

The Modern Woolen Mill and the Spinning Room in 1929

By C. E. WILLIAMS, WORCESTER, MASS.

The question of the best and most economical method of spinning woolen yarns is having the earnest consideration of every practical mill man at the present time. The most experienced superintendents and overseers of spinning agree that to produce the finest results in the finished product certain basic laws must be followed. These requirements are all met in the latest type of woolen mule.

Essential Qualities in Woolen Yarn

The yarn must be properly drawn and twisted before it is wound on to the bobbin or tube. The long draft of 6' or more between carriage and rolls allows the fibers to lie in their normal position, and the twist enters first into the weak places in the roving, thereby making the yarn uniform in size. At the same time the fibers should not be bound together, but the yarn should be lofty and elastic. These qualities re-

act in the finished product, as the fibers blend together properly when bobbins are put into the loom and the cloth when napped and pressed not only gives the finest appearance in the finished product, but the goods give long service.

Present Day Mill Problems

The woolen mills of today find that they must be prepared to change from one line to another very quickly. The 1929 Mule has unusual facilities for handling all kinds of mixtures, and there is very little loss of time in changing from one size yarn to another.

Illustrations No. 2 and No. 3 show the fibers on woolen yarn as they should appear. Fibers should intermingle when the yarn is put on the loom, and unless they are allowed to lie in their natural position during the process of spinning, the fibers are rubbed off, and a smooth, hard finish

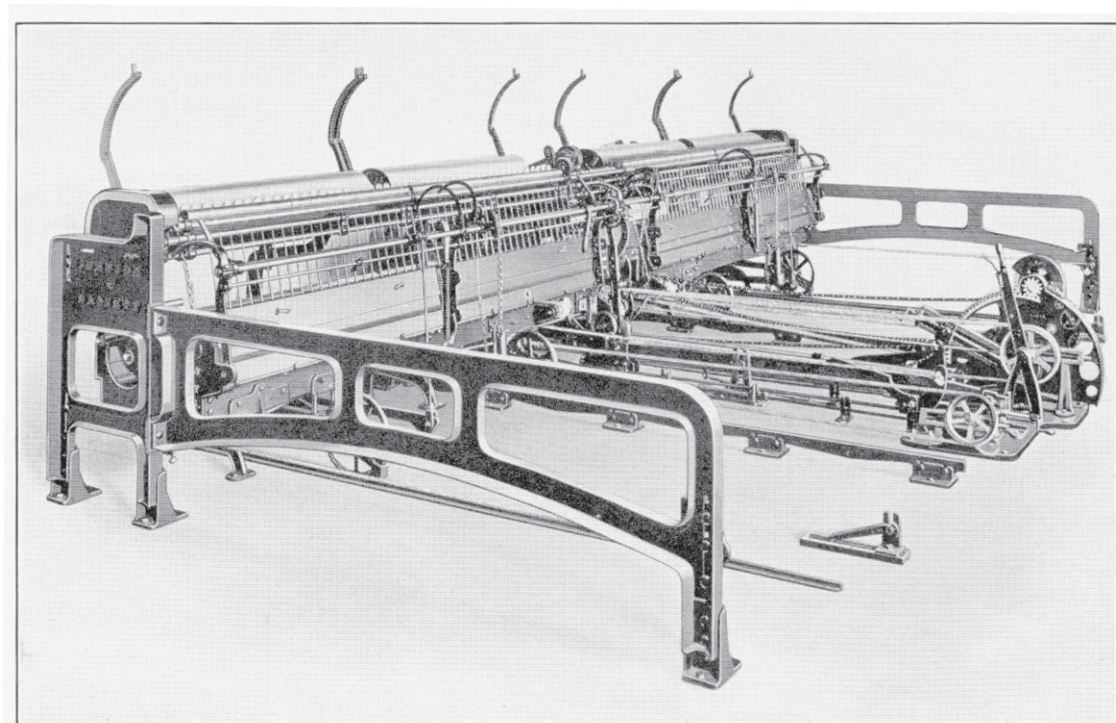


Illustration 1—1929 Woolen Mule

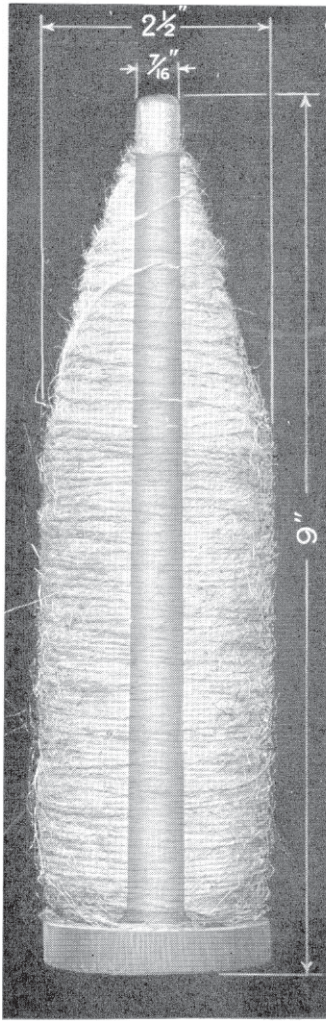


Illustration 2

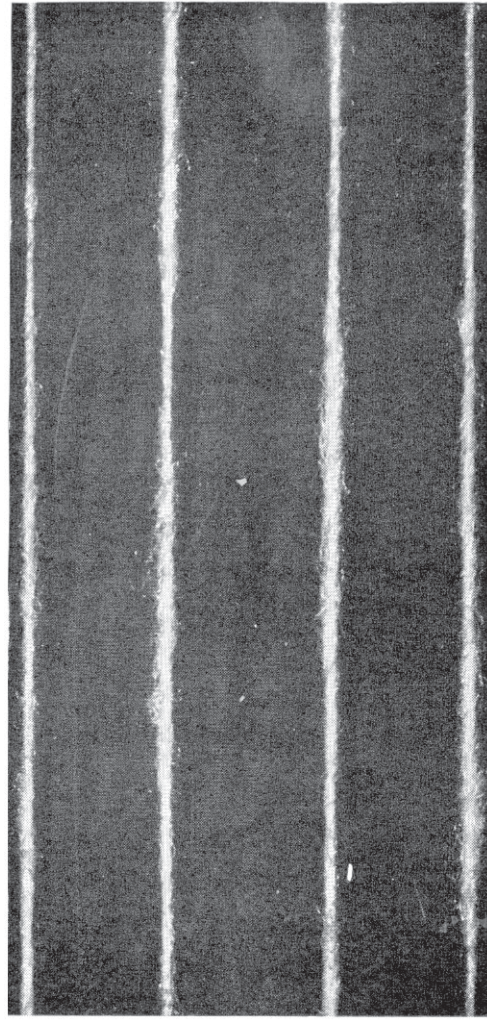


Illustration 3

on woolen yarns is not at all satisfactory.

As previously stated, woolen yarn should be elastic in quality, even in texture, and of uniform size. The 1929 model mule accomplishes all this, in the most economical way.

Progress in Mule Construction

The progress in woolen mule manufacture has been a steady and gradual gain, improvements coming about as the needs of the period demanded. At the present time the urge for speed necessitates a machine which is made with great accuracy as to machining of parts, as well as of very rugged construction, so that it will operate at very high speed even when there is a large number of spindles in the mule.

Many different factors enter into the construction of the mule to produce a machine

capable of spinning yarns of high quality.

Mills spinning on the woolen principle including those making blanket, carpet, felt, asbestos, satinet and, of course, woolen goods of all grades, all use woolen mules.

A mule designed for one class of yarn is different than that used for another grade of stock. A mill man will sometimes feel that a good trade has been made when a used mule is purchased, whereas if the machine is not arranged for his particular class of work it is anything but cheap in the long run. To illustrate—An asbestos mule should be arranged for a wide gauge, i.e., distance between spindles. Compound gearing to draw the yarn without putting a large amount of twist into it may also be necessary, as well as special extensions on the draft scroll. The quadrant should

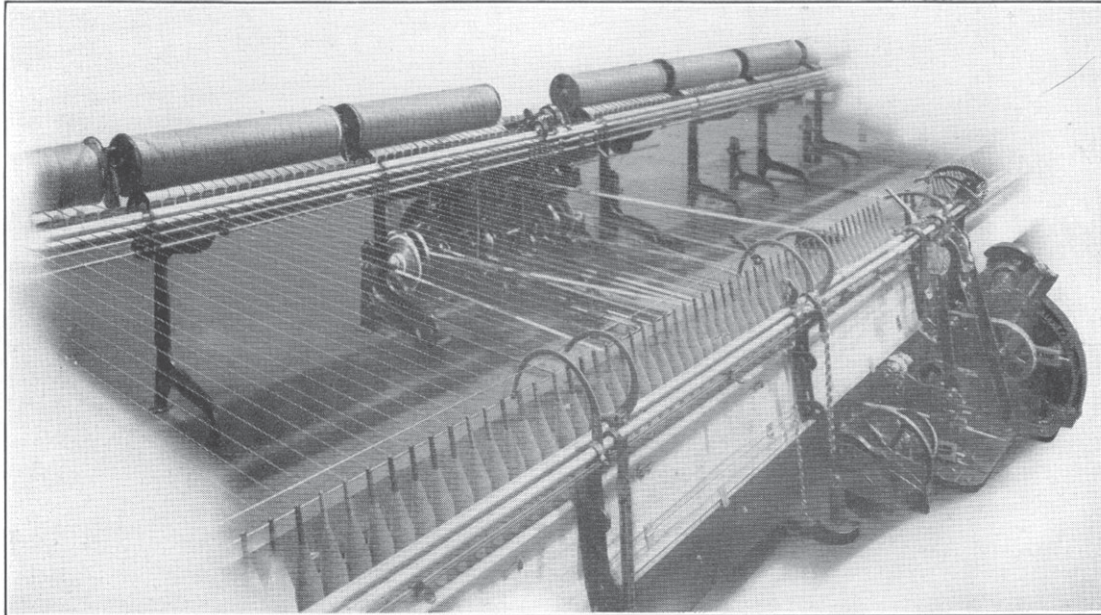


Illustration 4—Close up of Mule Carriage showing how roping lies in a straight line from Spools to Spindles

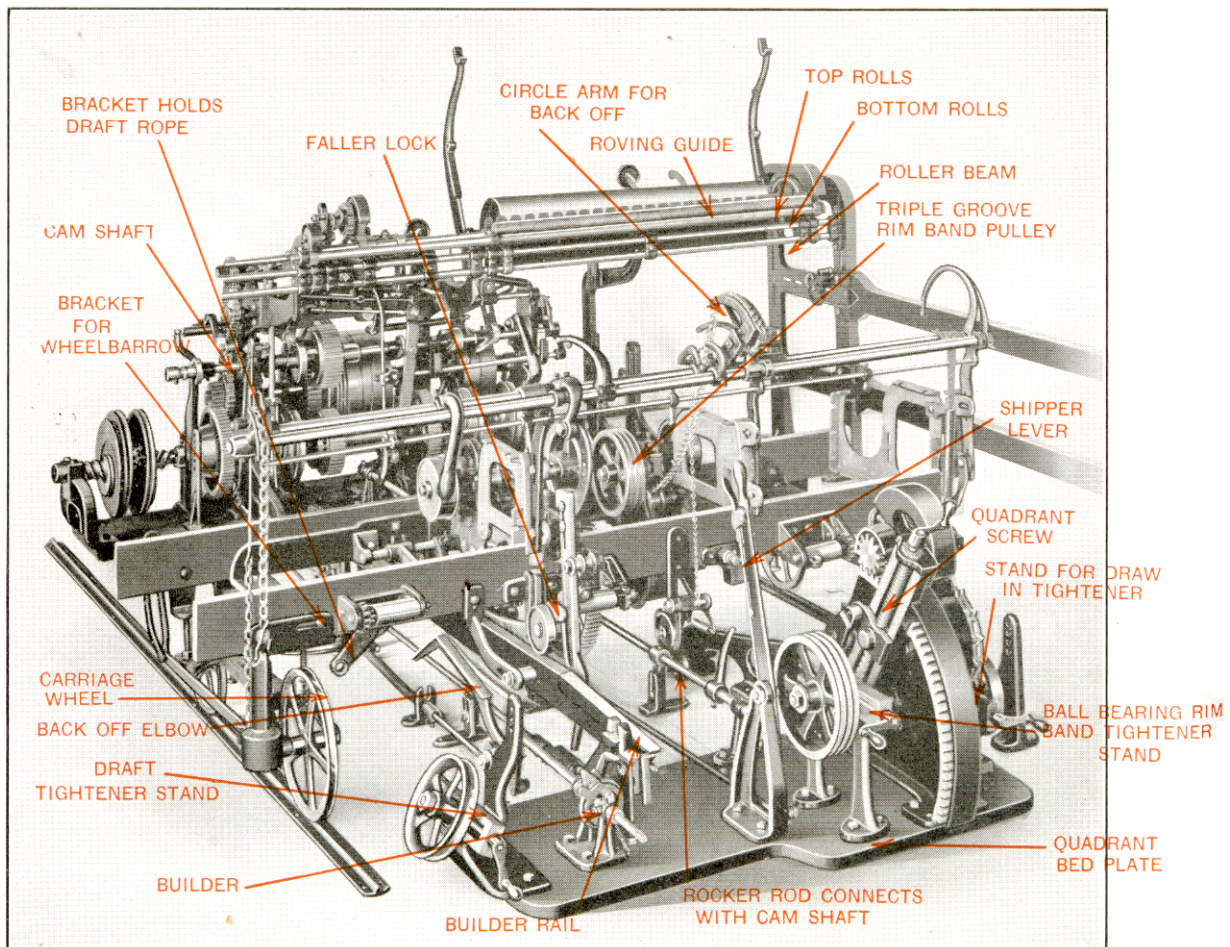


Illustration 5—Detail of Head, Center and Quadrant Mechanism on Mule

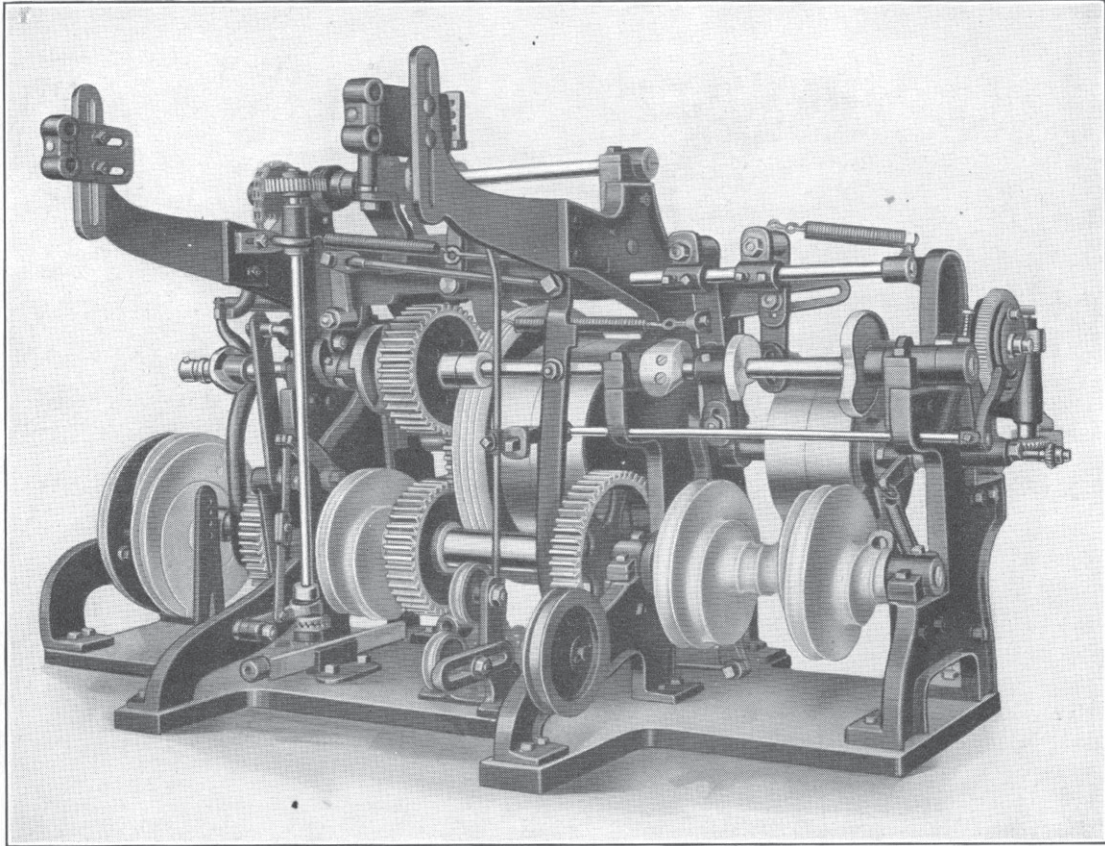


Illustration 6

also have the correct gearing required to wind the particular stock being spun.

Spindles should be made to suit a particular condition. The whirl in some instances may be only 1" diameter, while in extreme cases where a very slow speed is desirable a whirl 1½" diameter may be needed. The pitch of spindles in the carriage is another very important consideration. For most carpet yarns spindles should be at an angle of 14°, whereas for woolen yarns 13° is more satisfactory.

Modern Features

Incorporated in late mules are many improvements, including:

Substantial Head and Quadrant Bed Plates.
Cut Gears and Clutches which mesh accurately.

Shafts ground to exact specifications.

Ball Bearings in many locations, removing friction and increasing operating speed.

Wide Belt Drive preventing belt troubles.

Overhead Wind in Center mechanism.

Rigid Carriage Construction.

High Speed Spindles particularly designed for use with long bobbins.

Bronze Collar Board bushings with groove to hold oil.

Collar Boards and Step Rails with felt inserts, saving time spent in oiling.

Spindle Steps of special metal to operate successfully with high speed spindles.

Double Shoe Builder Rail of very substantial construction.

Various parts particularly designed for speed in making changes.

Oil cups in studs where desirable.

Bronze bushing in main pulleys.

Roller Bearing Carriage Wheels, adding to life of Ropes.

Rugged Cylinder Construction to stand high speed.

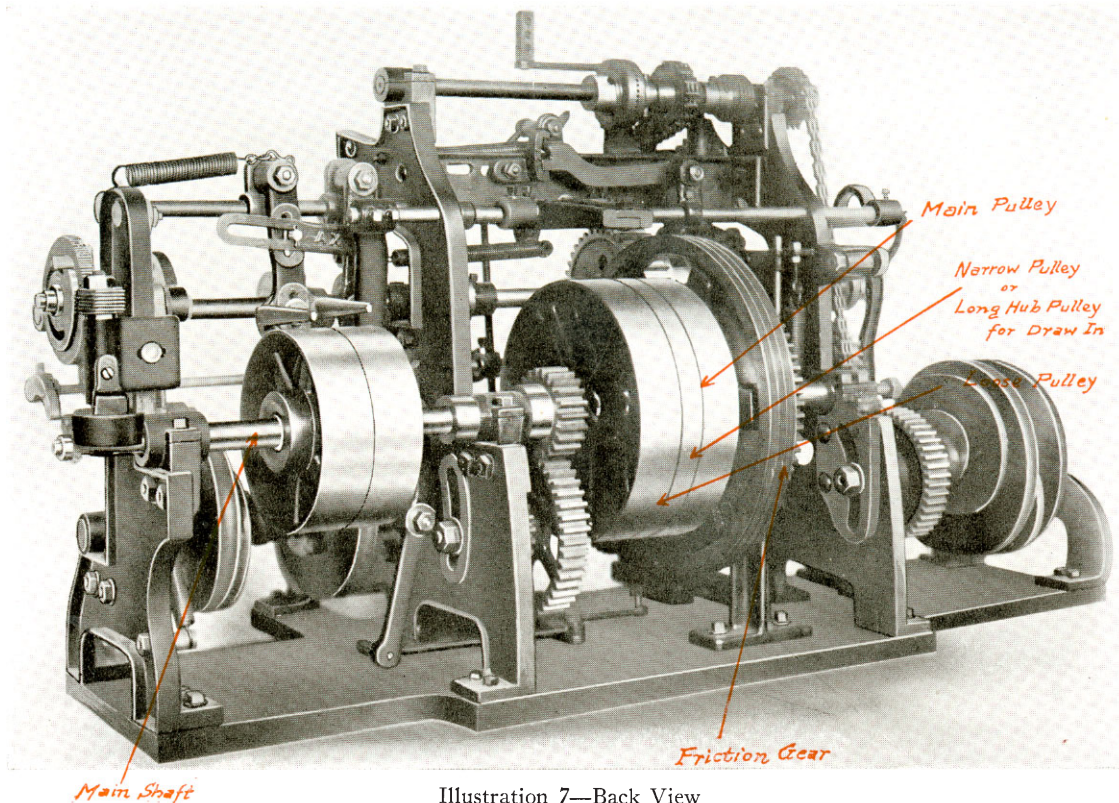


Illustration 7—Back View

Practically all of the many changes that govern the action of the mule originate in the head mechanism, and the head may rightly be termed the operating center of the mule. Two different types of mule heads are used on woolen mules, one a head action control governed by balanced springs which in turn operate a series of levers; the other a lever control operated by a series of cams, on one cam shaft, somewhat after the idea of the cam shaft in an automobile gasoline engine. The latter type is more commonly used and this is the type of mule head described in this article. It will be readily recognized that a mule head built on this principle functions with precision and every motion is brought into action at just the correct moment.

The various speeds of the different gears, shafts, pulleys, cylinders, spindles, etc., is governed by the speed of the main shaft. See Illustration No. 7.

On this main shaft is located the main pulley, as shown in Illustration No. 7. This pulley is designed for speed transmission from the counter pulley over the mule head. Also

at various locations on the mule head provision has been made for the changing of gears, so that speed of a particular motion may be altered independent of the other motions of the mule. These changes are necessary to facilitate the handling of different sizes and grades of yarn. For instance, in spinning yarn made from very coarse woolen fibers, the twist will set very rapidly and the thread will be twisted more firmly than is desirable before the mule has completed the full course of the draw. To overcome this situation, the carriage must travel out faster than it would on average stock. By a simple change of the draft gears and drum gears this result is accomplished. This does not in any way affect the original speed of the main drive on the mule. Other adjustments are also made by similar simple changes.

Quadrant Mechanism

The function of the quadrant mechanism, located in front of the operator as he stands in position to spin, is to regulate the speed of the spindles while the carriage is traveling toward

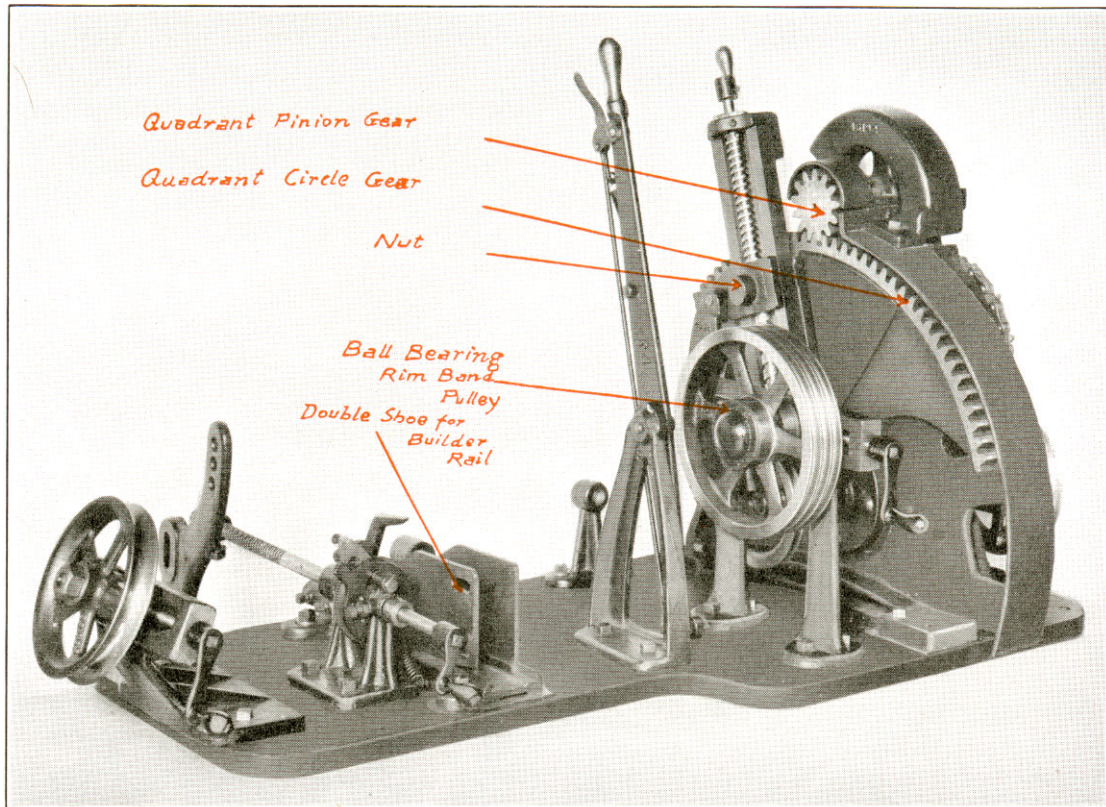


Illustration 8—Quadrant Mechanism

Note particularly rugged and substantial frame work and bed plate.

The gears can be furnished in different combinations for the spinning of different kinds of yarn.

the rolls. While this is taking place the belt is on the narrow pulley, and the rim band is not operating in connection with the spindles. The draw in scroll functions, bringing the carriage in to the rolls, thereby unwinding the quadrant winding chain from the chain drum, which is located in center mechanism.

The amount of quadrant chain unwound

from the drum determines the speed of the spindles. This amount is regulated by the position of the quadrant nut, see Illustration No. 8, on quadrant arm, and the speed of segment or quadrant circle gear which is being operated through a series of gears to a quadrant sprocket chain connected through the carriage to the head mechanism. *(To Be Continued)*

Long Draft Spinning

There has been a decided increase in long draft spinning during the past year. When domestic manufacturers became interested, it was believed generally that the method was more desirable for manufacturing fine than coarse yarns. For some reason this opinion has been reversed in recent months. Large

producers who are using the process are convinced that it saves space, reduces manufacturing cost and produces a stronger yarn and that for some products a shorter cotton can be used.

It is predicted that the method eventually will replace those in use.