

top; then heat the plate until the foil is melted, and then squeeze by heavy weights, or between the jaws of a vise, as most convenient. This plan permits of the piece being changed in position on the lathe to suit the operations. If the surfaces of contact, in applying this method, be large, a cut of considerable size may safely be taken. And this way of attaching surfaces together is also capable of indefinite extension in other operations beside lathe work.

Many years ago I had a great number of cast bevel gears to bore. Whoever has had experience in these things, will know where the trouble lay. All were more or less warped, and some were so bad that they were useless. In truing them up in a lathe, all the foundry faults had to be averaged to get any kind of a job. It was piece-work. It had been taken at too low a price, and if the job should be done as usual by holding the hubs in a chuck and truing them up experimentally, there would be a loss of about fifty cents a day. Something must be done, and this was what saved me.

The gears were about five inches, and two and a half inches in diameter, to run together, and the faces were about one inch long. Two thick flanges were got, both alike, and these were fitted to the spindle of a lathe in the usual way, like face-plates, chuck-plates, etc. These flanges were about nine inches in diameter. The experiment was made with the pinion or smaller wheel. The shape of the teeth surface on this wheel was turned into one plate the full length of its face, very carefully, and to the correct conical angle. Then this internal cone was divided into three equal parts and laid out into as many surfaces, each about one half inch wide, and directed toward the apex. The spaces between these surfaces were cut away, one-eighth of an inch deep, so that the gear should bear alone on the three equidistant conical seats.

It will be seen that this kind of chuck will, and did, position the teeth of a gear at three points that were distributed equally about the entire circumference, so that the teeth that lay on them at least were true, and the teeth that lay between them a general average. The gears were held in this chuck by a "yoke" strap and two bolts.

In about 500 gears thus chucked, there was not one lost by this method of holding them; and four could be set in position while one could be adjusted by the previous method. The other gear was arranged in the same way, and instead of a loss I came out more than a dollar a day ahead of the usual pay.

Of course such internal cones are often cut to position bevel gears in. But what is not generally known, is the arrangement of the three high conical surfaces to average and equalize automatically the usual warped condition of cast bevels. If there were but six gears to bore, it would pay to make a wooden chuck of this kind, and bolt it on to the face-plate.—*The Manufacturer and Builder.*

### JOURNEYMEN STEAM FITTERS.

The profession most nearly related to that of steam engineers is the working steam fitters' occupation. Strictly speaking, the engineer should produce the steam, and it is the steam fitters' place to fix up all the steam pipes and make all the necessary connections.

Too often the engineer is called upon to be steam fitter as well. Where the steam plants are small, the engineer may be steam fitter also; but where the engines and boilers demand an engineer's whole attention, he should be relieved from work that may distract his thoughts.

The professional steam fitter's avocation calls for special studies, and his own particular work is enough for him to attend to, if he is to do his work in a thorough and efficient manner. A Jack-of-all-trades is a master of none, is a true saying, and worthy of consideration in this connection. If an engineer attends to his engine properly he cannot afford to "waste time" on the steam fittings of the establishment, otherwise his mind may become too divided to do one thing or the other well.

It is a great mistake to overtax the energies of an engineer, or any other man. Senator Plumb has just died at Washington, through overwork. And many a locomotive engineer has been so overworked as to be totally unfit to hold his responsible position.

For a man to keep his equilibrium it is necessary for him to eat well, sleep soundly, have a clear conscience, and not have too much to do. A steam fitter is the stationary engineer's friend; he relieves the engineer from work that does not properly belong to him. And in this age of subdivision of labor, the steam fitter supplies a "much felt" want.

Owners of steam plants will find it is the truest economy to have each man fill his own place, and no more, and that it will be cheapest in the long run to have a steam fitter as well as an engineer, instead of insisting that the engineer should do the work of the two. Of course, when one plant is not large enough to take up the entire time of a steam fitter, two or three (or more) establishments may join together to have a competent man to attend to the steam fitting department in each house.

### SURFACING GELATINE PRINTS.

I know of nothing more aggravating than after carefully finishing a fine positive to your satisfaction, having it stick fast to a glass plate, defying all attempts to remove it, and having finally to scrape it away in shreds to get the glass clean. But a few failures lead to success. I soon found the right way, and curiously enough, when thoroughly accustomed to the work, you become absolutely certain and confident of the result; not the slightest hesitation nor fear of sticking enters the mind.

Almost any kind of glass will do, provided its surface is good and free from bubbles, scratches, or other defects. Although plate glass is usually recommended, it is the least suitable, owing to the porosity of its surface.

To clean the glass, I know of nothing more suitable than a brand of soap known as "Monkey Soap," used only for cleaning non-destructible articles. After this the plate is well polished with clean chamois leather or an old silk handkerchief. Now comes the critical point, i.e., the application of the French chalk or powdered talc. This is the time when the operator