

MORISON'S NEW STAMP MILL.

The problem of increasing the output of a Gravity Stamp Mill has been dealt with by Mr. D. B. Morison, on the principle of leaving well alone, as he retains almost every detail of a modern mill except the cam and tappet.

The great feature of the Morison High-Speed Mill is, that it will give from 130 to 150 drops per minute as compared with the 85 to 95 of the cam mill, and will work with a 1,500 lb. stamp head as smoothly as with one of 100 lb.

DESCRIPTION OF THE MILL.

On the top of the king posts is a crank shaft with cranks at equal angles, each of which is provided with a connecting rod jointed to a cylinder, so that as the crank revolves the cylinder moves up and down. Within the cylinder is a deep solid plug or piston, the rod of which passes through the cylinder bottom, and constitutes a stem to which the stamp head is attached. A jacket surrounds the cylinder, and at a few inches from the bottom is a port or opening, communicating with the jacket space. The cylinder below the piston is filled with liquid, for which the jacket forms a reservoir, and above both the piston and the water level in the jacket are air spaces with free communication between them.

The head strikes the rock on the die before the cylinder has completed its downward stroke, so that, at the end of the stroke of the cylinder, the bottom of the piston is above the port in the side of the cylinder, and the liquid flows in. As the cylinder returns on its upward stroke, the liquid is squeezed through the port from the cylinder into the jacket space, which has the effect of gradually and smoothly overcoming the resistance of the weight, until, when the bottom of the piston closes the port, no more liquid can escape and any further upward movement of the cylinder will raise the stamp head on an incompressible liquid buffer.

The blow causes a rebound of the head, and, while rising therefrom, the liquid "pick-up" catches the weight, and the energy required to move a body from rest is thus saved, causing a very considerable economy in power required to work the battery. So gradual and smooth is the effect, that, whether the weight be 100 lb. or 1,500 lb. or more, there is not the slightest shock on the mechanism, and in this respect it constitutes a very great improvement on the sledge-hammer upward blow delivered by a cam.

When the cylinder and the stamp head have completed the up-stroke, the cylinder descends, under the control of the crank, at a velocity exceeding that at which the stamp head would fall under the influence of gravity, so that not only is there no retarding friction, but the cylinder, travelling the fastest of the two, actually assists gravity, increasing the velocity, and consequently, the force of the blow. It will thus be seen, that while the lifting of the Stamp is controlled by the crank, the falling and the crushing effect are due to gravity assisted by the friction of the driven cylinder.

The wearing away of the shoes and dies is very simply provided for. In the side of the cylinder are several ports, about 1½-in. below each other, so that when the shoes and dies have worn down to that extent all that is necessary is to unscrew the plug. It is, perhaps, a small matter, but the corresponding operation in a cam stamp mill is to drive out three keys in a 120 lb. tappet, raise the tappet and re-drive the keys, and it would probably take a man no longer to adjust ten heads in a Morison High-Speed Mill than to adjust one tappet in a cam stamp mill.

The quick knapping blow in the Morison Mill granulates rather than pulverises, so that the slimes are far less than with the cam mill. This is an important and valuable feature, as the cyanide liquid will more readily per-

meate through the pulp, more complete absorption and easier leaching will result, and an increased percentage of gold will be recovered.

A well-known manager says that Mr. Morison's invention means a very great deal to mine owners, especially those running mines of low grade ore, as a greatly increased milling output, with practically the same labor, will earn a dividend for such mines as are now only clearing expenses. In order to deal with concrete figures he takes a 60-head Stamp Mill. With an ordinary cam stamp battery, running 350 days per annum, the output per head would average, with hard quartz, four tons per twenty-four hours, or 84,000 tons per annum, at a cost of about £17,000, and supposing the ore to yield eight dwts. only per ton the annual gold output would be 33,600 ounces, say £127,000 in value. The Morison Mill in the same time would crush 142,800 tons of similar ore, say £217,000 in gold value, or an addition of £90,000 per annum, and this with the same number of stamps, with a less cost of power per ton crushed, and practically the same cost of attendance and milling.

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