age of steam used to drive the air compressor always falls below two per cent., and with the plant in question the results obtained so far seem to indicate that it will not vary much either way from one per cent.

Of course this expenditure is to be placed against the fact that there is no other expense connected with getting the fuel into the furnaces, and none for removing ashes, clinkers, etc., and the further fact that a much more steady pressure of steam is maintained than is usually possible with coal, which, of course, conduces to economical working.

During a recent visit to the Boston & Albany shops, we saw some ¾" round bars of iron being heated at one end in a furnace fitted with six burners of this kind, consuming an average of fifty-two gallons of oil per day. The irons were to be used for making the ladders for freight cars by which the brakemen climb up and down, and were being upset by a bolt-header. One man did nothing but put them in and remove them from the fire, which he did at the rate of ten per minute, twenty-three being in the fire at once. Another furnace fired by the same system is used for heating old driving-wheel axles preparatory to cutting them up for smaller forgings, this also being done in a very satisfactory manner, the burners having very largely increased the capacity of the furnace, and enabled the steam hammer, by which the cutting is done, to be used to much greater advantage than formerly.. There is every reason to believe, from correspondence shown us, that the Associated Mutual Factory Fire Insurance Co.'s will endorse the system as a safe one, from an insurance point of view, this being probably the highest endorsement it could receive on this score. This is owing principally to the fact that the oil will not flow to the burners by gravity, but can only reach them by the pressure of the air. Altogether, we think no one familiar with such matters can doubt, after a visit to the Boston & Albany's Springfield shops, that this system possesses many advantages, and has a future of usefulness before it.

A Machinist's Reverie—Tapers—Dream.

By Jarno.

A cabinet of curiosities I have just seen—curiosities not because any one of them is in itself curious, but because each to another is a companion so strange, so unwelcome, so needless, as to be a severe criticism upon some of the mechanical practices of our time. I linger near, drawn by a fascination like that in beholding a ruin, or in looking at an orchard overgrown with a forest, and near a cellar upon which once stood a house, or in seeing an old ship that never sailed. I go away with long thoughts and mixed feelings. The cabinet is not in a museum, but in a machine shop, contains things not ancient, but modern, things telling of thoughts unproductive and of energies misdirected.

In a casual meeting with a machinist, the conversation turned upon the subject of grinding lathe centers, called to mind by reading in the American Machinist a statement that George Richards, of Broadheath, England, grinds them in his tool-room, and keeps them ready to exchange for those that have become worn. The machinist remarked that the same thing is done in this country, the grinding being done with a special machine that has, in its spindle, a large hole for taking center collets. There is a collet for each size, and one for each taper of center. I purposed to speak of the grinding machine, of hard centers in the foot-stock spindles, of soft centers in the head-stock spindles each soft center turned in its own live spindle whenever it is taken out and put in again; but the crush of the center tapers drives these ideas back into the chaos of thought unformulated.

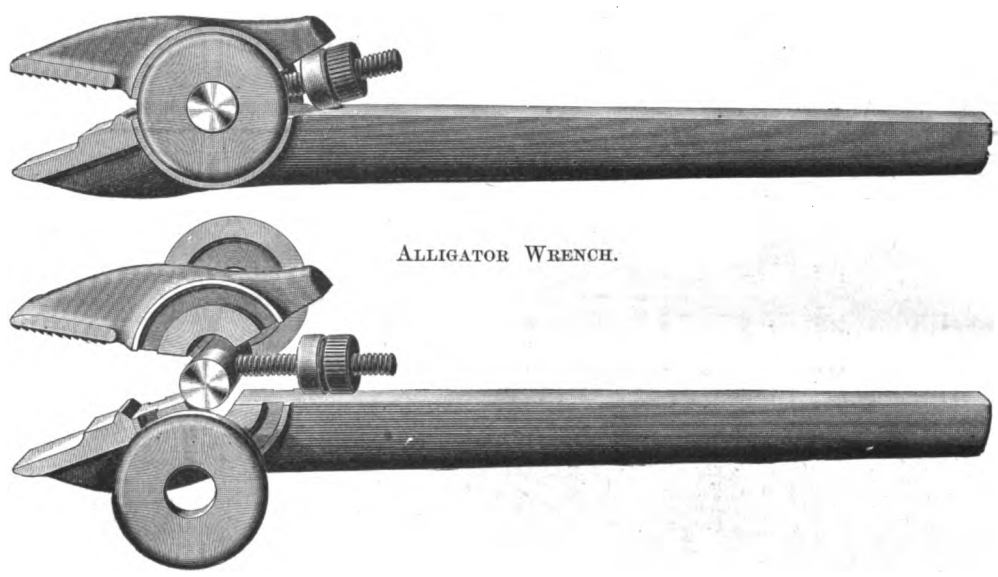
In a shop having a few hundred lathes there are sixty different kinds and sizes from twenty makers. In these lathes there are forty-eight different sizes and tapers of centers; in the tool-room there are *forty-eight* collets for grinding these centers. Of tapers now comes the crush. The twenty lathe makers use *twenty-three different tapers*. Again, two of these makers *each* use *six tapers;* and again, these makers each put *different tapers* in lathes of the *same kind* and *size*. Some of the makers use the same taper. It is to be hoped that this is not accidental.

To supply these lathes, a great many centers are required. It has been my privilege to see the plant for grinding and keeping them. The interesting thing about the plant is the center and collet cabinet. It is five feet long, four feet high, and one and a quarter feet deep. It contains fifty-two drawers. The drawers are numbered, and each of forty-eight of them is filled with centers and a collet. In two of them are blanks of various sizes, for the machinist knoweth not the day or the hour when another collet will be required of him. Two drawers are yet empty. At fifty the dead line has been placed—over this line no collet shall go. A printed schedule accompanies the cabinet, and completes the convenience of the system. When a new ground center is wanted to replace one that is worn, the name and size of the lathe is given, the schedule is searched, the number of the drawer is found, and the new ground center is at once furnished. If the center does not fit, the foot stock spindle is quickly brought to the tool-room, and the right center is found by trial. Seldom does a foot-stock spindle have to be taken out when the correct data of the lathe is given to the cabinet tender. While I am standing near the cabinet, the machinist pulls out a couple of the drawers. I look at them, and then at him; our eyes meet; a smile comes over the face of each, but they are smiles sardonic. The smiles go and serious thoughts come.

The cabinet is something in which the tool makers of America should have a mournful interest. Unless it should incite them to agree upon some one taper as a standard, I should be sorry to have it exhibited at a world's fair. Suppose that the forty-eight kinds of centers, with their twenty-three different tapers, were shown up without explanation, would it not be difficult to make any one believe that so great a variety is actually made by less than half the tool makers within a radius of two hundred miles, in a country thought to be well advanced in mechanic arts? The exhibition would be a satire without words, an elegy without music.

In his dreams, no doubt, the author of "Looking Backward" had witnessed this exhibition of energies misdirected. At first I thought I would dream of centers arranged around me in a threatening attitude, points toward me, offering no chance of escape; and of red-hot centers falling in a meteoric shower, some into the sea, and that I should wonder whether these were hard enough; of lathes wandering about looking for lost centers, and of the earth mounted upon a pair of centers that did not fit their spindles. I decided not to have this dream, but, in its stead, to have one that a standard taper has been agreed upon, and that some lathe makers, for fear of trouble if they change too suddenly, will not come to the standard all at once, but will come gradually, one ten-thousandth inch to one foot, during each year, until the standard will have been reached. At this rate, with a fortieth inch to go, the standard will be reached in two hundred and fifty years, which, considering that it took more than five hundred years to introduce generally the Arabic numerals into Europe, is comparatively quick work.

In a future paper I will put dreaming aside. I purpose to show a way to change. It is a sad pleasure to know that in this a mistake cannot be made, as no change can be for the worse. I feel the force of the argument against any change in the established tapers in a machine shop. It is easier to moralize than to make over, but does any man wish to see a cabinet annex? Certain it is, at least, that there should be no farther increase in the number of tapers. As I write, a superintendent tells me of an order for twenty-five taper shank mills; the taper does not agree with that of either of two well-known makers, and a gauge hole must be fitted; so the confusion spreads. Some time this must end—to end it will never cost less than now. Perhaps it would be a surprise to the owner of a shop to be told that there are nearly two dozen tapers in his lathe spindles. They have come one by one, and, unlike Rip Van Winkle's "one more," every one counts.



Alligator Wrench.

Improved Alligator Wrench.

With this we present engravings showing some recent improvements in an adjustable alligator wrench, made by the Campbell Printing Press and Mfg. Co., New York city. One of the cuts shows the parts separated sufficiently to show the construction of the wrench, the manner of adjusting the jaws, and the way in which they are jointed together and held by the caps or washers, engaging with an annular groove instead of by the central pivot. The smooth jaw is made either flat or stepped, as may be desired, the latter form being preferable for some purposes. The jaws are also made wider than formerly, and the wrench generally strengthened.

Chinese Progressiveness.

The opening of China to foreign trade has been as yet but very partially accomplished, and what has been effected in this way has mainly been done within the past thirty or forty years. In the development of the internal resources of the vast Chinese empire by help of the telegraph, of steamships and railways, scarcely a start has yet been made; but the intelligence we have lately received from Shanghai shows that at last the Chinese government has determined to take a new departure, which, before the close of the present century, promises incalculable benefits to the teeming millions of that vast and populous empire.

Preparations are now being made to carry a telegraph line right across the empire to the Siberian frontier, where it will be connected with the Russian telegraph system, and will bring Pekin, Shanghai and the numerous other great ports and cities of China into direct communication by land with all the capitals of Europe. Again, while Russia has decided to build within the next ten years a great railway running from Europe through Siberia to the borders of China, the statesmen of Pekin have also resolved to commence the construction of a great network of railways within the Chinese empire itself. Ere the year 1900 arrives we shall therefore see travelers proceeding from Calais to Pekin by Pullman car without changing. The distance between these two places is some seven thousand miles, which is twice the length of the longest Atlantic and Pacific lines in America.—*London Standard.*

Captain Wm. R. Jones, of Braddock.

(*Correspondence.*)

A few mornings ago there came to us the news of a most serious accident at the hearthstone of one of Braddock's largest furnaces. An accident which, by its unexpectedness and its swiftness, not only swept some of the bystanders into instant death, but also wounded most seriously the well-known mechanical engineer and metallurgist, Capt. Wm. R. Jones, so long the general superintendent of the Edgar Thompson Steel Works. While the brief item spoke of the injury sustained by Capt. Jones, it mellowed its sadness by expressing the belief that he would recover. To those who have long and well known the active head of that great industry, the news of his subsequent, and, as it seemed, sudden death, has brought a peculiar sorrow.

While I cannot claim an acquaintance as long or as intimate as can many of his associates, it was my privilege, on various occasions, to catch glimpses of a tender inner life of gentle thoughtfulness for others, which his business life and occupation rarely revealed to the general public. I cannot say how this charmed as well as surprised me. Placed all his life in positions where he had to combat difficulties, to grapple with resisting forces, to control and guide animate and inanimate surroundings, always, as it seemed, amid the smoke of battle, moving here and there to control and direct amid clanging wheels, roaring furnaces and flashing flames, he was ever an example of what a mastering mind and an unbending will could accomplish; and yet, at a time when it seemed he held the forces about him with a mastery that left no doubt, a rent gap in a giant furnace opened out a fiery flood that swept him and all else about him to destruction. To picture one who thus moved in his daily rounds amid such surroundings, would not be a difficult task; all would readily form their conception of what stuff such a man must be made of in order to succeed, but few, I fancy, ever dreamed that beneath all the firmness that was so necessary to his success, there was a heart as gentle as a woman's. The swinging portals of our homes close in, and properly so, from public view, the lives and conduct of all within, yet, feeling, as I do, how prone we are to judge of men as seen only in the "battle of life," now that my dead friend has been laid away, my regard for his memory urges me to give at least a glimpse of what he was outside, and away from his daily tasks. It was ever a marvel to me that a man who was so constantly environed by all that was crude and massive, whose daily touch was of the ore and the ingot, and where the lightest thing to be seen about him weighed a ton, yet could, and often did, select, with lightest touch as to texture, and most excellent taste as to shade of color, the gossamer fabrics for home use, the selection of which the enforced seclusion of an invalid wife made his duty, as well as his pleasure.

I have been with him in places where were stored the choicest ceramics of European