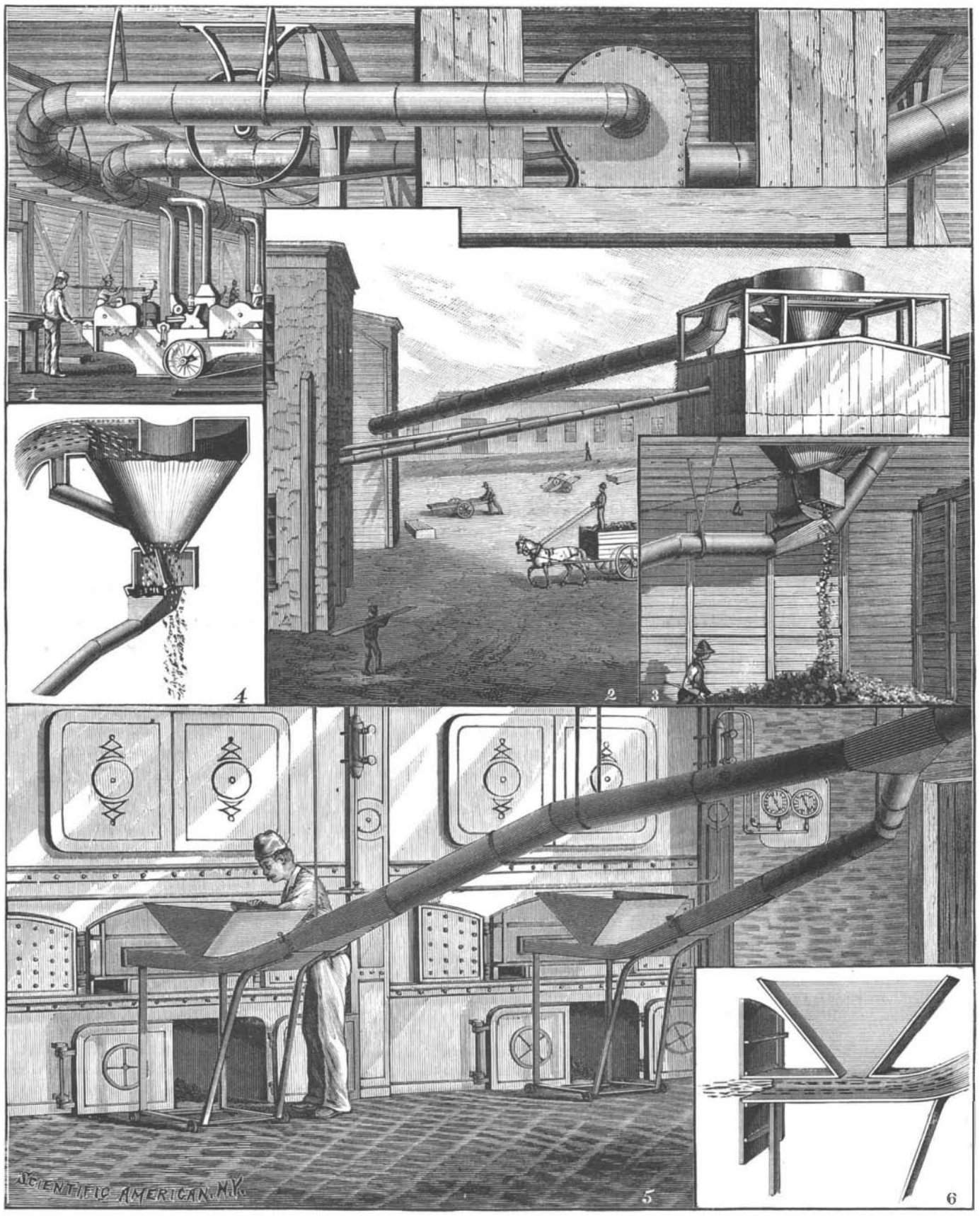
AUTOMATIC SAWDUST FEED FOR FURNACES.

The consumption of sawdust and shavings in sawmills effects a great economy in fuel. A large mill produces more such waste than is required to do the entire firing. In this vicinity sawdust is a marketable product, but the larger chips from planers are not readily disposed of. These are practically a waste product. They are so bulky that if handled in the ordinary way much labor is entailed.

Another trouble in connection with the dust and chips is their rapid accumulation around the planers and sawing machines. Incidentally more or less dust is always present under ordinary circumstances in the atmosphere of the room, and, of course, is an element of unhealthfulness.

The Dodge Lumber Company, of West End, Jersey City, N J., have recently introduced a system of ventilation and boiler firing in their extensive mills that automatically removes all the chips and dust from the machines, transports it to a special building, and thence carries a supply to the boilers. The whole system is entirely automatic, and is controlled in its operations by a few valves. Its leading features are shown in the illustration.



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Upon the second floor of the building a double exhaust and force blower, shown in Fig. 1, is established. This is a Sturtevant 60-inch centrifugal fan, with two 22-inch inlets, and the same outlets, which are brought together in a long Y-branch, the outlet pipe thence onward being single and of 30 inches diameter. The blower comprises practically two fans, mounted on one bed plate, with a single shaft and one driving pulley placed upon the shaft between them. This is driven at the highest speed, 1,300 revolutions per minute, and maintains a pressure of five ounces of water at the outlet.

The inlet pipes communicate with the machinery, as shown in Fig. 1 also. The main pipes are carried the length of the mill in lines corresponding generally with the long countershafts. These lines are gradually reduced in size as they extend further back from the fan. For each machine one to three drop pipes descend, according to requirements. Each drop pipe is provided with a hood or hopper to inclose a set of knives, or the saw teeth at the cutting point, as the case may require. A telescopic joint permits the hoods to be raised or lowered.

When the fan is in action a rarefaction is produced, causing a very strong in-draught of air at the mouths of these pipes. A handful of shavings raised to the mouth of one of them is drawn up instantly.

When a machine is in operation one or more of the pipes, with its hood or hopper attached, is adjusted so as to inclose the knives or cutting point of the saw. Every particle of sawdust and chips produced is drawn away and carried through the inlet pipes, fans, and outlet pipe to a separate dust bin. The latter is an isolated building, shown in section and elevation in Figs. 2 and 3. The large pipe carrying the shavings is seen leading to its roof from the left hand side of the picture. At the top of the building this pipe enters a dust separator, shown partly in section in Fig. 4.

The dust separator is simply a hollow cone. The blast enters its top tangentially, and the dust and shavings are caused to whirl around its inner surface with great velocity. The top of the cone is partly closed, a large central orifice being left open. Through this the air escapes, perfectly free from dust and chips. The latter, under the influence of centrifugal force, descend in a spiral down the sides of the cone. At the bottom of the cone a valve is placed, by which the material can be deflected into the dust bin or boiler supply pipes as desired. In Fig. 4 this arrangement is clearly shown.

As all the air escapes through the central opening, there is not sufficient pressure left to carry the fuel to the boilers. Accordingly a branch pipe connects with the main pipe, back of the separator, and is carried down so as to connect with the fuel pipe, as shown in Fig. 3. This insures a constant draught of air through the fuel pipes, carrying chips and sawdust to the boilers, when the valve at the foot of the separator is set to thus direct them.

In Fig. 5 the boiler fronts are shown. The fuel pipes connect with a perforated diaphragm fitted to the furnace doors. The end adapters of the fuel pipes are carried on a rolling frame, so that they can be rolled to one side at night or whenever desired. A hopper is arranged to permit of inspection of the operation. Looking into it, the stream of chips and dust is seen, and by inserting the hand it becomes filled in a second or two. The sectional drawing, Fig. 6, shows this feature. The hopper is also used for hand feeding. When the supply of fuel runs low, additional sawdust can be shoveled into the hoppers to be blown into the boiler.

A deflecting vane is provided just at the mouth of the fuel pipe, within the fire chamber, to prevent the fuel being blown too far back.

The grate bars are of about three-eighths inch opening. The engineer regulates the separator valve so as to get a supply of fuel in accordance with his needs. The auxiliary air supply he also regulates with a second valve. The object is to use as little air as possible with the fuel. The air for combustion comes as much as possible from below and through the grate bars.

The whole apparatus, which is very efficient and contributes greatly to the cleanliness of the mill, was put in by C. I. Roskoph & Co., of New York and Newark, N. J.

Mining in the Rocky Mountain States.

It is probable that the mining industry has never been prosecuted in the Rocky Mountain States at such profit as at the present time. The geology of the various mining districts is becoming better understood through the work of the geological surveys of the various States and the studies of local engineers carrying on the investigations begun by the United States Geological Survey. Mining investments are being more intelligently made, and mining enterprises everywhere are being more systematically and more economically managed.

Mining operations which, from the days of the Comstock bonanzas until after the time of the discovery of the rich lead carbonate ore bodies of Leadville, had been regarded in the light of purely speculative enterprises, are now becoming looked upon as legitimate business undertakings, and are being conducted as such. The fact, also, is becoming well understood and appreciated that with honest and intelligent management a good mining investment is safer and pays a larger interest on its capital than any other. The largely increased output of the gold, silver, lead, and copper mines of the Western States, the increased dividends that are being paid, and the number of new companies that are now being incorporated are evidences of this opinion.—*Engineering and Mining Journal.*

AT the sluices near Maigrange, according to M. Cuony, ground ice forms about the iron work largely used in the sluices, and is got rid of by heating the upper part of the structure with wood fires. M. Cuony produced ground ice experimentally, by cooling an iron bar 10° to 15° below zero C., and plunging it in cold water; thus illustrating the part played by the piles of bridges.