The manner in which a saw may be stretched so as to remove a swelled or stretched spot is shown by Fig. 3. As depicted at a, a single blow of a hammer has been struck while the saw was lying fair upon some hard surface like an anvil or some other flat steel object. It will be of no use for the would-be saw-hammerer to try stretching a saw by hammering it against a wooden block or any other elastic material.

With the saw-blade lying flat and fair against the anvil, it is evident that if a blow be struck with the peen of the hammer at a, the metal will be slightly depressed by the blow, being affected in every direction as shown by the wavy lines around the mark a, made by the hammer. When other blows are struck, see Fig. 3, it is evident that the saw-plate has been stretched entirely across the portions outside of the depression c d, and it is also in evidence that the stretching of the flat portions of the plate has eased the tension in one portion of the swelled spot, as shown by the absence of the shade lines at c d.

It is evident that, were the hammer blows to be judiciously distributed all over the flat portion of the saw-plate, the swelled spots would be removed entirely. At a, b, c and d, Fig. 4, may be seen the manner in which the hammering

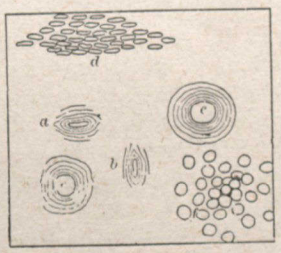


Fig. 6.

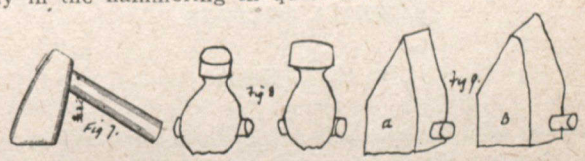
must be done to straighten a bulge. Blows applied in the spaces a and b must relieve the tension in certain portions of the swelled area g, and more blows at d and c will relieve the tension in another portion of the saw-plate. Then it will be necessary to hammer the small portions e, f, h and i in order to make the plate stay flat, for the tension created in hammering the saw in all its other parts must needs be relieved by hammering the corners also.

A clew to the proper arrangement of the necessary hammer blows is given by four channels through the swelled spot by means of the rows of hammer blows a b and c d is plainly shown, and the effect of other rows of hammer blows between and d is also apparent. It will be noted that the arrangement of the rows of hammer blows is symmetrical, all over the surface of the plate, the row at e being put in next after rows a, b, c, and d, then row g is made, and these rows are extended through other quarters of the saw-plate. Thus, row e is continued between rows c and b, and likewise made in the quarters a c and d f.

Next, the rows f and h are put in and distributed over the other quarters of the saw-plate. It is assumed that small pieces of saw-plate are being experimented with as shown by the engravings, Figs, 3, 4, 5 and 6, but when it comes to applying the hammer blows to the saw for the actual relief of the several swelled spots, there must be a considerable merging of the rows of blows into the territory occupied by the several swelled spots. Thus, were there another swelled spot at i, the same rows of hammer blows intended to relieve spot j would take care of the little spot i as well, and it would only be necessary to look out for the direction of the lines of blows when approaching another spot so as to make sure that the blows expended their effect in the proper direction.

A hammer blow can be made to expend itself, in either a lateral or a transverse direction. That is, the blows can be made to effect the plate either in a lengthwise or a crosswise direction. By referring again to Fig. 3, particularly to the side elevation, and to the marks b b on elevation and on plan, it will be noted that the blows expend their force nearly altogether in a longitudinal direction. The side elevation of the plate shows the stretching action of the blows; the plate being made a very little thinner at b and the metal thus made to move along leaves a thin place which is the measure of the stretching of the plate, thereby adding to its aggregate area the same amount that the swelled places have stretched, for they, too, must be thinner than the original plate.

The longitudinal or lateral effect of the hammer blows, however, is determined entirely by the shape of the hammer and the manner in which the hammer impinges upon the plate. Referring to Fig. 6, it will be seen that at a and b the stretching effects are at right angles to each other for the reason that the peen of the hammer is turned in the two directions mentioned. Thus at d the longitudinal effects of the blows have been massed in one direction, being entirely vertical. This is because the peen hammer is used exclusively in the hammering in question.



Should it be desired to stretch the plate uniformly in every direction, a ball-faced hammer must be used and the effect of the blows will be as at c, Fig. 6, where a single blow has been struck and the radiating effect of the blow surrounds the place of impact of the hammer. At d is shown the uniform grouping of blows. This would, if continued long enough in the same place, have the effect of forming exactly such a swelled place as we are trying to remove from a saw.

It is very necessary that all hammer blows be struck fairly, with the face of the hammer flat to the plate. The effect of such a blow is shown at c, Fig. 6, but when the hammer is permitted to cant a little, the effect is as at e, the blow being heavy on one side and light on the opposite side. Blows of this kind have a very bad effect upon the hammering of a saw.

A good deal of attention should be given to the selection of hammers for saw work. For a ball-faced hammer, the preference is largely for the "dog's-head" hammer which has most of the weight below the handle which is set at an angle as shown by Fig. 7. This tool is much liked by old-time saw hammerers, but is hardly used as much by the younger men. However desirable the dog's-head hammer may be, a good job can be done with an ordinary machinist's hammer, only care must be taken to have all the corners ground off as shown at B, Fig. 8.

A hammer with square corners, or edges like A, would quickly cause disaster by cracking the saw. The peen hammer should be selected or prepared in a similar manner as shown by Fig. 9, where the worthless form is at A, the correct peen being at B. If a hammer like A must be used, it should be ground off to look like B, so there is no danger of the corners cutting the plate.

RING BEARINGS FOR SHAFTING.

Of late considerable attention has been given to the improvement of shafting, bearings, and lubrication in sawmills,