

New Inventions.

Use of Gold.

The principal use of gold is in coinage. As a medium of exchange, it has been employed from time immemorial, and will perhaps be so used while the earth remains. Owing to its unalterable nature in the atmosphere, it is extensively used in covering more oxidizable, but cheaper metals exposed to the atmosphere, in the form of thin leaf, called *gilding*. It is now very extensively and usefully employed in the art of dentistry, in thin plating, for securing artificial teeth, also for filling decayed teeth. In the art of jewellery, it is the principal metal used; but this is not considered so much a useful, as an ornamental application of it. But we would term the beautiful, *useful* also, for certainly it is a beautiful metal, and the beautiful has always an elevating and therefore a useful tendency.

American Iron Steamer.

On the 27th ult., a beautiful iron steamer named the *Cecile* was launched at Wilmington, Delaware, built by Harlan & Hollingsworth, of that city. Her length over all is 161 1-2 feet, breadth of beam 29 feet, and by carpenters' measurement she is 481 tons burden. She has two air-tight bulkheads; dining saloon 48 feet long; 24 state-rooms, two berths each; four state-rooms, four berths each, and a ladies' saloon on the main deck with eight berths. She will have a low pressure condensing beam engine, 38-inch cylinder, 10 feet stroke of piston, capable of working up to 490 horse power; will have composition balance puppet valves, and Sickles' adjustable cut-off. Her wheels are 24 feet in diameter; she will have an auxiliary locomotive boiler for working a steam pump. The *Cecile* is to be fitted up at Charleston, S. C., where she is owned by Messrs. Peck, Lafith & Co.

New Protector for Firemen.

The attempts which have been made to protect firemen from the injurious effects of smoke and heated air upon the lungs, by causing the air which they breathe to pass through moist sponge for the purpose of filtering and cooling it, have been but partially successful. The improvement here represented has for its object the accomplishment of the same end, and is based upon the fact that in apartments filled with smoke to an extent that would render it impossible to breathe at the height of a man's head above the floor, there is in nearly every instance a draft of cool, pure air near the floor.

To take advantage of this circumstance, a light-fitting mask has been adapted to the face of the person, from which depend air tubes, through which he breathes; the extremities of the tubes reach to within an inch or two of the floor, as will now be more fully explained.

The accompanying engravings exhibit a form of apparatus for this purpose, invented by I. P. Nelson, of Cambridgeport, Mass.

On Fig. 1, A is a front view of the mask, which conforms generally to the face of the individual, and is made of a sheet of prepared india rubber. The mask is contracted at its edges by an elastic band, by means of which it is caused to cling to the head, and all entrance of air or smoke at this point is prevented.

The tubes C are united to the mask immediately beneath the nose, and at this point there is an opening between the tubes and the interior of the mask, through which air is admitted for respiration. Immediately in front of the mouth, there is an opening, which is covered by the flexible valve B.

This opening is placed directly in front of the mouth, so that expiration may readily take place through it, while no air can be admitted at this point from the outside, as the valve B is of flexible india rubber, and effectually closes the opening when the air is exhausted upon the inside of the mask.

The tubes C reach to very near the floor, and are passed over the shoulders, and secured to the body and legs by straps, D, as seen in Fig. 2. It will be seen that a person thus equipped for entering an apartment filled

with smoke, may inspire through the tubes C, taking the air from the lowest stratum in the room, and expire through the opening at the mouth.

By removing the lower portion of the tubes, at the chin, the mask may be used to protect the face from severe wind and cold, and may, under some circumstances, be of great

NELSON'S PROTECTOR FOR FIREMEN.



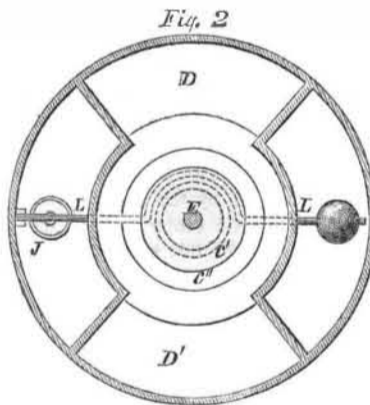
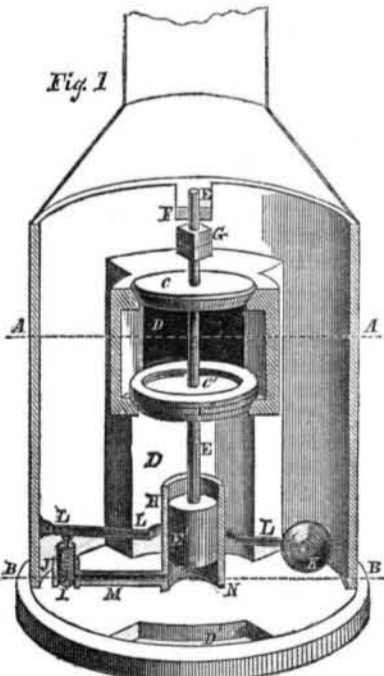
service to pilots, stage drivers, and others, whose occupations require them to be exposed to a great degree of cold, and to the beatings of storms in the face, which often seriously

affect them in the discharge of their duties. For further information, address the inventor as above; or, Geo. W. Backer, No. 85 Nassau street, New-York.

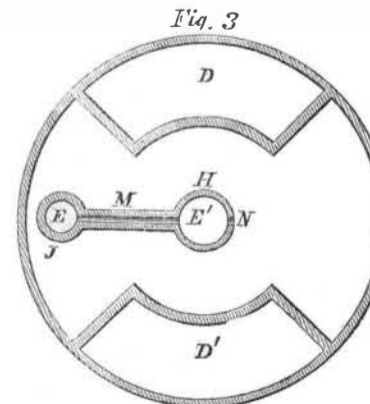
Day's Boiler Guard.

The action of the ordinary safety valve as a means of preventing the possibility of an excessive pressure within a steam boiler, is quite imperfect. The opening made by lifting safety valves of any reasonable dimensions is too small to vent all the steam which can be generated when the fire is in full activity, and

much too frequent exception. Attention has, at different times, been turned to providing some more efficient means of protection, by



the offering of a larger area for the escape; but we do not recollect any which seem so simple and offer so little objection in friction,



provide for the sudden generation of gases or super-heated steam, to which so many explosions are attributed, which occur on starting engines, or when the boiler, on account of low water, becomes highly heated; and except for the fact that the engineer is generally in attendance to close the damper or open the doors of the furnace, explosions would, with only the ordinary provisions against disaster, become the rule, rather than as at present, the

and in the keeping up of stuffing-boxes and the like, as the device here presented.

Fig. 1 is a vertical section, fig. 2 a horizontal section on the line A A, and fig. 3 a horizontal section at a lower level, on the line B B. Fig. 1 is an attempt to represent a section in perspective, the better to show the

relation of the parts. The principle consists in providing a balance puppet valve of large dimensions, which can be lifted from its seat by a comparatively small force, and so arranging and connecting this that by the lifting of an ordinary safety valve the steam will be admitted to a piston below the large balanced valve and lift it. Means are provided for avoiding the possibility of lifting the balance valve too wide, and the action of the whole will very evidently cease by the closing of the valve, as soon as the pressure of the steam in the boiler is sufficiently reduced.

The apparatus presents the appearance of a simple cylindrical or conically topped dome, and may be mounted on the top of any ordinary boiler. The construction is tolerably well shown by the figures. C and C' represent, respectively, the upper and lower portions of the balance valve. The lower portion, C', is a little larger than the upper, and the steam from the boiler is allowed to rise through the segmental openings, D D', and to freely fill the chamber between these portions of the valve. The pressure is therefore directed upwards on the disk, C, and downwards on disk C'. The excess of pressure being downward, contributes, in addition to gravity, to close the valve and hold it tightly in its seat. As there are practical difficulties in the tight fitting of a balance valve under such circumstances, the lower disk, C', is constructed with a movable ring, C'', tightly packed to the disk, so as to insure the perfect fitting of both portions of the valve, C C', to their respective seats. The stem E, on which C and C' are firmly secured is prolonged upwards through a fixed guide extended across, and is prolonged downward in the form of a large plunger, E', fitted loosely in the cylinder, H, as represented. I is a small safety valve, peculiarly constructed, so as to guide itself in the small cylinder, J. It is held down by the force of the weight, K, acting through the lever, L, as shown. A free communication is made through the tube, M, from the cylinder, J, to the cylinder, H, before described; and a very small opening, N, is left in the lower portion of the latter, for purposes which will appear below.

When the pressure rises to such an extent as to lift the safety valve, I, the steam flows through the pipe, M, into H, and acts with considerable force on the under side of E'. As neither the cylindrical portion of the safety valve, I, nor the plunger, E', fit tightly in their respective cylinders, the steam escapes slightly through the narrow annular openings thus allowed, as also through the small opening, N, described; but when the pressure becomes so great as to lift the safety valve, I, considerably from its seat, the steam flowing through M, (which is much larger area than N,) rapidly accumulates under E, to such extent as to lift it, and with it the balance valve, C C', and thus to present a very wide opening for the speedy relief of the boiler. So soon as the pressure is relieved, and the safety valve, I, sinks tightly to its seat, the steam under E' escaping through the annular openings, and through N, allows the balance valve to sink tightly into its seat, and the whole now remains motionless, in its original condition, without leakage, until the pressure again becomes too great.

It will be seen that there are no stuffing boxes, and but a very inconsiderable amount of friction to be overcome in the working of this apparatus. A cord or chain may, if desired, lead up from the lever, L, to allow the engineer to raise it occasionally, and insure its perfect action, but there should be no extra means available for holding it down.

Any suitable means, by a screw or otherwise, may be adopted for adjusting the position of the weight, K, on the lever, L, and a small opening may be provided in the side of the exterior casing, through which the Inspector may operate with a suitable key in adjusting this weight to any point desired. Or, if preferred, the weight, K, may be dispensed with altogether, and a coiled or other spring, adjustable in any ordinary manner, may be substituted in its stead.

The inventor is Joseph C. Day, of Hackettstown, N. J., of whom any further information may be obtained. Measures have been taken to secure a patent.