door after forty minutes at 1,000° C. bent, while another gave ample protection for one hour against a fire of 900° C. Similar doors are to be tried again, as there was apparently some flaw in the hanging of the faulty one. Their dimensions were 42 in. by 6 ft., and the thickness 1½ in.

The only door, in fact, that received the assessors' approval was one of remarkably simple construction, exhibited by the Berlin Fire Brigade. Its body was of double oak boards nailed at right angles to one another, well covered in with sheet iron, the ends of which overlapped and were nailed down. This door (like those of Messrs. Kuhlewein) was hung not *in* but *over* the opening, being some 6 in. larger than the latter in each direction. The fire to which it was subjected had a mean temperature of 1,000° C., and a duration of some seventy minutes. The door showed itself to be thoroughly fire and smoke proof, but on being examined the wood was found to be badly charred. A thin layer of some non-conductor would have probably remedied this failing, but as the firemen exhibiting had limited their contributions to "everyday" constructions, the use of such a material was not permissible.

The report of the assessors gives no information as to the cost of the exhibits, as the promoters wished to avoid anything that would tend to let a commercial feeling show itself in connection with the tests. This omission is, of course, in one sense an unfortunate one, as opinions as to the practical utility of the materials would be partially dependent on such information. For all this the experiments alone will have been invaluable to many, and even if the commercial element may have been rather too conscientiously avoided, the efforts of the promoters and the assessors should

ABRASION OF WHEAT PRODUCTS.

By W. G. CLARK.

THE manner of handling wheat products, and the distance they travel in the course of manufacture, are two things very often regarded as of little importance in the art. Simple experiment, however, will readily show that abrasion is the inevitable result of travel, and that where the travel is long the abrasion becomes a factor working materially against good flour and a generally high order of results.

Abrasion is very much in evidence in the mills of to-day, producing quantities of impalpable dust that not only discolors the flour, but also makes it of uneven grain; whence follows a like unevenness of quality in the bread. In fact, a flour containing a large percentage of this dust has no life, no cellular formation to retain the carbonic acid gas given off by the yeast in fermenting, and little water-absorbing capacity; while a purely granular flour has all these qualities in a high degree.

When I say that one can reduce middlings to flour by simply rubbing them between the fingers, it is plain that when middlings are subjected to a prolonged rubbing against the sides and bottoms of long conveyors and spouts a considerable proportion of them will be reduced to something finer than flour. This stuff ought never to get into the flour, but once there it must be separated as completely as possible.

Flour that will pass through a 16 cloth is granular and fit for use, but here, in my mind, should be the limit. Yet, if we were to test the flour from almost any mills to-day, we should find a surprising quantity of so-called flour that would bolt through 17, 18, or even finer cloth. Now such stock is not fit to mingle

cause the dust is weak, or, rather, lifeless. Good bakers would tell us, furthermore, that this sort of flour yields a bread less sweet in the beginning, and souring much more quickly. The reason is, that in abraded flour the process of fermentation or decay is more rapid—the fine particles, indeed, have perhaps been partly decomposed before fermentation sets in. Bread of impure smell and taste, and poor keeping quality, is a natural result of abrasive milling.

The miller who gets his flour to the barrel by the shortest route will, other things being equal, make the best flour and the most money.—*Roller Mill.*

MANUFACTURE OF GLASS PIPES, TUBES, AND GUTTERS.

By P. SIEVERT, Dohlen, Saxony.

IN this process the pipe or tube is produced by rolling down molten glass in grooves or flutes and using a core to complete the formation of the pipe or tube. Molten glass is poured from a reservoir or hopper into the bite of two rollers. The rollers are placed horizontally, each being provided with grooves. A core of suitable dimensions is placed in the grooves. When the core is moved downward the molten glass follows the movement and forms a tube the dimensions of which are determined by those of the ring-shaped space between the contours of the grooves and the core. The speed at which the core is lowered is regulated according to the circumferential velocity of the rollers. When the downward movement of the core is completed, and the reserve ore is nearly emptied, the core is removed, when the tube may be subjected to the rolling process or may be annealed without rolling.

PRINTING-OUT PLATINUM PROCESS.

By C. C. HUTCHINS.

PREPARE the following stock solution :

	Oz.
I. Potassium chloro-platinite 60 grains, water...	1
II. Potassium oxalate 1 oz., water.....	20
III. Solution II. 5 oz.; ammonio ferric oxalate 2 oz., glycerine.....	14
- Warm the potassium oxalate solution, add the ammonio ferric oxalate in crystals, dissolve, filter, and add the glycerine.
- This solution must be kept from the light. A small stone bottle is a great thing to keep it in, then, if the stopper is kept in, it will suffer no harm should it be left exposed.

IV. Bromine water.

Put a few drops of pure bromine in a bottle, fill with water and shake. A small quantity only of the bromine dissolves, and when the solution is used it is only necessary to add more water.

The best paper is the River paper made for platinotype; the next best is plain Saxel. Have a medicine dropper in each of the bottles containing solutions I., II., and IV. Pin the paper flat upon a board. For the 8x10 sheets, measure into a small bottle 25 drops of I., 30 drops of II., and 1 to 5 drops of IV., according to the amount of contrast desired in the print. Pour the mixture upon the paper, with a tuft of cotton spread it about, squeeze the cotton dry to save all the solution, and then make the coating as even as possible, brush it every way with a broad camel's hair brush kept for this purpose and washed out immediately after use.

Dry the paper immediately after with the aid of heat. If the paper is bone dry it will not print, therefore leave it exposed to the air for a few minutes before printing. In the driest weather in winter I put behind the paper in the frame two sheets of dry wrapping paper, then one which has been wet and blotted off, then two more dry sheets. Print in direct sunlight to the exact density required in the finished picture.

After printing, the prints are washed for a few minutes in two or three changes of acid water (muriatic acid one part, water eighty), then for ten minutes more wash in plain water, and they are finished.

Negatives for platinum prints should be clear and of good strength. Thin flat negatives give similar prints.—*American Amateur Photographer.*

THE LIGHT OF THE ELECTRIC ARC.

AT a recent meeting of the International Society of Electricians, M. Violle described the experiments which he had been making on the electric arc. This experimenter has found that the light intensity of the positive carbon remains sensibly constant when the power supplied is varied in the proportion of 1 to 60. He has employed two methods of measurement: that of the spectrophotometer, the accuracy of which is really much greater than is usually stated to be the case; and a second method due to Arago, employing interference fringes. M. Violle exhibited a number of photographs of arcs of different candle power, in order to show the constancy of the intensity of the positive carbon. By measuring the opacity of the negative plates, these photographs could be used as a gauge of the intensity. M. Violle recalled that this phenomenon had already been investigated by Rosetti, as well as by Capt. Abney and Silvanus Thompson; and every one had attributed it to vaporization of the carbon. This opinion was perfectly justified, for the deposit on the negative carbon has the appearance of having been condensed from vapor, and M. Violle had actually been able to produce crystals on this part. A photograph of an arc produced between carbons of purified retort carbon was next shown, and this exhibited a very curious appearance. Despretz had also observed that the phenomenon was due to volatilization, but that there was fusion or more or less softening of the carbon; he had also attributed the deposit of carbon, which is formed in the arc, to the condensation of vapor of carbon, but he was unable to elucidate the question, because he used impure carbons. M. Blondel has recently recognized that impurities in the carbon have not, in practice, any sensible effect on the intensity, which remains constant with carbons of very different quality. The intensity of the arc, he thought, was therefore a constant, and it might be utilized as such. M. Violle stated, in conclusion, that the temperature of

SNYER'S ELASTIC COUPLING.

be fully appreciated. For once we have not had to deal with the tests of a tradesman advertising his wares, but with a *bona-fide* investigation in the interests of science alone.—*The Builder.*

SNYER'S ELASTIC COUPLING.

WE illustrate a form of clutch or coupling which is now being introduced by Messrs. Cowlshaw, Walker & Co., engineers, Etruria, Stoke-on-Trent. Essentially, says *Engineering*, the clutch consists of two disks, one of which is keyed to the driving shaft, and the other to the shaft or wheel to be driven. The face of one of these disks has fixed to it a number of toothed steel plates, while the opposing face of the other disk carries a series of brushes of flat steel wire, which, when the disks are pressed together, engage with the serrations on the other disk, forming a firm but elastic connection between the two. It is claimed that with these couplings there is no shock in starting even a high-speed machine. Thus, at the works of Messrs. Cockerill, Seraing, a couple of these clutches transmit 250 horse power each to the dynamos lighting the works, the speed being 200 revolutions per minute. The dynamos are started with the engines running at full speed, and for about 5 seconds slipping takes place, at the end of which the dynamo has reached its proper speed. In another case one of the clutches, running at 2,000 revolutions per minute, is used in the same way. We are informed that the clutch has been used for some years past on the Continent, where some 13,000 horse power are transmitted by its means.

THE Snake Laboratory now being built under government supervision at Calcutta will be the first institution of its kind in the world. It is intended for the purpose of thoroughly investigating the properties of snake venom and testing cures for snake bites.

in flour. It means poorer flour, poorer bread, and less bread to the barrel.

So I believe the most important steps in improved methods of milling will be in the way of reducing to a minimum the travel of stock. The "mill of the future" will have no conveyors except for wheat. Its machinery will be so arranged that the breaks will pass from one set of rolls to another, through scalpings and bolters, and each reduction drop to its place—finished material to flour packer, unfinished to roll or reel—without conveyors. I believe that 60 per cent. of the elevators will be done away, and be replaced by belt carriers, and that not more than one-fifth the present length of spouting will be employed.

Hungarian flour is selling at from \$1 to \$1.50 above the best American patents. Why? Because it is milled by a method which avoids abrasion of products, and which therefore insures an even and perfectly granular flour, yielding better bread and more to the barrel. I know this superiority is not in the grain, for the mills of Hungary have ground American wheat in short crop years, and still maintained quality and price.

We might as well acknowledge these facts—for they can be proved—and set about mending our methods accordingly.

I cannot speak too emphatically of the evil consequences of abrasion. I wonder that in these days of close competition and searching criticism on flour mill processes so vital a matter should be generally neglected. A miller wishes to make a simple change in his flow. To this end he adds an elevator, or long conveyor, a liberal proportion of spouting, and thinks it a good job so long as the stuff "gets there." The day is coming when no progressive miller will think of doing such a thing.

To return to the baker's point of view—bread made from flour containing the dust of abrasion will dry out quicker than that from a granular flour. This is be-