

C.....	Manville High Pressure	2.38	17.2	1.25	37.20
D.....	Magnesia	2.45	17.7	1.12	36.90
E.....	Imperial Asbestos	2.49	18.0	1.12	36.80
F.....	W. B.	2.62	18.9	1.12	36.40
G.....	Asbestos Air Cell	2.77	20.0	1.12	36.00
H.....	Manville Infusorial Earth	2.80	20.2	1.50	35.85
I.....	Manville Low Pressure	2.87	20.7	1.25	35.65
J.....	Manville Magnesia Asbestos	2.88	20.8	1.50	35.60
K.....	Magnabestos	2.91	21.0	1.12	35.50
L.....	Molded Sectional	3.00	21.7	1.12	35.20
M.....	Marsden Infusorial Earth	3.11	22.5	1.00	34.85
N.....	Marsden Infusorial Earth	3.27	23.7	1.00	34.60
O.....	Asbestos Fire Board	3.33	24.1	1.12	34.20
P.....	Calcite Bare Pipe	3.61	26.1	1.12	33.24
		13.84	100	....	....

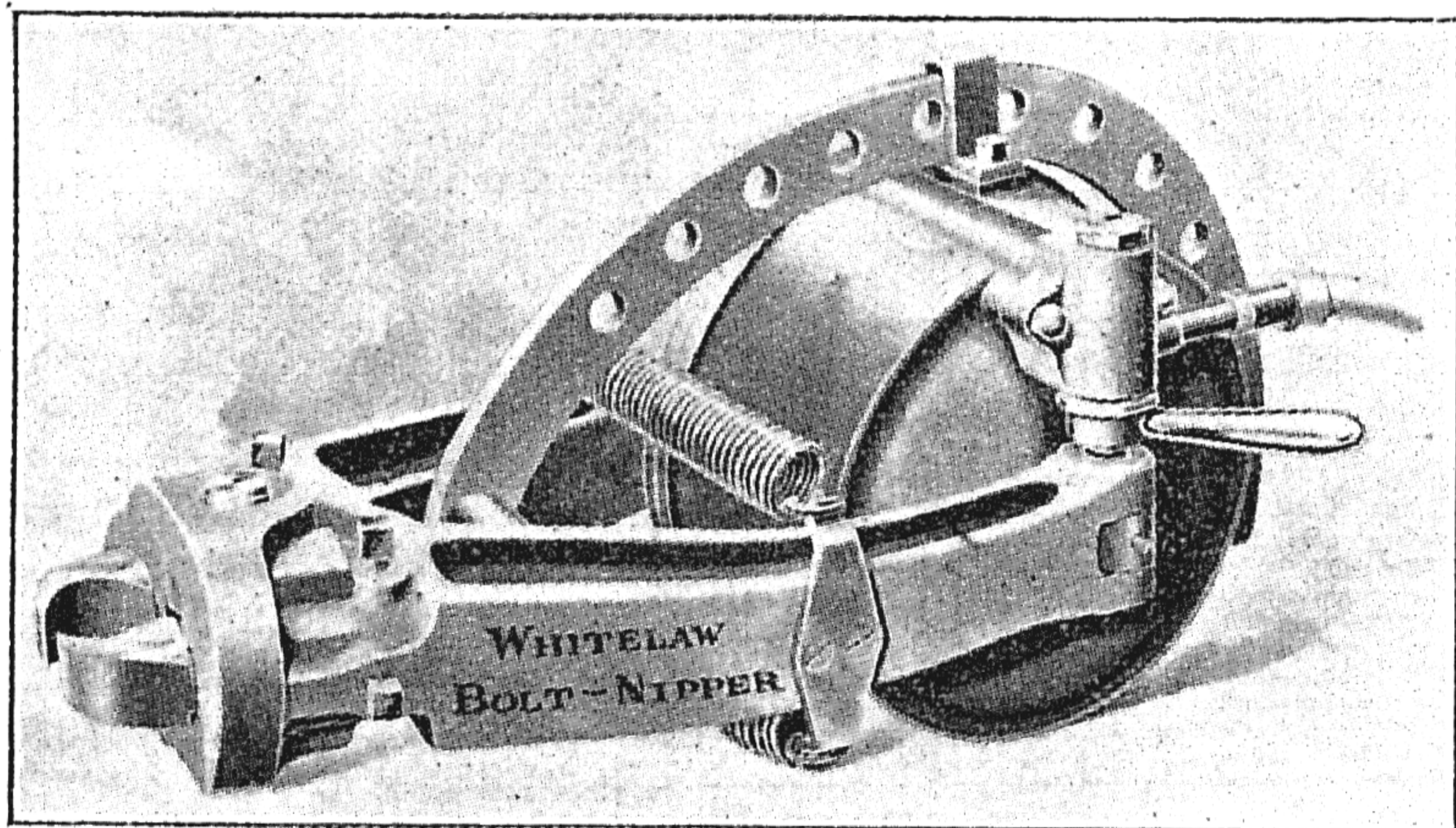
By the advice of the members I have made an assumption that the cost is not nearly proportional to the thickness. As the thicker coverings are not now made in great quantities, the actual cost of their manufacture is uncertain.

TABLE V. VARIATIONS IN THICKNESS, ETC.

Specimen.	T. U. sq. ft. per minute.	Saving in B. per 100 sq. ft. per year.	Net saving.				Ap- proximate cost.
			1 year.	2 years.	5 years.	10 years.	
Magnesia:							
1 3/8-inch thick.....	11.62	\$37.75	\$7.75	\$45.50	\$159	\$347	\$30
Magnesia, 1 3/8-inch thick and 1 inch of hair felt.....	12.38	40.22	5.22	45.44	166	367	35
Magnesia, 1 3/8-inch thick and 2 inches of hair felt.....	12.77	41.50	1.50	43.00	167	375	40
Nonpareil cork							
1 inch.....	11.64	37.80	12.80	50.60	164	353	25
2 inches.....	12.84	41.75	7.75	48.50	174	383	35
3 inches.....	12.94	42.05	7.95	34.10	160	370	50
Fire board:							
1 inch.....	10.54	34.20	9.20	43.40	146	317	25
2 inches.....	11.48	37.25	2.25	39.50	151	337	35
3 inches.....	11.70	38.00	12.00	26.00	140	330	50
4 inches.....	11.83	38.40	26.60	11.80	127	319	65

Inspection of Table V. shows the saving due to the use of hair felt outside a standard Magnesia cover.

In five years 100 square feet of hair felt saves \$7 more than its cost, and in ten years it saves \$20 above its cost. The further saving due to a second inch outside the first



Whitelaw Staybolt Nipper.

is \$8 in ten years. Of course, the well-known tendency of hair felt to deteriorate should be considered.

In the case of Nonpareil Cork, increasing the thickness from one to two inches raises the cost from about \$25 to \$35 per 100 square feet, and increases the net saving in five years by \$10 and by \$30 in ten years. In other words, the second inch of material in use about pays for itself in two years, while the first pays for itself in about one year. The third inch does not increase the saving even in ten years. The second inch, therefore, more than pays for interest and depreciation, while the third fails to do this.

In the case of the Asbestos Fire Board, a second inch in thickness causes a saving of \$20 in ten years, the third and fourth inches showing a loss.

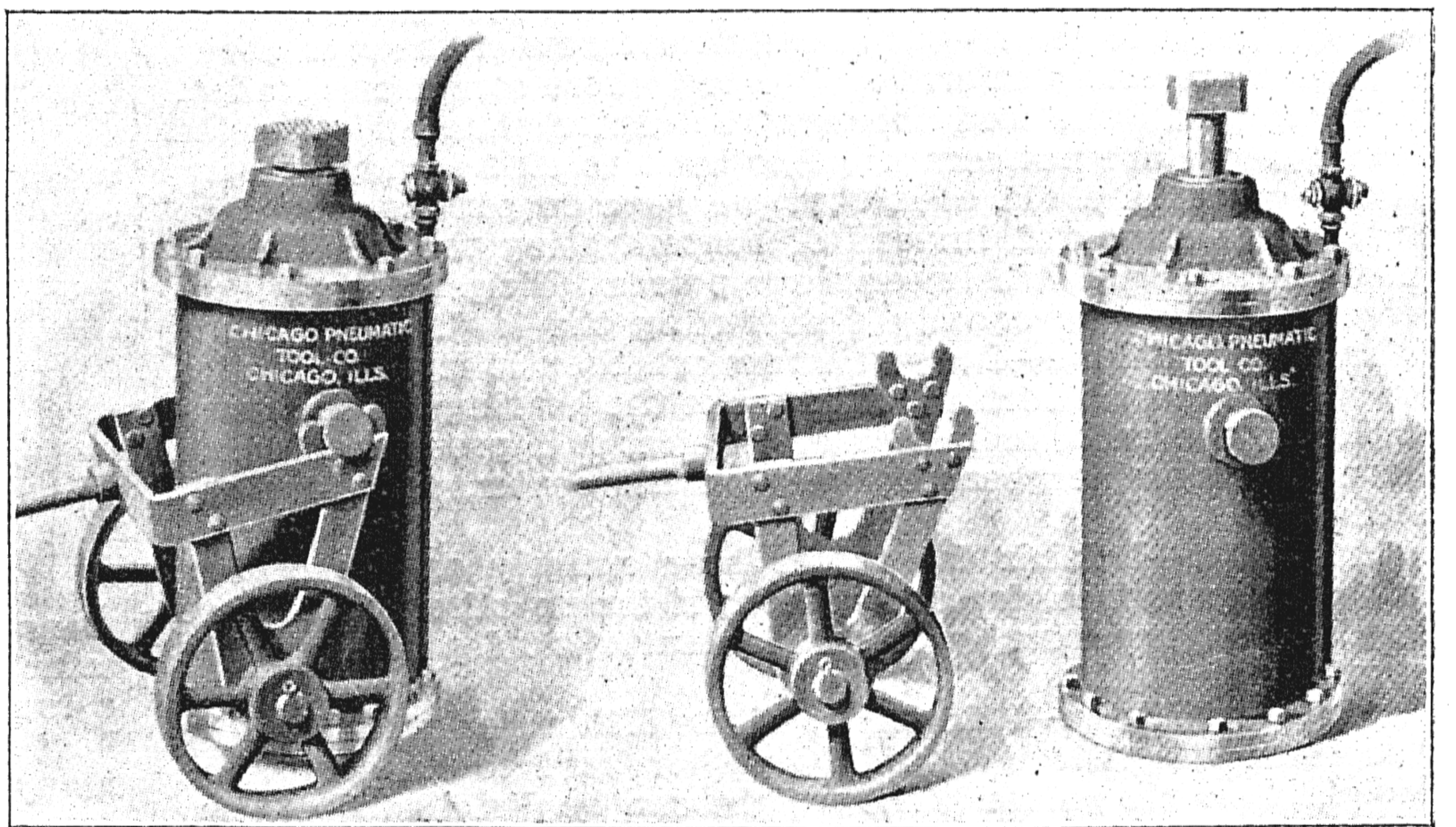
In general it may be said, therefore, that if five years is the length of life of a cover, one inch is the most economical thickness, while a cover which has a life of ten years may to advantage be made two inches thick.

CONVENIENT PNEUMATIC APPLIANCES—CHICAGO PNEUMATIC TOOL COMPANY.

In our July issue we gave an outline description of the new tools introduced by the Chicago Pneumatic Tool Company, and now present engravings of three devices which have proved themselves to be especially valuable in machine and boiler shop equipment.

Car and Locomotive Jacks.—The design of these jacks is very simple, not differing in essentials from others that have been in use in railroad shops for some time. They are compact and are well made and well finished from good material. The cylinders and heads are of cast iron, with bolted machine joints, and the pistons are of cast iron, with leather packing. The piston rods are of steel, surmounted by bearing blocks that are free to turn on the piston rods. The air pipe connection is made through the upper head, and the pressure is controlled by a cock. The capacity now ranges from 5 to 25 tons, several of the latter having already been ordered. Trunnions are cast on the cylinders and the jacks may be carried about on a neat two-wheel metal truck, which will fit the trunnions of all of the jacks. The design is arranged with a view of producing jacks that may be easily used and conveniently transported, and which will not require repairs.

Bolt and Staybolt Nipper.—This appliance is so clearly shown in the engraving as to be readily understood. It has a short cylinder between the long arms of two levers, the short arms of which are fitted to receive the hardened cutters. The long arms are returned to their closed position by strong coiled springs, attached to the outside of the levers, where they may be seen and cared for. The nipper is suspended by a bail with a number of holes by which it may be held in any desired position. The machine is adapted to work in restricted quarters. These machines are well made and may be easily taken apart for overhauling. They work rapidly and are controlled by a lever operating a



Car and Locomotive Jacks.

valve at one end of the cylinder, shown in the engraving. Two sizes are made. No. 1 will cut bolts up to 1 inch in diameter, and No. 2 will cut bolts as large as 1 1/2 inches. Their capacity is limited only by the ability of the operator to move them to the work.

Pneumatic Flue Welder, Reducer and Expander.—This machine is a combination of devices perfected and improved from the original devices known as the McIntosh flue welder and the Whomes flue reducer. They are combined on one bed plate that may be bolted to the top of a small post in the shop, the only power connection being a single piece of rubber hose. Shafting being avoided, the machine may be set up anywhere, and the air pipe carried to it. The machines are very ingenious; they are well and strongly built, and are automatic in the sense that the introduction