

Koppers Sectional Bronze-Iron Locomotive Cylinder and Valve Packing

STEAM locomotives are being modernized and improved in many ways to keep their performance competitive with other types of motive power. Streamlining, lighter weight reciprocating parts and mechanical improvements of various kinds are helping to make them more efficient machines. One of the major mechanical improvements is Koppers Sectional Bronze-Iron Packing for main cylinders and valves. The chemical composition and microstructure of the two metals in the component parts of this packing enable the packing to mate perfectly with the cylinder or valve bushing material, affording better sealing, longer life for rings and, more important, longer life for cylinders and valve bushings.

The high physical properties of the metals insure a large margin of safety against failures resulting from the extreme conditions to which locomotive packing is frequently subjected. The longer wearing qualities of these metals increase length of service between replacements, thus reducing maintenance costs greatly. Further details of the construction, installation and use of this packing are given below.

Cylinder Packing

Longer life for packing, longer life for cylinders and longer life for pistons are obtained by use of Koppers Sectional Bronze-Iron Locomotive Cylinder Packing. The high-strength bronze rings smooth and burnish the cylinder wall to a mirror like surface, which greatly reduces friction and wear on



Fig. 1—View of cut-away piston showing Koppers Sectional Bronze-Iron Locomotive Cylinder Packing—Flanged Type

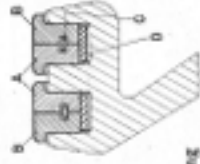


Fig. 2
Flanged Packing

both the packing rings and the cylinder. The cast iron rings are slow wearing against the polished surface of this cylinder and the restraining feature keeps the wear uniform on both the bronze and cast iron rings.

Two Types of Packing Available

1. **FLANGED PACKING** for light-weight steel pistons or bull ring type pistons where the weight of the piston is carried by the packing. This is illustrated in Figs. 1 and 2.
2. **UNFLANGED PACKING** for bull ring type pistons where the weight of the piston is carried by the bull ring. This is illustrated in Fig. 3.

In both types the adjacent faces of the segments of the cast iron ring (B) and bronze ring (A) are grooved to receive a restraining ring (C) which fits with suitable clearance in the recess formed in the two rings. This restraining ring permits the rings to seat independently but, after they have sealed, it serves to equalize the wear on the bronze and cast iron rings. It also permits the packing to override the counterbore with no danger of the segments springing out and catching on the edge of the counterbore. One end of the restraining ring is formed into a head which fits into pockets in two of the segments as shown in Fig. 4 and thus maintains the joints in a staggered position so as to prevent loss of steam and maintain uniform distribution of oil around the cylinder walls.

An expander ring (D), which is made of heat-resisting alloy steel, presses the cast iron and bronze rings outwardly against the cylinder.

Due to the long and satisfactory service obtained from Koppers Sectional Bronze-Iron Locomotive Cylinder Packing, marked economy has consistently resulted from its use.

Valve Packing

Figure 7.36 shows the design of Koppers Sectional Bronze-Iron Valve Packing. This valve packing is similar to the Bronze-Iron, Flanged Type, Main Cylinder Packing shown in Fig. 2.

Koppers Sectional Bronze-Iron Valve Packing is not dowelled and is allowed to float in the grooves.

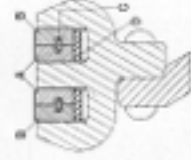


Fig. 3—Unflanged Packing



Fig. 4—Method of anchoring restrainer to prevent joint alignment Valve Packing

This keeps the wear uniform throughout the entire circumference of the packing and also keeps the wear uniform on the valve bushing. The restraining feature keeps the joints staggered and also prevents the ends of the segments from springing out and catching in the ports of the bushing.

The diameter of the bull ring is less than the diameter of the valve bushing, so that the valve rides on the packing, and is thus protected from wear. On oversizes, the increase in the valve bushing diameter is taken up by an increase in the radial thickness of the packing flanges permitting the same bull ring to be used in either standard or oversize bushings.

a K O P P E R S product

KOPPERS COMPANY, INC., Piston Ring Division, BALTIMORE, MD.

Other Products and Branch Offices Are Listed in the Classified Indexes

Sec. 7-539

