

SPRING PLANT AT ALTOONA MACHINE SHOPS, PENNSYLVANIA RAILROAD. *

All kinds of P. R. R., class "E" (elliptic), single, double, triple and quadruple locomotive and car springs are manufactured at this plant. Other classes of springs furnished here are manufactured by hand at forge.

The tools and machinery in use at this plant consist of four iron tanks for storing tempering fluids; six oil furnaces for heating plates and bands; two tables for spring fitters; two machines for spring forming or cambering, operated by belting; one comb punch and shears, operated by belting; two comb nibbing roller and shearing machines, operated by belting; one hydraulic spring banding machine; one hydraulic spring testing machine; one hydraulic spring stripping machine; one air hoist for transportation of finished work; one air spraying machine for painting.

All bands and pads are manufactured by blacksmiths at forge. Manner of working steel in spring shop is as follows: The steel bars are delivered to the comb punch and shears, where they are sheared cold into plates in lengths as per blue prints. These plates are then heated in the adjoining furnace and transferred to the comb nibbing, rolling and shearing machine, which tapers the ends, shears them and nibs the plates. This rolling and tapering process is accomplished by means of two horizontal cam-rollers, which revolve against each other, and contain grooves at one end facing each other. The plate is inserted between the grooves, butted or upset at the corners during the revolution of the rollers, moved to center of rollers, inserted there between the rollers and fattened or tapered by the stroke from the cam of the upper roller during the next revolution. A shear attachment, in continual motion with the rolls, trims or shears the end in one movement. The entire operation of drawing or tapering the ends, nibbing and shearing, is thus accomplished in three consecutive movements.

Plates requiring gib-slabs are now brought to the comb punch and shears while hot. The slab is punched in one movement. All plates are not transferred to the spring forming machine for formation of set or camber. The first leaf (or pad-leaf) is heated and given its standard set, whereupon it is plunged into the tempering bath, cooled off and placed in the machine between two vertical rollers, which operate in rotary motion against each other. The next leaf is then placed against the former

* From paper presented by H. A. Falk at the Master Blacksmiths' Convention.

(cold) leaf and both leaves are now run through the rollers, the latter (hot) leaf thus assuming the camber required by the pressure against the former (cold) leaf. This (second) leaf is now tempered, cooled off and used, in the same manner as base-leaf, for the cambering of the next leaf in the spring, etc., until the entire spring has been formed or cambered. All cambered plates are now passed into the hands of the fitters, who examine the set and temper, fit the plates, and re-temper or anneal wherever needed.

These men use a wide open furnace, kept at an even low temperature, to which all plates are exposed before accepted by the fitters. The spring is then delivered to the banding machine. Here the bands are pressed on hot, by use of movable clamps connected at top and sides of spring and forced against it by means of hydraulic pressure. Being banded the spring is transferred to the hydraulic testing machine, subjected to the load specified on blue print, and deflection and permanent set noted. The spring, if acceptable in test, is now painted and delivered to the store-keeper ready for market. The furnace is used jointly by two fitters.

In repairs to old springs the bands of these springs are heated somewhat in a small oil furnace having cavity in center about large enough to admit the band, this being done in order to soften the iron and save the old bands, if possible, for further use. The springs are then introduced to the hydraulic stripping machine and clamped fast by straps in an open space between two side pieces, so as to admit springs of different widths. These side pieces are parallel and are fastened to the sides of the springs by being clamped at the top. The strap is now moved forward by means of hydraulic power, received from a reservoir placed at end of strap and operating the strap through a piston attached to the straps. The movement causes the side pieces to force the band off by pressing against it. The plates are then assorted, examined and passed forward to the cambering machine and the two fitters, etc., in order heretofore described.

All tempering is done by immersion in a bath, consisting of 500 degrees fireproof petroleum. This oil is stored in an oil tank suspended within a tank of larger size, thus allowing a space between the two tanks, which is filled with water in order to keep the oil in the inner tank at an even, low and permanent temperature. This oil is not mixed with any other substance.

All heating is done in oil furnaces having the Walton & Rees patent oil burners, which were invented in this department and are manufactured in the Altoona machine shops. These burners are placed inside of the furnaces, and are worked by fan-blast and produce an even distribution

of oil over the surface of the furnaces, thereby perfectly atomizing the oil and reducing the cost of fuel to a minimum.

All machines and fixtures used in connection with this plant are designed in this department and have been manufactured at these shops. The working force of the plant consists of fifteen men and one gang leader. This force does not include smiths making pads and bands.

The output of springs for twelve months, ending June 30, 1900, is as follows:

5,306 new locomotive and car springs	1,039,226
5,305 repaired locomotive and car springs . .	855,435

Total 10,611 springs.	1,894,661
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or about 884 springs per month.

All operations are covered by piece work prices, and are paid for by the plate. Cost of springs are made up monthly per pound.

Cost of new springs average 4.7 cents per lb.

Cost of repaired springs average . . . 1.1 cents per lb.

These prices cover all labor (shop and pro rata) and material furnished, and have only varied .1 cents occasionally during the period here mentioned, owing to the fluctuation in cost of material.

THE CAR FOREMEN'S ASSOCIATION OF CHICAGO.

NOVEMBER MEETING.

The regular meeting of the Car Foremen's Association of Chicago, was held in Room 1741, Monadnock Block, Chicago, Thursday evening, November 8, being called to order at 8:00 p. m. by President Sharp.

Among those present were the following:

Bell, W. A.	Elkin, J. L.	Kline, Aaron	Sanderson, S. P.
Bates, Geo. M.	Gruhlke, Edw.	Longfellow, Fred	Stimson, O. M.
Bundy, C. L.	Grieb, J. C.	Marsh, Hugh	Schramm, Chas.
Bannes, A.	Hunt, T. B.	Morris, T. R.	Schultz, F. C.
Bossert, Chas.	Hedrick, Elias	McAlpine, A. R.	Sharp, W. E.
Chadwick, A. B.	Husband, E.	Olsen, L.	Wolfe, Chas.
Cook, W. C.	Johannes, A.	Perry, A. R.	Wentsel, Geo.
Depue, Jas.	Krump, M.	Prickett, Jas.	
Earle, Ralph	Kroff, F. C.	Ruff, A. W.	

President Sharp: The executive committee, at its meeting last week, authorized the officers to procure a more suitable meeting place.