough burnisher, called a rub; the tool offers rather a singular illustration of wearing out giving value to an article, a rub being simply a half-round, smooth file worn down so much as to be useless for filing, which, if worn equally in all parts, and not nicked on the edges, is worth three or four shillings, the original cost being sevenpence. The use of the rub is to smooth and harden the silver. The work is next "dressed" by rubbing with leather thinly spread with pumice powder moistened with oil, which removes the coating of tin left on the outside surface of the silver by the "getting on" and "soldering" processes, and, at the same time, smooths the surface, and prepares it for the final polishing with leather, slightly dusted with powdered rottenstone.—*English Mechanic.*

Nickel Plating.

The following is from some remarks made by M. Dumas upon this subject before the French Academy of Sciences.

"In the numerous experiments attempted heretofore by M. Becquerel, Sr., M. de Kurlz, and others, they have succeeded in depositing upon objects a coating of nickel, but the means of which they made use had not the certainty and regularity necessary to an application really practical, which qualities are particularly marked in the method of Dr. Isaac Adams, of Boston.

"The Academy will notice with interest several of the results obtained by Mr. Adams. The coating of nickel is very uniform. It adheres perfectly. It is susceptible of any desirable thickness. It has a remarkably brilliant polish, which is very easily obtained. When the article comes from the bath it is only necessary to rub it with a cloth impregnated with a little metallic powder to give it all its luster. This electro-deposit of nickel can be well used for covering articles of saddlery, cutlery, plumbing, clockmaking, tools, fire-arms, decoration, etc.

"It may be used, and this is a valuable application, for covering plates designed for reprinting engravings; and on account of the very slight abrasion of the nickel covering, a perfect drawing can be repeatedly procured.

"Nickel is white, and possesses the property of resisting the action of the air, acids, and any substance with which it may come accidentally in contact. Its hardness is superior to that of untempered steel, and its cost is little. So much for the useful and industrial side of the question. From a scientific point of view, continues M. Dumas, the researches of Mr. Adams are of a nature to throw great light upon many of the phenomena displayed by electro deposits. When one wishes to separate the oxide of nickel by a fixed alkali from one of its solutions, there remains either potash or soda combined with the nickel, and nickelate of potash is formed accidentally. It is precisely this difficulty of obtaining the oxides and the carbonates of nickel free from potash or soda, which has defeated, until now, other experimenters.

"The discovery of Mr. Adams consists above all in having observed that when a solution of nickel contains the slightest traces of potash, magnesia, etc., the metal, instead of being deposited pure, will be found mixed with little particles of peroxide of nickel, which take from the adherent plating all its cohesion and its beauty. Further, the American chemist employs nickel salts entirely free from a fixed alkaline substance, such as the double sulphate of nickel and ammonia, or the double chlorate of nickel and ammonia. From this moment the operation is made with the greatest ease. The salt is decomposed in the bath, the nickel is de-