An increased speed of trains can be maintained with considerable decrease in the cost of haulage. From numerous tests made with various kinds of rolling stock it was demonstrated that the power required to haul a train of cars (with rigid wheels and axles) around a curve of four hundred feet radius, was double that required to haul the same train along a straight track.

A reduction in the cost for repairs to both track and rolling stock would result in an increased life of both, these results are insured by the use of the above mentioned axle.

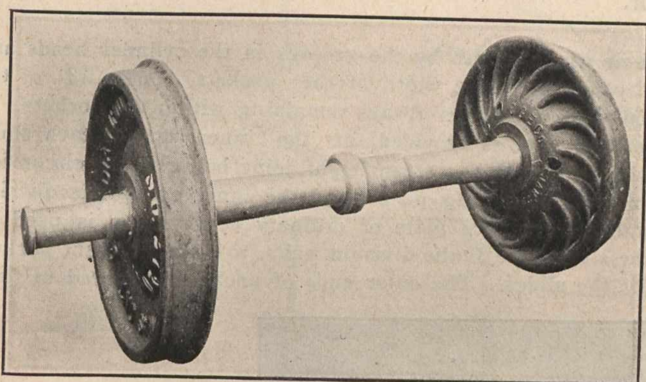
Furthermore, there would be a greater decrease in the danger of derailment at curves, involving loss of property and life.

This axle may be reduced in size without danger of failure, because torsional stresses are entirely eliminated, therefore, the axle will simply be subject to direct bending stress; with the solid axle the same is subject to bending and torsional stress, acting together. Axles are now frequently twisted apart in the middle with disastrous results; such could not take place with the "Ideal Simplex Jointed Axle."

The Construction of the Joint.

There are two methods of connecting the axle joint together, but neither bolts, nuts, screws or springs are used, nor is any part liable to excessive wear, or to become injured, unless the whole axle should be destroyed by wreck.

The axle is made in two parts and joined in the middle of its length, one end of one half journalling within a socket forged upon the end of the other half. Upon the inner or



Ideal Simplex Railway Car Axle.

journalled part two collars are raised, several inches from the end, leaving a suitable annular channel between them.

The socket on the end of the second half of the axle is enlarged, forming a band around the extreme end, and is made to fit over the journal and collars (which also form a part of the inner journals) within that part of the socket over the two collars is made an annular groove, corresponding in size, and immediately over the groove formed between the two collars of the first half of the axle. Into these two grooves or channels is fitted a steel or other metal ring in segments. By referring to the illustration it will be seen that the last segment is wider than all others, and projects up into the slot, and made taper on the two ends. The ends of the slot are similarly inclined, making the hole longer on the inside than outside. The slot is next closed by a lock piece, being forced in under pressure.

Both ends of the lock piece are parallel and of the same dimensions as the top of the slot in the socket, but the ends of the lock piece are shaped to exactly fill the space in the slot, not occupied by the head of the last segment. Therefore in forcing in the locking piece the ends are expanded by their contact with the taper head of the last segment, and cannot be removed without destroying it. After the lock has been driven, the joint is securely joined together, but one half of the axle can revolve within the socket half. Should either half of the axle become destroyed the joint can be separated by first drilling out the lock piece, and removing all the segments of the ring. But the lock piece must be destroyed before it can be removed.

The alternate method of making the joint is by pouring in any suitable molten metal (see section of joint), but the joint with the segmental ring is preferable.

Special machinery has been designed for the manufacture of these axles, and all the parts of each size and kind of axle will be produced in duplicate and to standard guages. So that either half of one axle will fit upon any other axle of the same carrying capacity. Therefore half axles may be kept in store to replace injured ones.

A series of experiments have recently been made to demonstrate what amount of power could be saved by substituting the Ideal Simplex Jointed Axle for the M. C. B. Standard Axles in the hauling of cars around curves.

An ordinary standard flat car of 60,000 pounds capacity was used, the car being new and in perfect condition. Four trials where made with M. C. B. Standard Axles under the car, on a curve of two hundred feet radius, starting off the straight track, and stopping near the end of the curve to get the true position of the trucks and wheels, and wheels occupied upon the curve at the end of the trial. The grinding of the flanges of the front wheels of the trucks against the outer rail tread was excessively heavy and the noise produced by the friction could be heard at a considerable distance. The trucks where skewed across the track until the flanges of the inner hind wheels were in contact with the rail.

Moreover the point of contact between the rail head and the wheel flange of the front wheel was from 6 to 8 inches forward off a perpendicular line dropped from the centre of the axle.

After the completion of the above tests the M. C. B. Axles were removed and the I. S. J. Axles substituted.

To insure fair lubrication of the axles the cart was run over the tracks and several curves, and finally taken to the curve of two hundred feet radius, and the point where the previous tests had been made. Four other trials where made under similar conditions to the first trials.

During these latter trials no noise was heard from rail and wheel flange contact, and the point of contact of the wheel flange with the rail head was almost under the centre of the axle, and both wheels of the trucks in the inner rail rolled freely without the flange coming in contact with the rail head.

The skew of the truck on the track was very slight. In conducting these trials a new "Giddens" self-recording dynamometer was used.

The results showed that with the I. S. J. Axles under the car, the pull on the draw bars was forty per cent. less than with the M. C. B. standard rigid axles and wheels.

This represents the power saved during the time trains are running around curves. This is only one item, add to it the amount to be saved in the wear of wheels, rails, etc., the sum total will represent a very large reduction in the operating expenses of railways.

Another serious loss in railway operation is the slowing down of trains at curves, due to the extra power required to get the train to its former speed and the extra wear of rolling stock, by the application of brakes, etc.

From these tests we may assume that the slowing down of trains running at moderate speeds need not be resorted to if cars are equipped with the "Ideal Simplex Jointed Axles."

Note.—On the results of steel tires sliding. If a tire has a flat spot up to 2½ inches long the tire must be reduced 1-16 inch in diameter, and ⅛ inch reduction in diameter if the spot is from 2½ to 3½ inches long.

Northern Italy, with her copious Alpine streams, is one of the world's most active workshops for the transformation of water into electrical energy. A recent development of that activity, described by Consul J. E. Dunning, of Milan, is worth the attention of American railroad interests. Milan and Genoa are to be connected by a railroad eighty-five miles long, to be run by water power generating electric current in three units of twenty-four thousand horse-power each. The road will cost $47,000,000, or nearly half a million dollars a mile. It will have nineteen tunnels, one of which will be twelve miles long and will take six years to cut, boring from ten points at once.