THE CANADA LUMBERMAN

VOLUME XIV. NUMBER 4.

TORONTO, ONT., APRIL, 1893

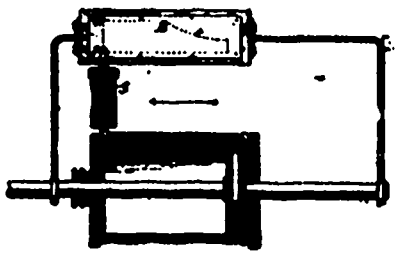
TERMS, $1.00 PER YEAR. SINGLE COPIES, 10 CENTS

THE INDICATOR.

IN a reply to an inquiry from several of our readers as to the action of the "Indicator" as used on the steam engine, says the Northwestern Mechanic, we have prepared the following cut and explanation, hoping that thereby the principle may be shown: although it must not be thought that the instrument used is anything like the one here shown; this merely shows the principle. In the cut will be seen the cylinder of an engine, showing the sectional view, and the piston being at the right hand end of the stroke.

The piston rod is extended out of the cylinder each way in order to make clear that the board above moves with the piston, in fact in this case is moved by it.

The board is shown supported by the arms which run up from the piston rod, and on the board is a sheet of paper tacked on to receive the card or tracing of the pencil, which is held in the place marked P at the upper end of the rod in the cylinder. It will be seen that a small pipe runs from the right hand end of the cylinder to the small cylinder and there is free connection between the small cylinder and the main cylinder of the engine.



THE INDICATOR.

The piston in the small cylinder is a neat working fit and is forced down by the spiral spring as shown at S. Now we will suppose that steam is admitted at the right end of the cylinder (the steam chest and valve being on the side in this case) and we see that the steam having free access to the small cylinder as well as the large one, will force the small piston up; and supposing this takes place before the piston of the engine has moved at all, the line that is drawn by the pencil will be perfectly straight as shown by the dotted line on the paper tacked to the board. Now that the piston has commenced to move, and the board moving with it, it will be seen that so long as the steam pressure in the cylinder (and indicator also) remains the same, the indicator pencil remains at the same height, and the line traced will be a perfectly straight line as from A to B. Now if we let the steam follow full stroke, the line will remain straight to the end of the stroke, but as this is not good practice, we cut off at half stroke. This means that when the engine piston has travelled half of its stroke the live steam is cut off, and the steam then in the cylinder expands, forcing the piston along but of course reducing the pressure as it advances.

As the pressure begins to fall, the spring in the indicator piston forces down the pencil arm, and remembering that the board is continually moving, we can readily see that the pencil will trace a curved line somewhat as shown. When the exhaust opens (we will suppose it to open and free the cylinder instantly) the pencil falls back to the original position, and on the back stroke traces a perfectly straight line. The dotted outline is called the card, and if we study it we can see that it represents the work the engine has done during the stroke, the height to which the pencil went as soon as steam was admitted, represents the pressure of steam in the cylinder at the beginning of the stroke. We also see that this pressure was maintained until the piston had made half its stroke, then the gradually falling line shows that the steam pressure was becoming less, owing to the volume of steam contained in the cylinder being expanded to twice its normal volume, and finally we see the pressure line drop, showing that the exhaust was opened and the free escape of steam allowed. Then we see that the height of the diagram represents the steam pressure, the point where it begins to fill represents the point of "cut off;" and the height before the final drop, the terminal pressure, or pressure still existing when the exhaust is opened and discharged it into the atmosphere.

These exact conditions do not exist in practice, but this will serve to show the manner in which they indicate the performance of the engine.

If we know the steam pressure as it is admitted to the cylinder, we can easily read the card intelligently, but if we do not, the card has much less meaning to us.

This is arranged in practice by having the springs "S," very nicely adjusted in the following manner. A spring is made that will be compressed exactly 1 inch with a pressure of 20 pounds, this is called a "number 20 spring," another is made that will be compressed exactly 1 inch with forty pounds, and called a "number forty spring" so that you can remember that the number of an indicator spring means the pressure required to compress it exactly 1 inch.

Now if we know that a forty springwas used in taking a card, and the card measures 2 inches in height, we know that the steam pressure, when admitted to the cylinder was exactly 80 pounds, and if the height of the line at the other end of the card is ¾ of an inch, we know that the terminal or exhaust pressure must be ¾ of 40 or 30 pounds. This makes the measurement of cards entirely practical if we but know the spring employed. Revising this operation we can see if we wish to indicate an engine whose boiler pressure is 90 pounds, and we do not want our card to exceed 2 inches in height, we use either 45 or 50 spring, usually the latter, as it is best to keep the cards reasonably small.

Of course with the primitive indicator as shown in our cut, we can only indicate the right hand of the engine, and would require two of this type to fully indicate the engine, but of the commercial kind in use to-day, it is possible to indicate both ends with the same instrument, by only changing the connection at the different ends of the cylinders. Now tracing the evolution from this crude indicator of ours to the finely finished one of *the present day*, we will see that the board as large as the cylinder is replaced by a very light cylinder or drum, and instead of taking the paper for the cards to a board, we simply fasten them around this drum. This drum is revolved at the proper time to be in unison with the engine piston, by being attached by means of a cord wound around the base of the drum, to some moving part of the engine, that gives the correct motion.

The movement of the piston in the instrument of to-day is usually multiplied by a very light arm carrying the pencil over the paper and otherwise being much more simple and compact than our crude instrument, but otherwise it might be called similar.

We will at some future time enlarge upon this subject, still in a very elementary way, for we believe that this is the part to be explained and that any who is desirous of learning in this any other branch has got the principle so that he can thoroughly understand it, he will need little further help in this way.

A LUMBERING AFFAIR.

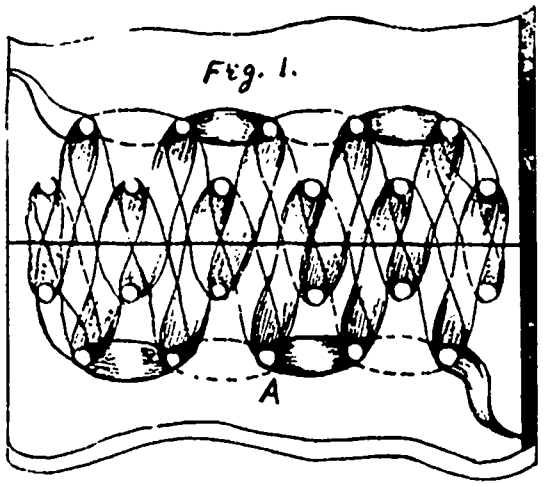
MASTER of Ceremonies. Now, boys, be good, come Fourth and Select your partners. The Pickings are rich. The girls are Culled from the Upper-ten, and not one but that would grace a Box. All join in. We want no Shelving, nor Siding off in the corners. This is no Common affair. The Gang-saw to the Dressing of the hall, the Band-saw to the musical numbers, while the Jig saw to the dancing programme. The supper will be served in Double Courses being a Dry affair. Let there be no Cutting up at supper. The Inspector is Knot a respecter of Grades, and any one caught Edging Up will be Rejected, Marked Down and Thrown Out. N.Y. Lumber Trade Journal.

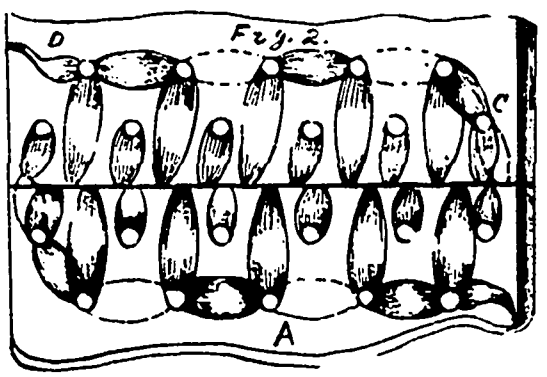
BELT LACING AGAIN.

BY J. H. MYERS.

THE following sketches show styles of lacing that I illustrated about four years ago. Some asserted that Fig. 1 could not be laced as per cut, and appear exactly alike on both sides, without crossing. My only way out of this was to mail a sample to all who were interested; the result was that my postage bill greatly increased for some time.

Fig. 2 illustrates the celebrated hinge lace, which every practical man ought to be conversant with. I have run this lace for four years on a line shaft belt without replacing it. The cross stitch, A, was replaced several times, but the lace proper was not removed, as if it was not necessary.





This cross stitch will not make the lace any thicker, as it should be well hammered down after being put on the pulleys. If laced too "scattering," it does not last well. The best results are obtained by punching not over ⅛ apart, using a full ½ inch lace, and if the lace is very thin, and a small punch is used, ⅜ apart for the holes is better, drawing the lace as tight as possible at C. If the lace is drawn in twice through each outside hole, it will add greatly to the life of shifting belts, as it completely covers or incloses the outside edge or end of the belt.

Fig. 1 I termed the "puzzler" lace. It is quite difficult to those not familiar with it. The hinge lace is superior to it for small pulleys, the only advantage of it is that it can be applied quicker. If the users of the hinge lace will adopt the cross stitch, they will be surprised at the result. In all cases I hammer the lace as flat as possible. Time will flatten it, but a nice smooth joint from the start is preferable. The Wood Worker.