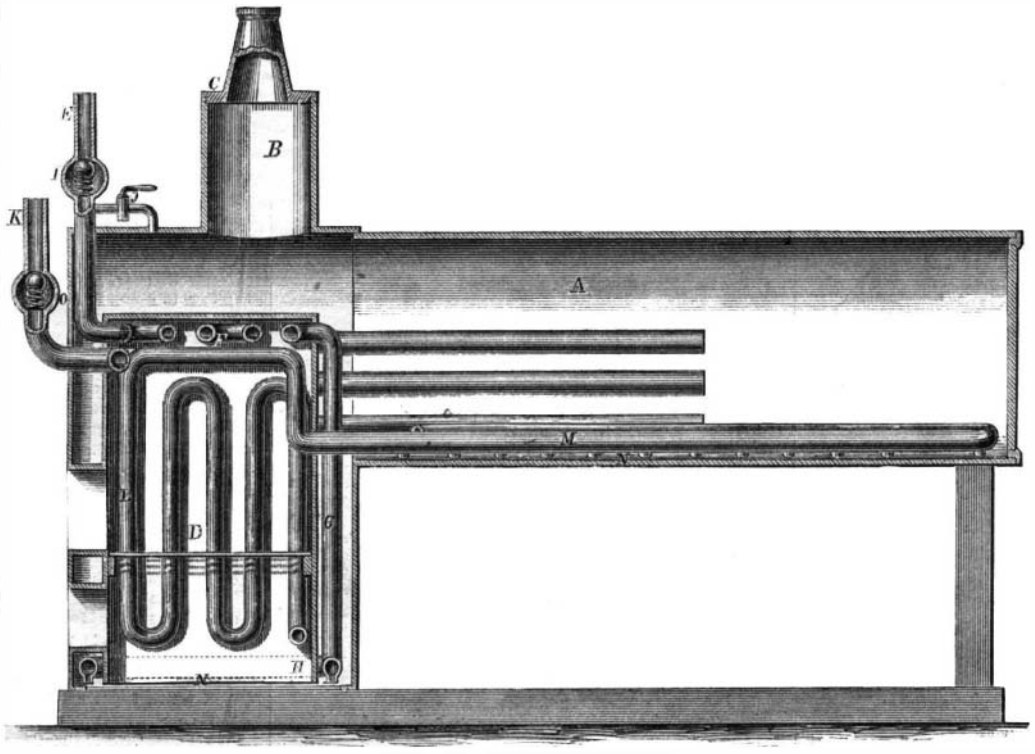
Improved Steam Boiler.

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.



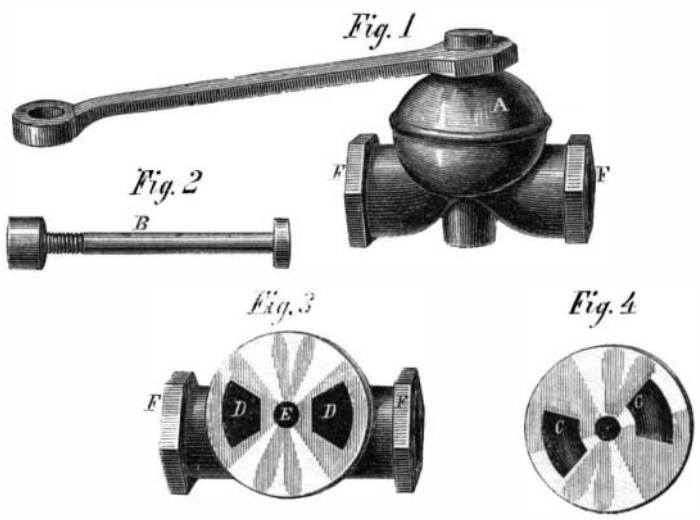
TANGER'S STEAM BOILER.

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