FRICTION IN STEAM PACKINGS.

BEFORE the meeting of the American Society of Mechanical Engineers in December, 1899, Mr. C.H. Benjamin, of Cleveland, Ohio, read a paper on the above subject, describing some experiments made at the Case school with several varieties of packings. He gives four tables showing the results, which we reproduce, together with his comment and general conclusions.

TABLE I.

Kind o Packing.	No. of Trials.	Total Time of Run in Minutes.	Average Horse-Power Consumed by Each Box.	Horse-Power Consumed at 50 Pounds Pressure	Remarks on Leakage, etc.
1	5	22	.091	085	Moderate leakage
2	8	40	.049	.048	Easily adju ted ; slight leakage.
3	5	25	.037	.036	Considerable leakage.
4	5	25	.159	.176	Leaked badly.
5	5	25	.095	.081	Oiling necessary ; leaked badly.
6	5	25	.368	.400	Moderate leakage.
7	5	25	.067	.067	Easily adjusted and no leakage
8	5	25	.82	.082	Very satisfactory; slight leakage.
9	3	15	.200	.182	Moderate leakage.
10	3	..	.275	....	Excessive leakage.
11	5	25	.157	.172	Moderate leakage.
12	5	25	.266	.330	" "
13	5	25	162	130	No leakage; oiling necessary.
14	5	25	.176	.276	Moderate leakage; oiling necessary.
15	5	25	.233	255	Difficult to adjust, no leakage.
16	5	25	292	.210	Oiling necessary ; no leakage.
17	5	25	.128	.084	No leakage.

TABLE II.

Kind of Packing.	Horse-power consumed by each box, when pressure was applied to Gland Nuts by a 7-inch wrench.						Horse-p wer before and after oiling rod.	
	5 Pounds.	8 Pounds.	10 Pounds	12 Pounds.	14 Pounds.	16 Pounds.	Dry.	Oiled.
1	.129	....	.136					
3				..		....	.055	.021
4		.248	..	.363	....	.399	.154	.123
5		.220						
6		.348	.430			....	.393	.194
7		.126	.228	.2 0	.230	.340	.067	.053
8		.701	500	.535	.540	.531	.533	.715
9		.176	....				.666	.635
11		.425	414	....			454	175
12		161	.242	359	454		454	.122
13		417	394	582				
15		5 6						
16		3 7	860					
17		198	277	380				

TABLE III.
VARYING STEAM PRESSURE

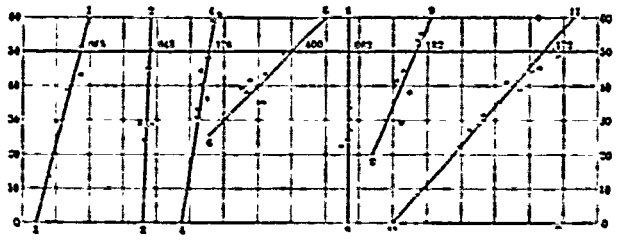

TABLE IV.
VARYING STEAM PRESSURE

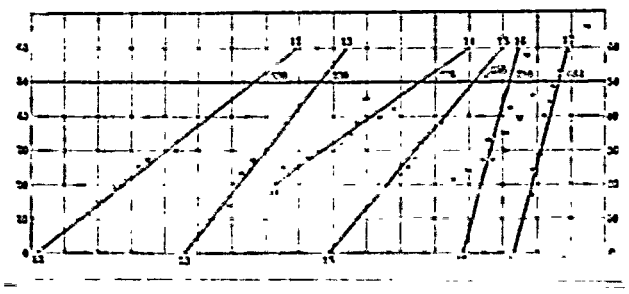

Table I gives a summary of the results, showing the average horse-power consumed by each packing box at varying pressures, and, for purpose of comparison, the power at 50 pounds pressure of steam. The friction of the machine has been deducted.

Table II shows the effect of tightening the gland nuts on the friction of the packing, and also the effect of oiling the rod.

In most of the experiments detailed in Table I the nuts were tightened with the fingers only, and then just enough to prevent leakage, and no lubricant was used except that incorporated in the packing itself. With some of the dry rubber packings it was necessary to use oil from the first. A good quality of cylinder oil was applied.

The effect of varying the steam pressure is best sho graphically, as in Tables III and IV. The numbers at the ends of the lines correspond to numbers used in the other tables. The ordinates indicate the steam pressures observed, while the abscissas represent the horse-power consumed by each box. The points where these lines cut the line of 50 pounds pressure are those used for comparison of the different packings. It will be seen that the friction varies with the pressure in approximately straight line ratios in many of the cases.

GENERAL CONCLUSIONS.

1. That the softer rubber and graphite packings, which are self-adjusting and self-lubricating as in Nos. 2, 3, 7, 8, and 11, consume less power than the harder varieties. No. 17, the old braided flax style, gave very good results.

2. That oiling the rod will reduce the friction with any packing.

3. That there is almost no limit to the loss caused by the injudicious use of the monkey-wrench.

4. That the power loss varies almost directly with the steam pressure in the harder varieties, while it is approximately constant with the softer kinds.

The diameter of rod used—two inches—would be appropriate for engines of from 50 to 100 horse-power. The piston speed was about 140 feet per minute in the experiments, and the horse power varied from .036 to .400 at 50 pounds steam pressure, with a safe average for the softer class of packings of .07 horse-power.

At a piston speed of 600 feet per minute, the same friction would give a loss of from .154 to 1.71 with a working average of .30 horse-power, at a mean steam pressure of 50 pounds.

THE CARE OF WOODEN PULLEYS.

Wooden pulleys are very good things to have in the mill. They hug a belt very tight and stay in place pretty well if decently taken care of; but it will not do to let them go year after year without attention. A wooden pulley which is not properly taken care of will soon begin to squeak; and once a wooden pulley gets to squeaking, all the tightening up that can be done will not prove a cure. When a wooden pulley begins to squeak the usual thing is to tighten up the clamp bolts under the idea that the pulley is slipping on the shaft.

Even when tightened up sufficiently to draw the nuts and washers into the wood the squeaking will continue. In such a case the squeaking is not between the pulley and the shaft, but between the parts of the pulley itself. Some of the joints have become loose and the parts thereof rub together, and, under the heavy belt pressure, cause the squeaking which proves so annoying. To make good pulleys which are in this condition, take them partly to pieces, rem any loose or partly detached segments that have started up in the joints. Make a s dry room either by putting a coil of pipe i big air-tight box, or by inclosing s me h coils at a number of radiators. If there is room for lumber near, say in a neighb oring ing mill or furniture factory, it will be jus thing and should be utilized. Otherwise, t packing box large enough to contain the pipe in steam, and slowly heat the partial molished pulley two or three days, or until been slowly heated entirely through. Then the pulley into the shop and work every and crevice full of thin hot glue. The woo ing hot, the glue will penetrate to the inner portion of each crack without becoming as would be the case were it attempted to cold pulley with glue.

After giving the pulley all the glue it w sorb, replace the portions removed, tighte the iron braces, castings or screws there ma then put the pulley back into the dry house least twenty-four hours more, but do not the heat too great—say at least 160°—a there be good ventilation to the dry ho box while this final heating is going on. removing the pulley from the dry room, two coats of good orange shellac inside a to keep the dampness that may be in the sphere from again getting into the wood. long as moisture is kept out and the lead the pulley is not too great, there will be no squeaking. Pulleys which for any cause been exposed to the weather for some ti those that have been exposed to water in a ed mill or at a fire, may be heated in the m indicated, and they will come out nearly as as new.

There are usually a number of wood p around the mill which are not in use. pulleys should never be allowed to remain shafting. Although very slight, it still do something to impart motion to idle p therefore it is an expense to keep them o shafting. Gather up all such spare p look them over and make such repairs a necessary. Usually only a little glue is n Then give each pulley a good coat of shellac, and place in a dry room, there t till wanted. Mark each pulley with its di and face width. White chalk will d effectually. Pulleys thus marked and p up side by side are as good as cash in the of a mill. When a pulley is wanted it c found in an instant by the chalk marks upo it is certain that the pulley is in good repa all ready for instant use without any p delay for repairs. When iron pulleys are s range them in a similar manner in a ro mark in the same way, but also add the diameter to the sixteenth of an inch. Mill.

Paul Robarge, of Como Bridge, N. B., was k near St. Leonard's, while in charge of Keswick & log drive.

A distressing accident occurred at Goldthrop mill near Dungannon, Ont., when Charles Carpe mill hand, was thrown on a circular saw and kn to pieces.

Messrs. J. F. Lillicrap & Co., Lakefield, On sold their planing mill business to Messrs. Moore tie, of the same place, Mr. Lillicrap retiring to whole attention to the wholesale lumber trade.