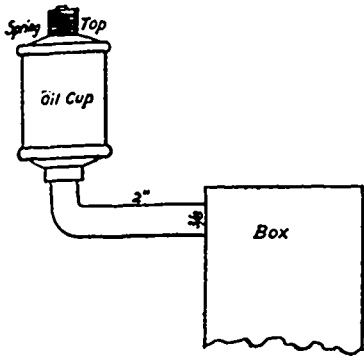


tion, and it is desired to test the alignment of a shaft already up, it is possible to run the line below the pulleys in the manner shown by Fig. 1, the ends of the sticks B being brought down to this plane. Now, starting at any bearing the exact center of the shaft is marked on the stick. To be accurate a small spirit level may be used to mark across top and bottom, see Fig. 4, and the space thus marked off divided in half to get the exact center. Measure carefully the distance to the end of the stick from this center line and cut a measuring stick to just that length. Use this to make a similar line on each of the other sticks B. One of these sticks will be located at each bearing and the center of the shaft may be readily brought to the line. All of the sticks may now be sawed off the right length and swung up out of the way for future use.

One should be cautious about always relying upon them, however, and if it is suspected that any portion of the building has settled since they were put up, they should be discarded, and a new line run.—Science and Industry.

A HANDY OILING DEVICE.

No doubt many of your readers have had trouble with the side spindles of matching and moulding machines running warm. I used to, and here is how I stopped it on the top boxes of a planer and matcher.



I drilled a hole in the side of box at the top, tapped it out for 3/8-inch gas pipe, screwed in a piece 2 inches long, put on an elbow, then a good brass cup fitted with spring top, put a little waste in horizontal pipe, filled the cup with oil, and have never seen these boxes warm since. You don't have to stop machine to oil, neither do you have to oil often. Were I to buy a new machine without some such device as this I should put it on before starting the machine—see sketch. The expense is trivial and the annoyance saved very great.—C. C. H., in Wood-Worker.

ROPE DRIVING FOR SAW MILLS.

The transmission of power by means of ropes running in grooved wheels has made considerable progress of late years. The system is low in first cost, and is particularly useful in conveying power to various points from the same centre. The great drawback to their use arises from the difficulty of obtaining an equal tension on all the ropes, some being strained, whilst others are performing their fair share of work.

During the last few months the writer has been consulted by several firms who have introduced rope driving as to difficulties they have encountered from ropes flying off, &c., and in each case it has arisen from the system not being properly designed and arranged in the first instance, consequently, a few general remarks on rope driving may be of interest.

DRIVING CENTRES.—Ropes will transmit power much better when arranged to run at long centres, and in comparing ropes with flat leather belts for conveying power considerable distances the balance is undoubtedly in favor of ropes, but when shafts are near together, say, 20 ft. or under, and the pulleys less than 4 ft. diameter, the advantage is in favor of belt driving. Ropes have been worked up to between 300 and 400 ft. centres when supported by idler pulleys, but this is, of course, exceptional. The slip of ropes is about 0.33, and leather belts working under similar conditions 0.96.

MATERIAL OF ROPES, &c.—The driving ropes are usually made of cotton, manilla, hemp, leather, or wire. For most purposes cotton ropes are to be preferred; they should be of the best quality, and firmly and

solidly made. Pure Egyptian throstle yarn, without weighting material, can be recommended. The lower side of the ropes should be the driving side, and a moderate amount of "sag" should be allowed on them, and when first put on they should be stretched as equally as possible. Cotton ropes are more pliable than those made of hemp or manilla. In splicing a rope the splice should be about 60 times its diameter. Ropes should be as elastic as possible, but lubricant should be used very sparingly, or there will be an excess of "slip".

DIAMETERS OF ROPES AND PULLEY.—It is of the utmost importance to secure successful working that the diameters of the ropes are properly proportioned to the diameter of the pulleys. Ropes of a moderate diameter are to be preferred to larger, as the friction of working and from bending and unbending is reduced in proportion. For like reason the driving pulleys should be of as large a diameter as may be convenient, say, not less than 30 times the diameter of the driving rope. Combe adopted the following minimum diameters of pulleys for the various sizes of ropes:—1 1/4 in. diameter of rope, 3 ft. diameter pulley, ratio 1 to 28.8; 1 1/2 in. diameter of rope, 4 ft. diameter pulley, ratio 1 to 32.0; 1 3/4 in. diameter of rope, 5 ft. diameter of pulley, ratio 1 to 34.0; 2 in. diameter of rope, 6 ft. diameter pulley, ratio 1 to 36.0. The ratio of pulleys to each other should not be greater than 4 to 1, but 3 to 1 is better practice.

SPEED OF ROPES.—A good average speed for economically transmitting power is from 3,000 ft. to 5,000 ft. per minute. Ropes are often run faster than this, but we fail to see any corresponding advantage, as any gain in power is counteracted by increased wear to ropes and bearing, and the centrifugal action, or tendency of the ropes to fly off is also increased.

ROPE GROOVES IN PULLEYS.—Another very important matter in effective working is the proper construction of the grooves carrying the ropes. The general consensus of opinion is in favour of grooves formed with straight sides at an angle of about 40 to 45 degrees. The grooves should be of sufficient depth that the ropes cannot rest on the bottom. Grooves are sometimes made with curved sides, but these are not to be recommended, as the ropes cannot bed themselves properly, and have a tendency to roll round, and, consequently, more rapidly deteriorate. Grooved wheels made of wood largely increase the driving power of the ropes.

SHAFTS CLOSE TOGETHER, &c.—Although ropes do not give the best results for driving shafts which are close together, they are sometimes used. In this case a single continuous rope is often employed, the rope being laced backwards and forwards from one groove to the other, a tension pulley being employed for leading the rope from the last groove into the first. For keeping the ropes from flying off an idle grooved tension pulley is sometimes employed.

CROSSED VERTICAL AND ANGULAR LINES.—This form of driving should be avoided wherever possible, but if absolutely required special forms of grooves are necessary, and for right angle drives a pair of additional specially arranged horizontal guide pulleys are required. For successful vertical driving extra ropes are required, as the ropes have a tendency to fall out of the grooves. Ropes convey power best when worked horizontally, or at an angle of about 45 degrees.

RENEWING ROPES.—Ropes should be renewed, as far as possible, altogether, as it has been found in practice that if new ropes are put on to work with old ones that the new ropes brake the old ones till they are all rubbed down to the same size. To get over this difficulty, in America a single continuous rope is often employed.

ROPES FLYING OFF DRIVING WHEELS.—Some of the chief reasons for ropes flying off may be stated as follows:—(1) Improperly proportioned driving wheels and ropes, (2) excessive speed, (3) too short driving centres, (4) a suddenly applied load, (5) too powerful an engine for the work, (6) too early a cut-off, or too much "cushioning" in the engine. If an engine has a fairly full load, and other things being equal, the jumping of ropes is usually not much, but if the power of the engine is larger than is generally required, and the slide valve is set to cut off early, when the steam is turned on great stress is immediately put on the tight

side of the ropes, which causes the slack side to fly up suddenly.

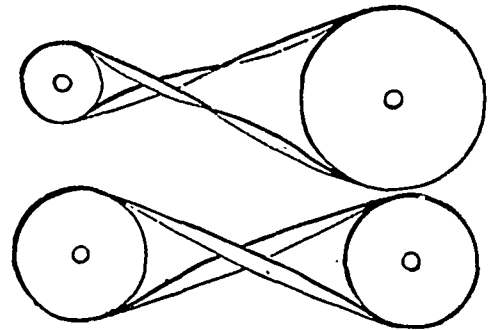
TO FIND THE HORSE POWER TRANSMITTED BY ROPES.—Rule. Multiply the sectional area of rope in square inches by 100 times the speed of the rope in feet per minute, and divide by 33,000, which will give the horse power (approximately) transmitted by each rope.

TO FIND THE INDICATED HORSE POWER TRANSMITTED BY ROPES.—Rule. Multiply eight times the square of the circumference of one rope by the number of ropes, and by the circumferential velocity of the driving pulley in feet per minute, and divide the product by 33,000.

ADVANTAGES OF ROPE DRIVING.—Amongst the advantages claimed for properly arranged rope driving may be mentioned low first cost and cheapness of repairs, and freedom from serious accidents. Power can be conveyed from the fly-wheel direct to various floors, and shafts that are not quite parallel may be readily driven.—M. Powis Bale, M. I. M. E., in the Timber Trades Journal.

CROSS BELTS.

What are usually known as cross belts are very common in driving machinery, and it is a well known fact that they run best when the two pulleys which they connect are somewhere near of one size. But sometimes it is almost necessary to use a cross belt on pulleys of very different diameters, and it does not seem to be generally known how this may be done and still have the belt run smoothly. If the belt connects two



CROSS BELTS.

horizontal shafts on the same level, and is given the ordinary single turn or twist, it will naturally stand in a vertical position at a point midway between the two shafts. Now, if the two pulleys are nearly of one size, this midway point is the natural crossing place for the two parts of the belt and all goes well. But if one pulley is much larger than the other, then the belt must cross at a point much nearer the small pulley than the larger one, and with the ordinary twist the two parts of the belt are apt to quarrel, so to speak, at this point. To remedy this, in many cases, it is only necessary to give the two parts of the belt an extra twist as they pass from one pulley to the other. The belt then will stand vertical at two points, making the thirds of the distance between the shafts, and if the pulleys are of such sizes that the belts cross at or near one of these points they will run smoothly again and with very little friction. The sketch shows the two positions.—J. C. Green, in American Machinist.

OBITUARY.

The death occurred at Fredericton, N.B., on April 22nd, of Robert A. Noble, a well known lumberman. Mr. Noble had suffered from lung trouble and about a fortnight before his death was seized with an attack of hemorrhage. He was fifty-three years old and had been identified with the lumber industry on the St. John River all his life. He was foreman for the late Robert Connors and afterwards employed in a similar capacity by Cyrus Dickie, of Fort Kent, Maine. Of late years he had taken logging contracts on the St. John headwaters for Cushing & Co., of St. John. Last year, in conjunction with John A. Morrison, he had charge of the corporation drive between Grand Falls and the boom limits.

The Hull and Ottawa district has lost one of the few survivors of the old By-town lumbermen in the person of Mr. Basile Tessier, who died at Hull last month. Deceased was only seventeen years of age when he began his career as a lumberman in the Ottawa valley. He was once engaged by the barge companies as ship-builder. Mr. Tessier retired from business eight years ago.