THE OUTLOOK FOR FEED MILLING.

I. RIDDELL, writing to the Corn Miller, says: "A radical change has come over the prospect of the feed miller's business during the last few months which deserves careful consideration from those interested in that particular branch of the trade. During all of last winter the phenomenally low price for corn and oats, discouraged all efforts to sell other feed and prevented the grinding of them to a great extent, the argument being that it would not pay to do so at the prevailing low prices. While the truth of this reasoning is, to say the least, doubtful, there will be little use in controverting it at this time, for as these grains have nearly doubled in price since then, there is little doubt but that a great deal more of them will be ground this season than last, and it behooves every one who is interested in the business to prepare to handle it as cheaply and expeditiously as possible.

It will be a good idea "about this time," as the almanac says, to look over the whole equipment of the mill, which may have been allowed rather to run down during the last unfavorable year or two, and by a general overhauling get ready for the work which will probably soon begin to drop in, for especially where lively competion exists, the mill that is always ready to handle a grist is the one which gets the best share of the patronage. The greatest lack of many feed mills is a cleaner which will take out the pieces of cob which interferes with the working of the elevators and also with the feeding of the buhr, where that is used as the instrument of reduction, as it is in the majority of cases. In oats, also, there is often a considerable quantity of straw, caused by contrary winds in threshing, and not infrequently, a miscellaneous assortment of nails, clevices, horseshoes, etc., which have been hung up over or laid into the oat-bin and got mixed with the grain.

I remember once gathering two or three pounds of steel fence staples, with an assortment of spikes, from off a shaking screen while running a grist over it, and on various occasions have got a sample of almost everything found on a farm from chicken droppings to a bed sheet. As many of these qualities are the reverse of profitable to grind, to say nothing at present of the danger, the receiving hopper, unless it feeds directly down onto the revolving screen, which is the best way when the arrangement of the mill will allow, should have a moderately close screen of small iron rods put in just low enough to be convenient to watch while the grain is being "dumped," or else there is likely to be a great mortality among the elevator cups, as well as a large amount of language indulged in which is likely to be more forcible than polite.

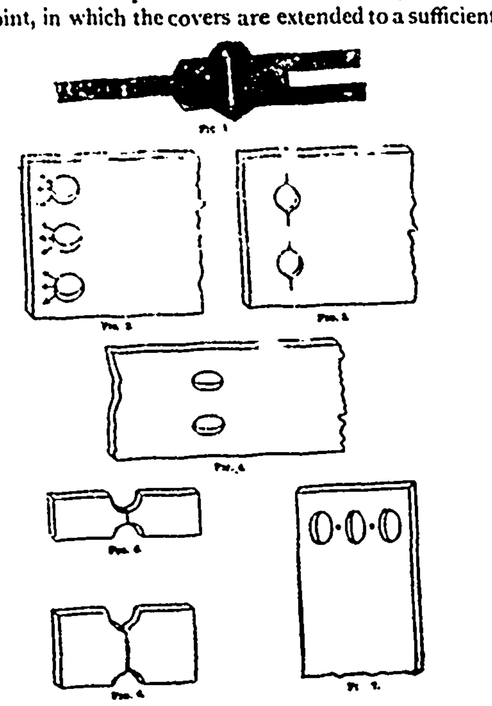
For a cheap cleaner for a feed-grinding mill a good sized revolving screen will do pretty good work, preferably one made of zinc or sheet iron, the proper size of holes in which will be about five-eighths of an inch. If there is not room enough for a screen, a simple shaker with a sieve say two feet wide by three feet long, with ⅝-inch holes, will handle a large amount of grain. It should have a wedge-shaped piece fastened to the delivery spout in such a way as to spread the stock over the whole width of the sieve, so as to prevent its piling up and carrying over. One reason for having the cleaner (especially if the sieve is used) where it may be easily inspected, is that in the winter time much of the corn that is brought in is shelled with hand shellers in open cribs where very likely the snow has driven in and perhaps partially melted, and so worked in among the corn with a good deal of the silk, etc. After such grists have stood in the mill a while the warmer atmosphere causes the snow to melt and makes the whole mass damp and sticky, and if it is then emptied into the dump hopper it will be found hard to elevate, and will most likely clog up the cleaner.

Next to the cleaning machinery, generally the most troublesome part of the feed side of the mill is the elevators. Leaving out of view for the present the many mistakes made in erecting elevators, especially in arranging them for easy delivery of their load, the condition of much of the grain the feed elevators have to carry, as noticed in previous paragraphs, still further increases the trouble with them, so that they should be seen to and put in complete repair before the rush for the season begins. 6975-22

While great claims are made for the various roller feed-grinding devices—and they will doubtless make the required reduction with less power than the buhr—the stubborn fact remains that none of them will make a feed as satisfactory to the farmers as the now despised buhr, and this for the same reason which has given the roll its preminence as a wheat grinder, namely, its ability to granulate, for it is not *granular* feed which feeders as a general thing desire, as the finer and softer s the better they are satisfied.

STRENGTH IN SINGLE-RIVETED JOINTS.

IN the course of some recent correspondence between this office and Mr. James E. Howard, of the Watertown Arsenal, some points concerning the shape of test pieces of boiler plate, and the distribution of strains in single-riveted joints, were discussed. Tests made at the Arsenal are executed upon strips 10 inches long and 1½ inches wide, and of the thickness of the plate as rolled. Strips of these dimensions compare well with larger specimens, 5 or 8 inches wide, and 15 or 20 inches long. Substantially the same results are obtained, whether the specimens have enlarged ends or parallel sides. Inasmuch as strips of the dimensions given above (*i. e.*, 10" x 1½") appear to allow unrestricted flow of the metal, so far as form is concerned, it seems fair to consider that they represent the true qualities of the material, and that the indications that they give are entitled to confidence in designing riveted joints or other built-up forms. The strength per unit of area, along the net section in a riveted joint, depends upon a number of conditions which vary considerably in different joints, so that the tensile strength of the net section in some joints largely exceeds that of the strip, and in others falls far below it. The conditions in perforated test specimens are in some respects quite similar to those existing in a joint; but there is enough difference to cause them, in many cases, to give results appreciably different from those obtained from the joints themselves. The simplest form in which a joint can be studied seems to be that represented in Fig. 1, where an annealed steel plate with drilled holes is riveted between two other plates, using one line of rivets. This corresponds to one-half of a single-riveted butt-joint, in which the covers are extended to a sufficient



distance to be grasped in the jaws of the testing-machine. In this joint we eliminate many of the influences which tend to complicate the study of most other joints. The stresses radiate from the rivet holes, as in Fig. 2; the metal about the holes is left in its normal condition, on account of using drilled holes; and there is no bending of the plate as in a lap joint.

It will be seen that in pulling against the rivet holes we change the conditions from a perforated plate in which the stresses pass by the holes. To take an exaggerated case for illustration, suppose we had an excessively wide pitch of rivets as in Fig. 3, and a correspondingly perforated plate, as in Fig. 4. The concentration of stress at the rivet holes in one case would tend to cause fracture in detail, the metal first separating at the sides of the holes and then tearing across; whereas, in the perforated plate, the percentage of metal removed being small, the stress on the net section would remain substantially uniform. If the rivet holes are punched, and the pitch very close, the cold-hardening of the punching might impart increased strength to the entire net section; while in a wider pitch, the punching would be an element of weakness by destroying a part of the ductility of the plate at the points where this ductility is most needed. These same considerations apply to wide and narrow grooved specimens. See Figs. 5 and 6. The narrow one has the entire net section reinforced by the surrounding metal, while the wider specimen merely begins to tear out at the edges on account of the larger, and consequently more rigid section of metal on either side of the groove. Of course it will be understood that all these effects are exaggerated in the cuts. A riveted joint gives the best result when the net section is most reinforced by the solid section of the plate, or when the stress is substantially uniform over the net section extending from rivet hole to rivet hole.

When rivet holes are enlarged, the metal is stretched more at the sides of the holes than at the middle of the pitch, *i. e.*, at x x in Fig. 7, and a metal, which in the tensile strip shows a large stretch near the maximum load with a small change in the load, seems particularly well adapted to distribute the stress from the rivet hole to the middle of the net section. In case this is an important point, it will be readily seen what a variety of conditions we may have in different grades of metal. The foregoing are some of the considerations which make a simple joint appear complicated when it is examined closely. There are numerous other considerations of a similar nature, one of which is the effect of temperature on the strength of the metal. Tests have been made at Watertown at 200°, 250°, 300°, 350°, 400°, 500°, 600° and 700° Fah., the highest strength being found in the neighborhood of 500° Fah.—The Locomotive.

MACHINERY & MFG.

Negotations are in progress for the establishing at Kingston of spiral weld steel tube works.

The Kingston Board of Trade has expressed the opinion that improvements made by manufacturers in their works in the city should not be assessed.

Messrs. Waring & White are to erect an extensive foundry at St. John, N. B. Messrs. Pender & Co. will erect at the same place a large factory for the manufacture of horse and wire nails.

The Osborne Manufacturing Co. of Hamilton, have compromised with their creditors at 20 cents on the dollar. The liabilities, direct and indirect, are estimated at about $100,000, about $32,000 of which is to the trade.

The boiler in Hugh McDonald's sash factory at Belwood, Ont., exploded on Oct. 30th. The boiler-house was wrecked, and pieces of the boiler, boards, etc., were driven through the air in all directions. No one appears to have been hurt.

The police magistrate of Toronto recently fined Thos. Moore & Co. for maintaining a nuisance in the shape of a gas engine on their premises. An appeal has been taken from this decision, and upon the judgment of the Superior Court rests the fate of fifty-five gas engines in the city.

The Canadian Society of Stationary Engineers has appointed A. M. Wickens, Toronto, Robt. Mackie, Hamilton, and Arthur Ames, Brantford, a committee to confer with a committee of the National Association of Stationary Engineers of the United States on the subject of the amalgamation of the two societies.

The Winnipeg City Council has accepted the proposition of Messrs. Mann, Holt, Ross & Mackenzie for the construction of the Assiniboine water-power works. This is looked upon as an important step by Winnipegers. The work will commencenext year and the contract calls for completion by the end of 1892.

On Nov. 19th, one of the large boilers in Peters & Cain's saw mill at Midland, Ont., exploded, going up through the roof, and moving the other two boilers about 20 feet out of their places. Several men in the mill were knocked into the bay, and another upon whom portions of the boiler fell, was found with his head in the mud port hole. None were fatally injured, however.

To most new engineers, how to square a valve is a mystery and is generally supposed to be done by rolling the eccentric on the shaft. This is not so. Squaring the valve is setting it so it will cut off the steam at both ends of the cylinder exactly alike, so that the exhaust will sound alike. This may be so and yet not have the proper relation to the time of doing it. Thus it might let on steam when the crank was at the quarter, say six and 12 o'clock, when the dead centre was at nine and three o'clock, and yet be square. Now to square a valve exact, pay no attention to the opening of the port, only that it is alike at both ends. First. Turn the balance wheel so that the cross head slide is about ½-inch of the end of the stroke. Now with a fine scratch awl make a fine mark across the slide and guide, then before moving the balance wheel nail a strip of board or lath to some stationary object so as to be at the edge or rim of the wheel, then with a piece of chalk make a mark on the rim of the wheel, then turn the wheel past the centre so the cross head has arrived exactly at the same scratch mark, then mark the rim of the wheel with chalk, then measure just half the distance between the chalk marks and at this make another chalk mark; turn this so it will be at the edge of the board, then the crank will be on an absolute centre. A large variation on the rim of the wheel makes but very little at the centre of the stroke. Thus ½-inch on a 12-foot wheel would not vary the stroke the hundreth part of an inch. When this is done next ascertain the amount of opening of the valve, or the amount or extent of the throw of the valve from any given point and mark this. Turn your crank to the other end and proceed just the same in all the particulars, except use the same strip of board or lath for a marker. Measure the opening in the port and you will find that perhaps one end was open ¼-inch and the other end was open ⅛-inch. Divide this by shortening or lengthening the valve rod by whatever method there is provided for doing this. It may be a turnbuckle nut in the rod or perhaps you will have to set the nuts back or forward on the valve rod where it passes through the valve. When you have set the valve so that it opens the port alike at both ends the valve is squared and the exhaust will be alike at both ends. If your engine is high speed roll the eccentric so that the port is open 1-16-inch. When the centre mark on the balance wheel is at the strip nailed on the post at the rim of the wheel the other end will be the same, for the engine is squared. You now will have a squared valve and 1-16-inch lead that is as exact as if the work had been done by the most scientific engineer.—Tradesman.