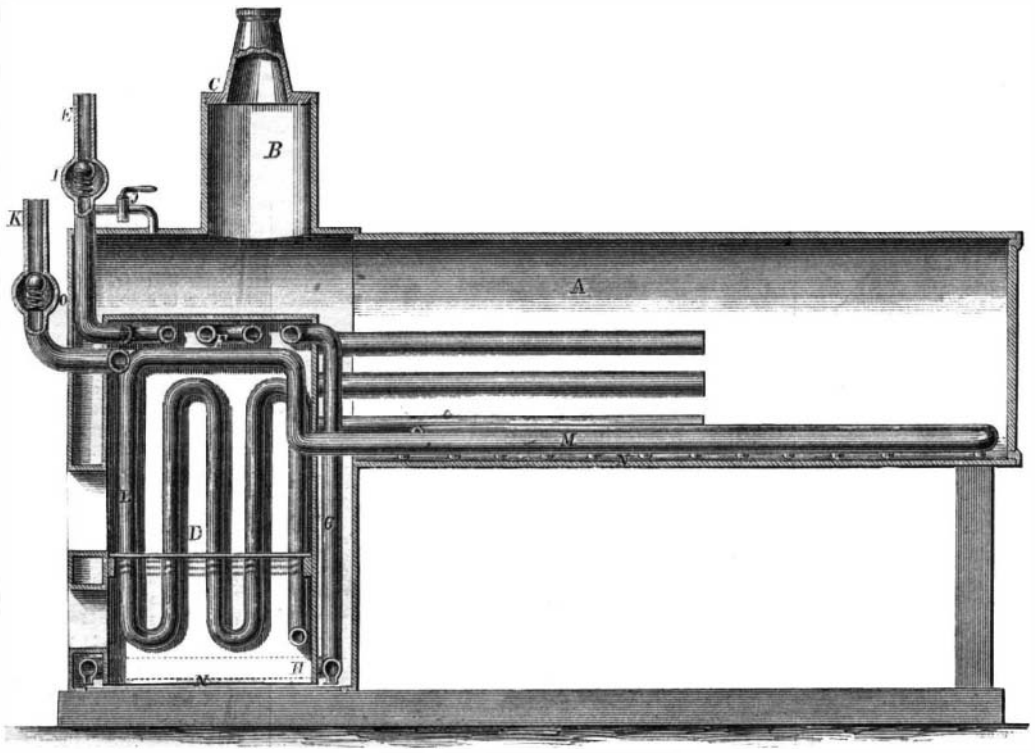
Improved Steam Boiler.

The increased and increasing cost of fuel, and the continual demand for it as a generator of steam power, has stimulated the inventive faculty to a remarkable degree to find means to reduce its consumption or to utilize a larger percentage of the caloric. The old-fashioned cylindrical boiler, having only a single or double flue to distribute the heat generated in the fire-box, is fast giving place to more complicated, scientific, and effective forms. The improvement under consideration is one among the many intended to economize the use of fuel and to make available a larger portion of the caloric generated by combustion. The illustration annexed represents a longitudinal vertical section of a boiler, A, similar in form to that of the locomotive. From the top rises the steam dome, B, provided with a cap, C, from which the steam is conducted to the engine. E is a pipe extending through the top or side of the boiler and communicating with a serpentine pipe, F, situated directly under the crown sheet of the fire-box D. From this serpentine pipe extends another, G, down in the space between the outside of the fire-box and the inside of the boiler. This is connected with the horizontal pipe, H, which is shown by the openings and dotted lines, and surrounds the bottom of the fire-box.



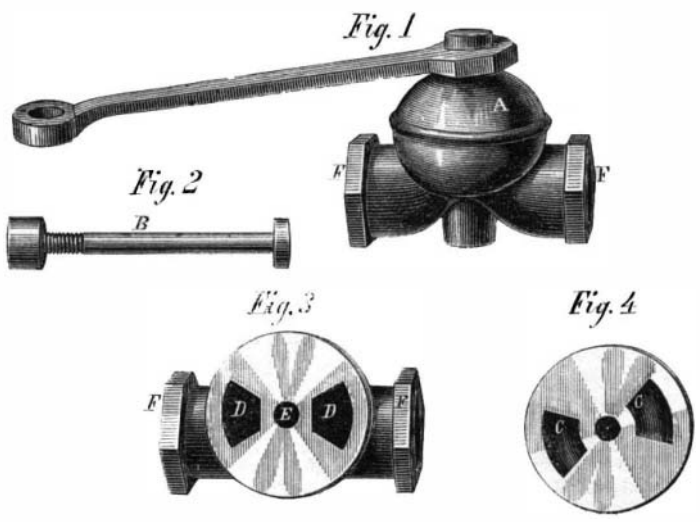
TANGER'S STEAM BOILER.

This pipe is provided with a set of nipples N, opening downward. Now, through the pipe, E, is forced gas or common atmospheric air, which, by traversing the serpentine pipe, is heated and discharges through the nipples, imparting additional heat to the water, and aiding in the circulation of the water and the disengaging of the steam. The air or gas is forced into the boiler by a pump or other similar device, and its return is checked by the valve, I. When the pump is not in operation the connection, J, is opened between the steam space and the pipe, E, to produce an equilibrium and allow the water to rise in the pipe to prevent burning. K is a similar pipe for a similar purpose, which enters the boiler from the front or side and connects with another serpentine-formed pipe, L, which surrounds three sides of the fire-box close to the sides. This also has a check valve, O, and connects with a return pipe, M, running along the bottom of the boiler and provided with downward opening nipples, N. Its operation and design are precisely similar to the first-described pipe. The object is to introduce to the water in the boiler highly-heated air or gas, which shall utilize the heat in the fire-box, aid in the circulation of the water, and thus indirectly in the production of steam, and directly by imparting additional heat.

Patent pending through the Scientific American Patent Agency by D. B. Tanger, whom address for further information, Bellefontaine, Ohio.

Allen's Improved Valve.

The accompanying engraving represents a disk or diaphragm valve, designed to supersede the common globe valve, which requires packing, and is difficult to keep in order after it is worn. Fig. 1 represents perspective view of the valve; Fig. 3 a face view of the valve seat, showing the ports, and Fig. 4 the valve face. The valve proper, A, forms the upper portion of the apparatus and is a cup-shaped casting of metal having an outer shell, and an inner shell surrounding the bolt, B, Fig. 2. The face of this hemisphere is finished smooth and has ports, C, opening into the annular chamber between the inner and outer shells, and corresponding with similar ports, D, in the seat, E. The pipes F, have free passages into this annular chamber by means of these ports. The upper and under portions of the valve are secured and held in close contact by the bolt, B, the head of which is on the top, and the nut underneath the valve. Between the nut and the bottom of the valve is a flat steel spring, having a tongue or spur fitting into a groove on the bolt, to allow the upper portion of the valve to turn without permitting the bolt to rotate. The spring holds the two faces of the valve together, while it permits a slight yielding to prevent unnecessary friction.



ALLEN'S DIAPHRAGM VALVE.

It is easy to see that the grinding and reseating of this valve could be easily accomplished in case of wear. It seems to be a very simple and efficient device for the purpose designed. Patented through the Scientific American Patent Agency, July 25, 1865, by D. D. Allen. All letters for information should be addressed to the Allen Valve Co., South Adams, Mass.

THE Patent Office Reports for 1863 are issued and in answer to numerous inquiries for them we would state that the reports can only be had through Members of Congress.

THE ADAPTATION OF IMPLEMENTS TO LABOR AND THE LABORER.

The continual improvements in labor-saving machinery, to which the attention of our inventors is directed, aims mainly at the release of the human body from immediate contact with the work to be performed, and the substitution of mechanical appliances for the direct power of muscle. The grand object is to contrive machines, which, managed by one or two men, will do the labor of dozens and hundreds. This is well, and we see on all hands the triumphs of genius in this substitution of the forces of steam, and the strength of metals for the powers of the human organism. But is there not another field of labor-saving invention, which, although by no means neglected, is yet imperfectly wrought? The improvement in the common implements of hand labor ought to keep pace with the inventions that replace the efforts of the laborer. Take a few familiar examples. Some blacksmiths persist in the use of a four-pound hammer for ordinary work, while another for the same work uses a much lighter one, producing as great an effect within the same time at a much less waste of muscular force. Carpenters sometimes select a hand-saw for the thickness of its plate and its width, rather than for its temper and perfect straightness. In the one case the workman moves back and forth a useless weight, and in the other the implement is as light as is possible for the result designed. The saw blade should be only thick enough to prevent "buckling," and should be set so as to cut a "kerf" only wide enough to allow its free movement.

We might cite many illustrations of the waste of human power by the use of unadapted implements. We copy the following judicious remarks on this subject from the *New England Farmer*. Speaking of the common hoe, it says:—

"To be the most efficient, the handle of this tool should be just long enough to enable the holder to stand as erect as possible, and at the same time apply sufficient power to effect his purpose. It should be strong enough to resist the force applied to strike the hoe into the ground, and not have any thing added to its bulk beyond that. The blade should be steel, thin, light, polished, and kept so by the workman, and should not have the tenth of an ounce in weight more than is necessary to give it the strength to perform the work required of it. Such a hoe should weigh two pounds, and no more, as the labor required to lift any more would be entirely thrown away. By observing the number of strokes struck by a man in hoeing during a day of ten hours, it will be found that he will lose a force each day equal to raising a tun-and-a-half weight several feet from the ground, if his hoe weighs one ounce too much. The labor required to raise such a weight, if multiplied by the number of days devoted to hoeing, would probably be found sufficient to hoe one or two acres of corn."

THE Omaha *Republican* of June 7th gives cheering bulletins of the progress on the Union Pacific Railroad. There are on the levee at that place fifty miles of iron, and ties for seventy miles, with 60,000 ties up the river, in the transportation of which five steamers are constantly employed. From one to two miles are finished daily, and at the above date the track had reached eight miles beyond Columbus

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Contents:

(Illustrated articles are marked with an asterisk.)

THE CULTURE AND MANUFACTURE OF SILK.

The war has done more than to unsettle and change the state of political parties. It has affected seriously the raising and manufacture of our great staple, cotton. The days of large plantations and aggregated settlements of farm laborers is past. Cotton will still continue to be an important staple of home manufacture and foreign export, but never again shall we see a whole section of country, comprising entire States, devoted almost exclusively to its cultivation.

For the benefit of the South—for the advantage of the country at large, and through the country, for the advancement of the world—we are not sorry. There is a meaning in all this, a meaning not altogether comprehended by our political leaders and statesmen. We believe that a subdivision of labor and pursuits not only insures the best results in itself, but produces the best effects on the world at large. There are exceptional cases where a particular locality is better adapted to the production of a particular material or its manufacture than to anything else, but those instances are only exceptional. There is hardly any fertile region but will produce equally well the raw material for several important manufactures, and, in many cases, will afford equal facilities for its manufacture.

Such, we believe, to be the South. The Gulf States appear to be the home of cotton. Some of the Atlantic States have endeavored to rival their sister States in its production, and, in some instances, with flattering results. But while the people have been engrossed with the production of the raw staple they have neglected its manufacture, purchasing, from those whose ingenuity has turned the product of their plantations into useful fabrics, the crops of their acres at a largely advanced cost. The manufacture of cotton at the South will undoubtedly hereafter become an important part of Southern wealth and importance.

But the business of silk raising and manufacture which, as early as the times of James I., was introduced into Virginia, ought to engage the attention of practical men. Owing to the demand for Virginia tobacco, it did not flourish, the planters preferring to cultivate the Indian weed to the production of the web of the Chinese worm. In 1732, artisans and others skilled in the silk business, were sent to Georgia, and succeeded in producing as fine a quality of silk as could be made in Italy, which commanded the highest prices in London. Before the close of the 18th century the last lot of Georgia silk was exported, owing to the revolutionary war and the want of interest in the business. About the middle of the century, or in 1747, its cultivation was undertaken in Connecticut, and some excellent qualities of silk, raw and manufactured, were produced.

For some reason, however, the silk business has never been a favorite one in this country. One reason has been undoubtedly the necessity of careful attention to the worms and the treatment of the cocoons, with the necessity of skilled labor in the manufacture of the raw material. It is, however, now becoming an important business. In Hartford and Manchester, Conn., the Cheney Brothers have the most important silk establishments in the country. They manufacture ribbons and dress silks, in no way inferior to those imported, and often far superior. But all their material comes from China, Japan, or southern Europe. In Hartford, also, is the establishment of Tobias Kohn, a Hungarian, who furnishes the New York market with the best specimens of silk braids and trimmings. But all the raw material for these manufactories are drawn from the other hemisphere.

The southern portion of this country is especially adapted to the culture of the mulberry and the raising of the silk worm. There is no adequate reason why it should not furnish all the material necessary to keep our home manufactories running and encourage the erection of others. At the North, also, it has been proved that silk can be successfully cultivated. We believe this could be made an important branch of our manufactures and a large item in our material wealth.

THE VALUE OF TIMBER.

We have already spoken of the attempts made to substitute some other material for fuel in place of mineral coal. Although, according to English statisticians, the limit of the production of coal in Britain can be approximately determined, and their calculations have engaged the attention of Government, this country leads off in the first successful attempt to provide for the possible contingency of an exhaustion of the coal beds, or, rather, here, to meet the demand for cheap fuel. Our coal mines will last us for an indefinite period, but owing to local or temporary causes, it has become an object to find a rival to the black diamonds which underlie our soil.

But while the attention of our people is drawn to the necessity of introducing a cheaper material than coal, as a fuel, our forests are rapidly wasting away. In localities not possessing good facilities for transportation, the trees in the forests are ruthlessly sacrificed, and, if the waste continues in the same ratio for the next half-century as it has for fifty years past, there must be portions of our country which will be changed from fertile farms to barren wastes. This is no fancy or sensational statement. The grand reservoirs of our springs, brooks, and rivers are our forests, except on the slopes of mountain ranges. They conserve the moisture deposited by rain and dew, by frost and snow, and deal it out through the arid and thirsty months, giving fertility and verdure to land that otherwise would not feed a goat. Forests serve a grand object in the economy of nature. They should be valued and protected. For this utilitarian reason, as well as for others of a more æsthetic character, we desire to see our forests preserved.

A trial lately made on the New Haven, Hartford, and Springfield Railroad, established, so far as a single trial could, the value of peat as a fuel above that of coal. The report of the run of twenty-six miles and return, demonstrated the fact that peat gave a greater heat, weight for weight, than the best coal, either bituminous or anthracite, at a cost of not more than sixteen per cent of that of coal. Here, then, is at least a partial substitute for coal as a fuel, and we do not despair yet of the economical use of petroleum for that purpose. The gas from wells has been used economically and with excellent results in places where wells have been bored which yield gas rather than oil. Of course this material must, from its nature, be restricted in its application. But all these help to preserve our woods from the waste of burning.

The alarming inroads made of late years upon our forests, the continually exacting demands for lumber, and its adaptation for thousands of purposes, make wood an absolute necessity. Yet although a very large portion of our territorial area, less than a hundred years ago, was covered by forests, it is a fact that large bodies of timber are now the exception rather than the rule. The forests of Maine, deemed at one time inexhaustible, the woody regions of Pennsylvania and Western New York, and even the forests of Canada, are yearly decreasing in extent. The pine is found now in larger quantities in the lower peninsula of Michigan than anywhere on this northern continent. How long can it remain? This is a question for those who have calculated on the forests of Maine as inexhaustible.

To be sure, the prairie dwellers of the West, with a foresight and enterprise that does them infinite credit, have gone to planting trees; but the object is a temporary and present one. The nature of the growth is rapid, attaining quick maturity, and intended only to subserve a present interest. No permanent forests will arise on our prairies. The wood will be cut as fast as it grows. Under these circumstances the discovery of a material which will fulfill the purposes of fuel as readily and cheaply as coal or wood, and the cessation of the wasteful destruction of timber by burning, in order to remove it from the soil, has become a necessity. We look to the inventive talent of the country—never yet appealed to in vain—to save to us and coming generations, those great storehouses of moisture—those equalizers of contingencies of the seasons—and depots for manufacturing material, our forests.

PARIS UNIVERSAL EXHIBITION.

A bill has passed the Senate—which will no doubt become a law—appropriating $48,000 in coin to provide the furniture and fixtures for the proper exhibition of articles sent to the Paris Exhibition from this country. The sum of $2,000 a year is appropriated to pay the principal agent. The sum of $33,700 is appropriated for office rent in New York, freights on articles to France, and other contingent expenses; and a further sum of $35,703 for railway transportation from Havre to Paris and returning, storage, clerk hire, etc. And, in addition to the above sums, $10,000 are appropriated to pay the traveling expenses of ten professional and scientific Commissioners—to be appointed by the President—and ten additional Commissioners are to be appointed, who are to pay their own expenses. The total appropriation amounts to $129,403, which include $48,000 in coin.

Senator Grimes offered an amendment, that no money be paid under the resolution until the French Government gave ample assurance of the withdrawal of French troops from Mexico, and urged that the whole exposition was got up on purpose to glorify the infant Napoleon, now ten years of age, who had been made President of the Exposition. This proposition was gravely debated at considerable length, but did not find much favor.

We hope the French troops will be speedily withdrawn from Mexico, and that hereafter the Emperor Napoleon will mind his own business; but it would be unworthy a great Government like ours to exhibit such a spirit in reference to an exhibition of industry, which so many of our countrymen regard with deep interest.

PATENTS IN CONGRESS AGAIN.

The House has had under consideration a bill authorizing the Commissioner of Patents to determine and decide an application of Jonathan Ball for the extension of his patent "for an improved mode of coating the interior side of water pipes with hydraulic cement." This patent was duly extended seven years by the Commissioner, and having, under operation of law, run twenty-one years, expired some time last year. Mr. Dawes, of Massachusetts, opposed the bill chiefly on the ground that it was against public policy for Congress to legislate to extend expired patents. He insisted with great justice that, after the patent had been opened to the public, by operation of law, for any one to enter fully upon its manufacture, it was not right for Congress to undertake to revive the right. The position taken by Mr. Dawes is impregnable and, we are happy to say, resulted in the defeat of the bill. Such legislation, if insisted upon, would soon make our whole patent system odious. We therefore, speaking in the interest of the great body of inventors and patentees, protest against all attempts to revive dead patents.