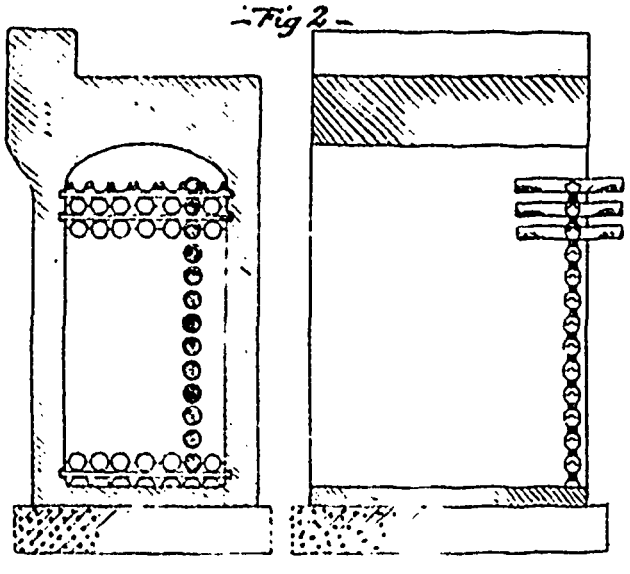
quite so verdant as the *Stationary Engineer* would have its readers believe. The safety valve of this exploded boiler was properly placed and of sufficient size, but carelessness had permitted it to become rusted to such an extent that the boiler burst before the pressure was high enough to open the valve.

Our friend says, "There must be some power to compel owners and superintendents to comply with the well understood

Fig 2.



principles, and not allow them to be disregarded, no matter from what cause, whether avarice, carelessness, ignorance or idiocy."

Quite correct! The safety valve should never be stronger than the boiler, but when it is, or is allowed to become so, whether from "avarice, carelessness, ignorance or idiocy," it is better to tell the truth about it than to thunder about "the utterly idiotic lack of intelligence which was responsible for such criminal foolishness."

BELT WIDTH.

SOMEHOW or other, power users seem to be afraid to get belts wide enough to do the work that they put upon them. They will get a double thick belt, or strain what they have to that point at which the lacings are in danger of giving way, and the bearings are being worn by the excessive pull on them; they will daub printers' ink and other messes upon the belt, and do almost everything that they can think of, except get a wide enough belt in the first place. Extra width means extra driving power, so nearly every time, that it may be put down as a working rule. It nearly always means driving power in proportion to the width, other things being as nearly equal as they can be made. Almost any eight-inch belt should drive as much as a four-inch belt of the same thickness, material, condition, tightness, arc of contact, etc. Almost any 12-inch belt will under the same circumstances drive three times as much as the four-inch belt, and half as much again as the eight-inch belt, just like it in every way. It may cost a little more for pulleys of wide face than for those of narrow face; and it will of course cost more for wide belts than for narrow ones of the same thickness; but in nearly every case it will pay to give width. There

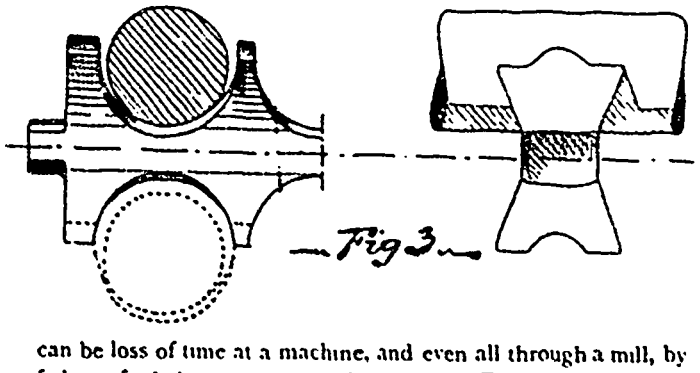


Fig 3.

can be loss of time at a machine, and even all through a mill, by failure of a belt to start up with its load. The attendants of a machine may have to wait, every one in the whole establishment may have to stand around until the belt is tightened. This may take an hour. There may be 400 hands (pairs of hands) waiting for that belt to start its load. The extra width of belt, the extra face of pulley, can be paid for by the cost of a very few such stoppages; perhaps by only one.

But it is not always necessary to have extra cost of belt. The extra pulley face will often do the business; using a single belt of double width rather than a double belt of single width. A double belt does not really drive twice as much as a single one. *It seldom drives more than half as much again.* This being the case, it is better to have a 12-inch single than a six-inch double belt. If the belt be laced, the 12-inch single is really stronger as far as driving goes, than the six-inch double, because they are apt to be laced with the same material, or fastened with practically the same fasteners; and as it is the fastening which determines the strength of the belt, you may find that the 12-inch single belt has double as much strength of fastening to stand the strain, as the six-inch double.

There is one thing to be said about doubling the width of the belt to get double the drive; it will sometimes fail because the belt is too rigid to bed down well; and in such cases it will often be found that two six-inch belts, side by side, will drive more than one 12-inch. Of course a rubber belt can not be cut down the middle any more than a canvas one; but leather ones generally can, and this will often be found a good remedy when a wide belt will not drive. Of course when it is a question of substituting a wide belt for a narrow one, there is less difficulty and expense in getting another one of single width, than in discarding the first one and getting one of double width. The question is one of pulleys only.

Where there is considerable crown on a pulley and it is found by the appearance of the side next to the pulley that it is not bedding well, that the edges do not touch the pulley, the trouble may often be cured (with a leather belt) by scouring it down the

Fig 4.

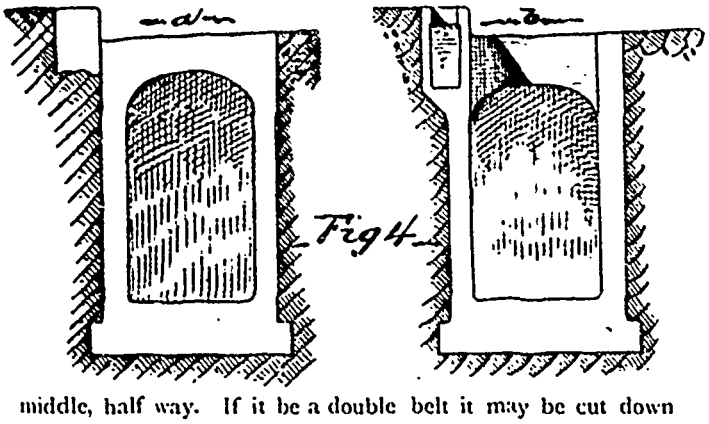


Fig 4.

middle, half way. If it be a double belt it may be cut down through the outer layer only. *Mechanical News.*

BOILER PLATES.

THE methods employed by Messrs. Cramp in the building of a large modern boiler, with thick plates for high pressures, are thus described:

The plates are, in the first place, pickled in a wooden bath containing a 5 per cent. solution of sulphuric or hydrochloric acid. After remaining in the bath for about six hours, they are removed and thoroughly scrubbed with hickory brooms, while a strong stream of fresh water is played upon them. They are then immersed in a bath of lime water to neutralize any remaining acid, and again washed with clean water. All holes are drilled, and the edges of the plates are planed and bevelled for calking. The shell plating is bent cold to the proper curvature in the rolls. The flanging is done by Tweddle hydraulic flanger, the plate being heated to a bright cherry red. A length of about eight feet can be flanged at each heat. Furnace mouth plates are flanged in cast iron dies at a single heat.

After the flanging of tube plates, etc., is completed, they are reheated, and the plates are straightened on a cast iron surface plate, and finally they are annealed by cooling in the open air from a cherry red heat.

The riveting is performed by a Tweddle hydraulic riveter, using a pressure of 1,500 lbs. per square inch on the flange, which gives a stress of about 90 tons on the rivet. The stay tubes are screwed into both tube plates and expanded, the ends in the combustion chamber being beaded over.