

each length. The lower die is fitted with an automatic knock-out operated from the blank holder, for ejecting the work when the operation is finished.

#### The Trimming Press.

The half-tone Fig. 5, shows the double back-geared power press used for trimming and rolling the rim. It is

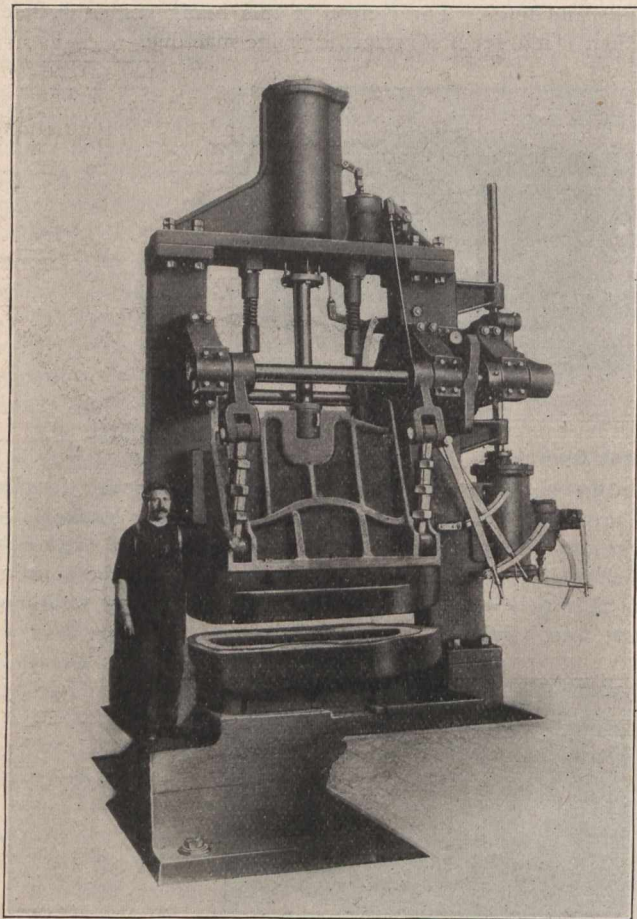


Fig. 4. The Drawing Press.

fitted with a die holder or fixture, which has its front section hinged and made to open—see Fig. 6. The swinging section is provided with a positive locking device.

The press slide is fitted with a positive automatic knock-out, passing through the punch. As the slide lifts with the stroke of the press, this knock-out is brought into action stripping the work from the punch. The bed is also fitted with an automatic knock-out, cam actuated, which is timed to rise with the slide. The cam is on the left hand end of the crank. This knock-out device receives the work when it is forced off by the knock-out in the slide, and prevents it from falling back into the die.

Some of the dimensions of this press—which the makers designate as 84-inch No. 96 double-geared special—are: stroke 6 inches, width between uprights 86 inches, bed 48x84 inches, and total weight about 85,000 pounds.

#### The Operations.

In the first drawing operation the attendant places the sheet in position in the die, and by means of the small cylinder brings the blank holder and pressure plate to bear with the necessary pressure. The large cylinder then forces down the forming punch and draws the sheet to a partially formed tub  $12\frac{1}{2}$  inches deep. This should not require more than one and one-half minutes to complete.

The blank is then annealed and pickled to remove the scale, and is ready for the second operation. This is similar to the first, except that the tub is drawn to its full depth,  $17\frac{1}{2}$  inches. This operation is shorter in point of time than the first.

The third operation in the power trimming press trims and rolls the rim at one stroke. The time required is less than one and one-fourth minutes. In actual use 48 tubs have been rolled and trimmed in an hour.

The complete equipment was designed and built by the Toledo Machine and Tool Company, of Toledo, Ohio.

## MINERAL RESOURCES OF NEW ZEALAND.

### Part VI.—Mining Education.

There is not sufficient space at the writer's disposal for this important subject to be treated with the fullness which its importance warrants. Accordingly no suggestion will be made under this heading. It may be noted, however, in passing, that during 1905, at a cost of nearly £24,000,\* 232 attended lectures in various mining and metallurgical subjects,† or 2.6 per cent. of the men engaged in mining. Only one-third of these students presented themselves for examination.

Four scholarships are annually offered to students at these schools. No winner has yet taken a place of distinction in either mining or metallurgy, although two occupy good positions in geology. None—so far as the writer is aware—has ever done anything to ameliorate the lot of the class from which he presumably sprang. The reason for these indications of failure is that the competitions fail to attract the class for whose encouragement they are intended—the practical and skillful miner or millman. Why this is so may be briefly indicated as follows:—

(1) £50 (the sum paid to the winner to pay his way at the Otago University—no fees are charged him for tuition) is not enough to tempt a man with any responsibilities away from work for seven months in the year. If the man has worked his way up in his employ, this reason is especially cogent.

(2) The goldfields schools are conducted by highly trained men, and the syllabus is very full. The time a man

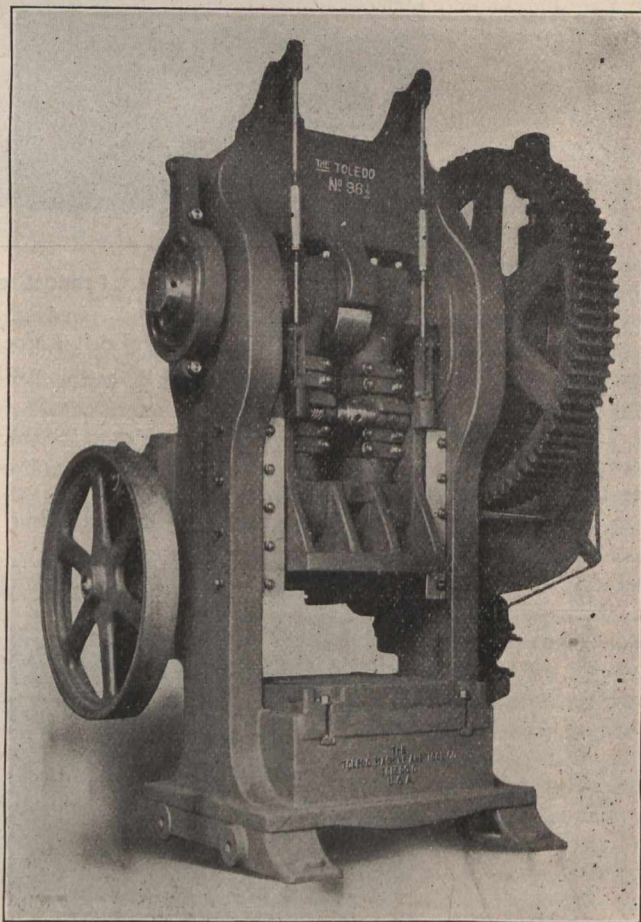


Fig. 5. The Trimming Press.

\*Direct cost to the State. No data published as to local contributions, fees, etc. The total expense might be safely estimated at £25,000.

†This is exclusive of school-children, but inclusive of bank-clerks (assaying), school-teachers (mostly chemistry). The figures relate to the goldfields schools of mines in the Auckland and Nelson Provinces. Otago has no school of this class. The Nelson schools at Westport and Reefton serve Westland also.