G CRANK PINS, WRIST PINS AND GUIDES ON STEAM ENGINES.

By W H. WAKEMAN.

n of oiling a bearing that is in motion (like pin of an engine) from a stationary oil cup, is ommonly practised that it attracts little or no among engineers in large cities. But this always so; even now there are hundreds running without this great improvement, and still a few engineers who do not appreciate the such a device. The word "few" here means housands, for it is used in a comparative sense total number of engineers in this country is e.

he time that I first opened the throttle valve of until the present day, it has been my ambi- keep my engine running at full speed for the number of hours, whatever that might be, from hat runs but five hours without a stop to a run urs without closing the throttle valve. During ix years of this time I did not have any way of crank pin while in motion, except a cup that with the crank. I am free to admit that the essary to keep that pin from heating was han that caused by all the other bearings com- I could fix them while running, but any mis- etting that crank pin oiler was sure to bring mill to a standstill before the appointed time. ler consisted of a common brass cup screwed trap on the connecting rod, with a tube in the rough which a piece of lamp wicking was When this was new it would feed too fast; ad been used a few weeks it fed just right, and it fed too slowly, provided it was not taken o that the adjustment consisted in manipulat- iece of wicking every morning and noon so as me its exasperating tendency to feed too much tle; but the rule followed was made up from y, so that it is impossible to repeat it here.

second engine that I engaged to run, a very levice was used for the crank pin. I soon dis- that this shop contained machinery that could topped at pleasure without damaging the stock nce the crank pin became more important than ny estimation. I decided that a "wiper" was y, but wipers were expensive at that time, and s anxious to make as good a record as possible st of running the plant, I had one made. A ing blacksmith forged out a piece of iron and a large hole in it, so that by taking one of the s out of the main bearing, putting it through and returning capscrew to its place, I had a

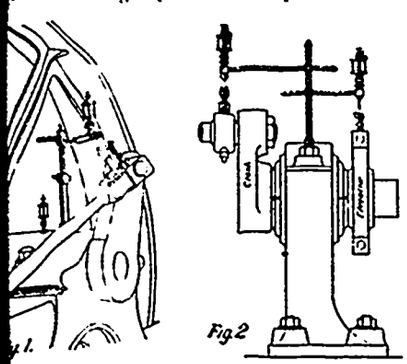


Fig 2

l that answered the same purpose as that shown . A piece of sheet brass was fitted into the the strap, a sightfeed oiler put on the standard, r details attended to that made it possible to engine as many hours as required without down to oil the crank pin. I am not advocat- idea of making such devices to the exclusion of t on the market by reliable parties, for the ones ompetition with others in the open market are ways better than any "home-made" device. le they a cheaper, too, all things considered. in sympathy with the man who uses $6.00 time and $1.50 worth of stock in making an could buy for $5.00, and then boasts of his sagacity. I do claim, however, that where an can not induce his employer to purchase some ppliance, he is justified in making it, provided patented.

The wiper shown in Fig. 1 has a piece of flat lamp wick stretched in a horizontal position underneath the sight-feed oiler; as the oil is dropped on this it filters through and is wiped off from the under side by the moving cup. Fig. 2 is all metal, the oil falling through a slot and hanging underneath until the wiper comes around and takes it off. This illustration shows the same device in use on the eccentric of an engine. While this is not absolutely necessary on a slow-speed engine, it is a very good thing to have in use.

Fig. 3 shows a wrist pin oiled in the same way, also a cup that feeds oil to the lower guide. The dotted lines show how the oil rises to both edges of this circular guide, thus insuring lubrication for the highest parts of it, after which the oil is sure to work downward to the lower part without further attention. Fig. 4 illustrates another device for oiling a crank pin while in motion. The principle on which it operates is the use of centrifugal force. The sight-feed oiler drops oil into the hollow ball beneath it, out of which it flows to the right and drops into the hollow ball which revolves opposite the center of the crank shaft. So long as it

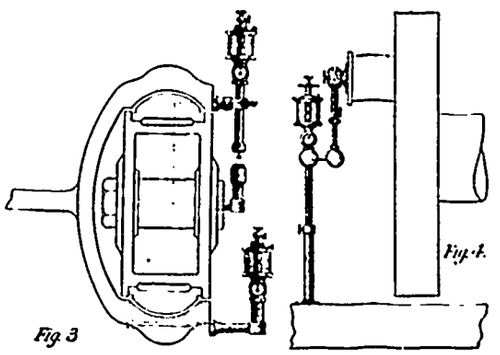


Fig 3 Fig 4

remains at the center there is no tendency to go in either direction, but when the crank is down the oil moves away from the center, and once started on its journey it quickly travels toward the crank pin without regard to the position of the crank. It is quite a job to apply this form of oiler to an engine in a mill, as two holes must be bored in the crank pin, but it is very satisfactory in practice, because it throws the oil less than any other device. The same principle is utilized on some center-crank engines, where oil is taken from oilers on the shaft bearings, and used in the same way.

Having described these oilers, I wish to call attention to their great value to steam users, not only on account of preventing lost time in shutting down during working hours, but because they deliver oil to the rubbing surfaces in small quantities and at regular intervals. It is quite possible for these surfaces to wear much more than is necessary without heating or giving any outward indication except that the keys need frequent adjustment and the boxes are worn out sooner than they ought to be. Some mill owners regard such devices as luxuries, therefore they can be dispensed with; but this idea is not wholly correct, for while a mill can be run without them it does not pay to do it. It seems rather inconsistent to find a mill in a city, near machine shops and other places where repairs are made, fully equipped with oilers that prevent friction and wear, and then to find another mill located several miles from the nearest machine shop (which may be a primitive affair at best) fitted with oilers that do not prevent the bearings from becoming warm every day. In such places repairs are always expensive, since it takes so long for one or more machinists to reach the place.

The only objection to wipers on the crank pin and wrist pin of an engine is that they call for oil cups, or rather oil-catchers, that are open on the top, and when located in a dusty mill there is a chance for some of the flying dust to get into the open cups and clog them, or work down into the bearings and damage them. This objection may easily be overcome, however. A small piece of waste put loosely into each one will allow the oil to filter through it, but will catch the particles of dust. It is necessary to renew these pieces of waste frequently in order to prevent them from becoming hard enough to stop the oil from filtering through fast enough to keep the bearings well lubricated. This is but a small job, and need not be done more than twice each week.—The Wood Worker.

THE HARDILL COMPOUND ENGINE.

The town of Mitchell, Ontario, presents an example of Canadian enterprise in the possession of a company who are meeting with success in the manufacture of a compound steam engine invented and perfected by purely Canadian genius.

Mr. Joseph Hardill succeeded in January, 1899, in obtaining the Canadian and United States patents on a new design of cylinders and valves for a compound engine which had occupied his attention for a number of years. Considerable interest was hereby manifested among experts, who recognized in this design the possibilities of an inexpensive, yet complete and serviceable engine presenting promise of increased economy, besides other features heretofore unobtainable, at a price which would be within the reach of all steam users, and at the same time be so free from all complicated parts and gears that it could be operated by anyone capable of handling an ordinary slide valve engine.

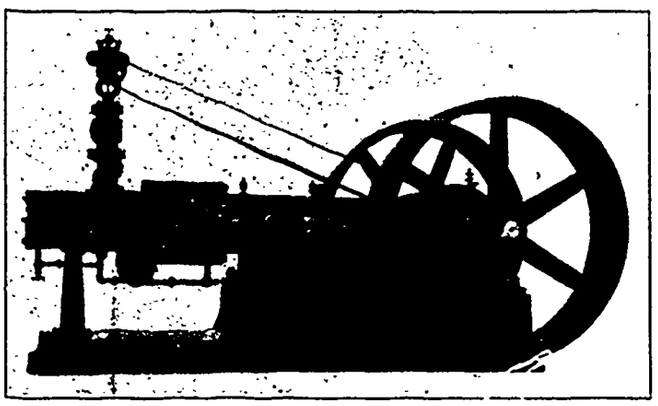
An engine was accordingly built and sent to McGill University, where it was subjected to an unusually thorough and practical test, and although the engine was the first of its kind, the results, we understand, were gratifying beyond the fondest expectations of its builders, who were congratulated on their possession of a most valuable invention.

A company was then formed and incorporated under the name of the Hardill Compound Engine Company, of Mitchell, Ont., Limited, who immediately made preparations for placing the engine on the market, and have been working quietly for a little more than two years, perfecting designs and building patterns, so that to-day, as all who attended this year's Exhibition at Toronto will agree, they have succeeded in producing an engine which for performance and appearance is of exceptional merit.

In the meantime a number of engines had been sold, and may be found doing almost every conceivable kind of work, and giving such general satisfaction that the success of this engine seems assured. The company are now prepared to supply this engine in all sizes, from 15 h. p. to 100 h. p., with the assurance that every engine will fulfill the claims made for it.

A company has recently been organized in Buffalo who are building the same engine and meeting with the same degree of success. One of their engines was tested at Cornell University, and its performance was such as to call for the most flattering commendations. It is hardly necessary to state that these two universities are equipped with special facilities for making such tests in a most thorough and vigorous manner and that their reports are comprehensive and absolutely impartial.

The Hardill compound, of which an illustration is shown, is a compact, self-contained, medium speed engine of the tandem compound type. It may be operated as a double-acting or single-acting compound as may be required. The peculiar feature is the two-valve chests, one on each side of the cylinders. These



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chests form the bulkhead and are cast in the same piece with the cylinders, giving great rigidity to the structure. Each valve is complete in itself and independent of the other, being operated by separate eccentrics so that either may be shut off at discretion without impairing the operation of the engine, in cases where half or less than half the usual power is required. The valves are extremely simple and compact, and themselves form the means of conveying steam from the high pressure cylinder to the low pressure cylinder without the aid of a receiver or any other connections. This is in itself a strong recommendation, in addition to the fact that the steam from the high-pressure cylinder, before being admitted to the low-pressure cylinder, must pass through the valve which is at all times surrounded by live steam, thus preventing condensation and insuring the desired result of greater economy.

The makers are desirous of having the public become acquainted with this new engine, and will gladly correspond with all who are interested in a reliable and economical engine at a reasonable cost.