2 Sheets—Sheet 1.

H. M. SCHÖN.

SPINNING-MULES.

No. 194,269. Patented Aug. 14, 1877.

Fig. 1.

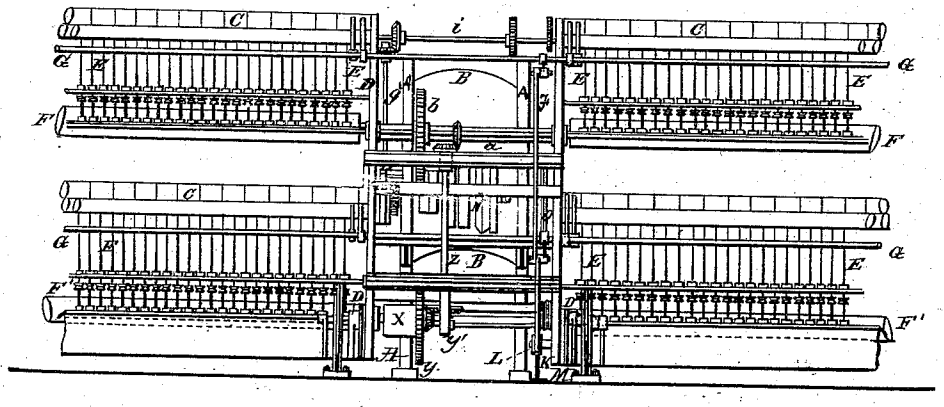
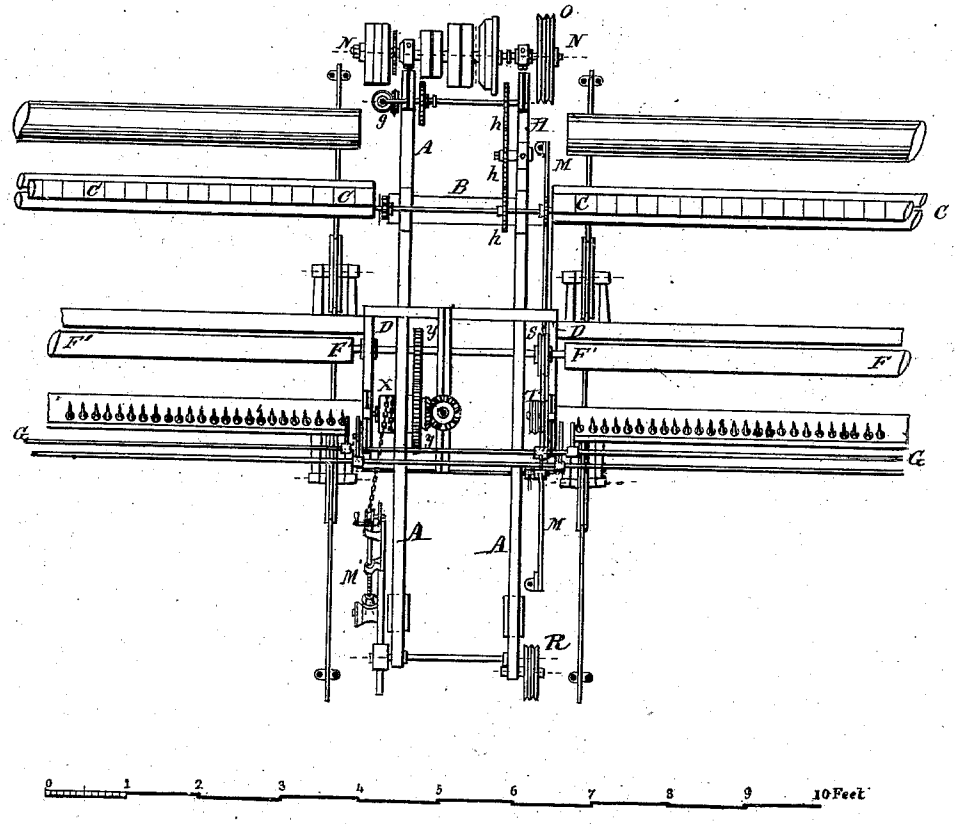


Fig. 2.



Witnesses
W. E. Chaffee
Leo Bacon

Inventor
Heinrich M. Schön
per A. Schücking
Attorney

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

2 Sheets—Sheet 2.

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Fig. 3.

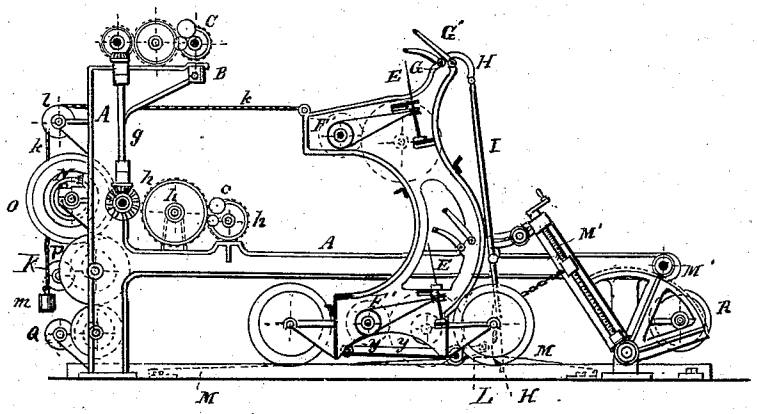
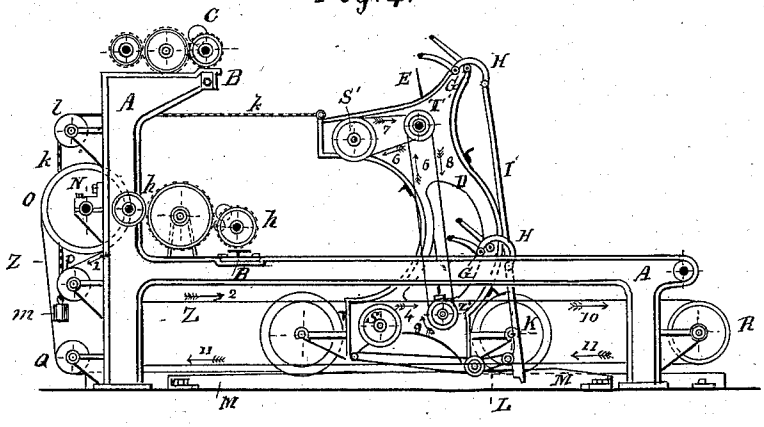
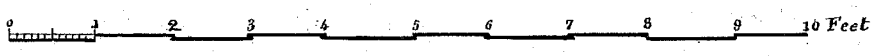


Fig. 4.





Witnesses
W. C. Chaffee
Lee Bacon

Inventor:
Heinrich M. Schön
per A. Schücking
Attorney

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

HEINRICH MORITZ SCHÖN, OF CRIMMITZSCHAU, SAXONY, GERMANY.

IMPROVEMENT IN SPINNING-MULES.

Specification forming part of Letters Patent No. **194,269**, dated August 14, 1877; application filed June 19, 1877.

To all whom it may concern:

Be it known that I, HEINRICH MORITZ SCHÖN, of Crimmitzschau, in the Kingdom of Saxony, Empire of Germany, have invented certain new and useful Improvements in Self-Acting Spinning-Mules, of which the following is a specification:

The present invention relates to improvements in that class of spinning machinery termed "spinning-mules," in which a reciprocating carriage is employed, alternately advancing toward and receding from a system of drawing-rollers, which deliver the rovings to the spindles placed on the carriage.

In the mules of the ordinary construction, and as hitherto in use, the carriage is made long, and the spindles arranged in a single row, which causes the carriage to take up considerable room or space, and renders the supervision of all the spindles quite difficult.

My invention is designed to overcome the objections to the ordinary mule.

It consists in arranging two or more rows of spindles in tiers, or one row above the other, so as to lessen the width of the carriage, and enable a larger number of spindles to be driven by the same motive power, or from the same head-stock, thus increasing the working capacity or productive power of a mule of a given width. The double series of spindles are combined with mechanism which serves to rotate the same simultaneously, and two sets of drawing-rollers, with their appendages, are also employed and driven together.

The details of construction, arrangement, and operation will be hereinafter fully set forth.

In the accompanying drawings, forming part of this specification, Figure 1 is a front elevation of a spinning-mule having a double series of spindles on the carriage. Fig. 2 is a plan or top view of a mule, showing, however, only a single series of spindles, so as to avoid confusion. Figs. 3 and 4 are side elevations, partly in section, taken on opposite sides of the mule-carriage.

I have deemed it unnecessary to show an entire spinning-mule, and, for convenience of illustration, show only the head-stock, with its driving mechanism, and the middle portion of the carriage adjoining said head-stock, it being obvious that said carriage is extended beyond the head-stock to any desired width, and provided with a suitable number of spindles. All the parts of a self-acting mule are not represented in the present instance, and I have shown only so much as is necessary to a full understanding of my invention, the parts omitted being of the ordinary construction found in self-acting mules.

The letter A designates the head-stock or main frame, the rear portion of which is made considerably higher than the ordinary head-stock, to provide room for an extra set of drawing-rollers, C. These rollers may be of any preferred construction, and are arranged in two sets, one directly above the other, and they are mounted in the usual beams B. The mule-carriage D is made higher than usual, and is provided with a double set of spindles, E, which are arranged on transverse beams, placed one above the other, but not quite in line, thus throwing one set of spindles in advance of the other, for facilitating the supervision of the spindles and the rovings or yarn. The carriage is provided with the customary wheels, running on a railway, in the ordinary manner.

The drums or cylinders F′, which receive the cords that drive the spindles, are also arranged in double sets, in line with the spindles. It may be said that the carriage is of the ordinary construction and operates in the usual manner, except that the spindles, driving-drums, and faller wires or frames are duplicated and all made to operate together.

The mechanism for operating the mule carriage and spindles is arranged in the head-stock; and it consists, essentially, of the driving-drum N, having fast and loose pulleys, and a grooved pulley, O, at one end, around which passes the operating cord or chain. This cord passes from the pulley O around the guide-sheave P on the head-stock, then half around the grooved sheave on the lower portion of the carriage, and from thence around the pulley S on the shaft of the cord-drum of the lower spindles. The cord passes from S back again around T, and then it goes in an upward direction around a pulley, T′, on the upper portion of the carriage-frame; from thence around a pulley, S′, on the shaft of the upper cord-drum, and then back over

the pulley T′ in a downward direction, when it passes again around the pulley T, and is then conducted around a sheave, R, at the end of the head-stock frame, and from thence it passes back to the sheave Q and to the main pulley O. By this means it will be apparent that, as the carriage recedes from the drawing-rollers on the head-stock, both sets of spindles will be revolved simultaneously, and the yarn drawn, stretched, and twisted equally.

The faller-wires G of both sets of spindles are connected with each other, so that they will be operated at the same time for depressing the yarns when the carriage is about to run back, in order that the yarns may begin to wind on at the bottom of the cop. The upper set of faller-wires are provided with an elbow, H, which is connected by a rod or arm, I, with a similar elbow of the lower set of faller-wires. This latter elbow carries the customary faller-arm K, which is raised by an elbow-lever, L, operated by an inclined plane or rail, M, as the carriage runs in. The customary counter faller-wires G′ are also present beneath the yarns for keeping the same taut.

In order that the broken yarns or rovings of the upper spindles may not fall down upon those of the lower spindles and become entangled therewith, I use a series of cords, *k*, which are attached to the top beam of the carriage, pass from thence around guide-sheaves on the head-stock, and carry weights *m* to keep them taut. These cords serve, in connection with transverse threads interlaced therewith, as a net for catching and supporting the broken yarns from the upper spindles.

The ordinary quadrant or "winding-on motion" used for winding the threads on the spindles as the carriage runs in is designated by the letter M′. The chain-drum X of the carriage serves to drive the lower cord-drum F′ through the medium of spur-gearing *y*, and the upper cord-drum by means of bevel-gearing *y′*, the vertical shaft *z*, upper intermediate shaft *a*, and the spur-gearing *b*. By these means one quadrant or winding-on motion serves to operate two sets of spindles, arranged in the manner herein shown.

The gearing for transmitting power from the driving drum or shaft to the double or upper and lower sets of drawing-rollers consists of a shaft having a spur-wheel and clutch, which, as in all self-acting mules, is connected with a registering and disengaging mechanism. This shaft serves to operate the lower set of drawing-rollers through the medium of a train of spur-wheels, *h*. The upper rollers are driven from the same shaft by means of a vertical shaft, *g*, bevel-gearing, and an upper shaft, *i*, connected with the shaft of the driven drawing-roller.

I have described my invention so as to enable others skilled in the art to understand the same, and wish it to be distinctly understood that the salient features of my invention are the location of the double set of spindles and drawing-rollers, the operation of the faller-wires of both sets of spindles by one faller-bar, and the operation of two sets of spindles by a single quadrant or winding-on motion.

The details of construction and arrangement may be varied without departing from my invention, according to the uses of the latter in connection with mules of various descriptions.

I do not wish to claim, broadly, driving a number of sets of spindles from the same head-block, as in the mules generally known as "double-deckers;" neither do I wish to cover the arrangement of two sets of spindles, one set in advance of the other, and located in the same horizontal plane on a mule-carriage.

Having thus described my invention, what I claim as new, and wish to secure by Letters Patent, is—

1. The combination, in a spinning-mule, of a single carriage having two or more sets of cop-spindles arranged in tiers, or one set above the other, a head-stock having two sets of drawing-rollers, a single quadrant or winding-on motion, and mechanism, substantially as described, for operating the carriage, the rolls, and the quadrant, for the purpose herein set forth.

2. In a spinning-mule, an upper and lower set of faller-wires, connected together and combined with a single faller-bar, a mule-carriage, and devices, substantially as described, for operating both sets of faller-wires when the carriage runs in, substantially as herein set forth.

3. The combination of an upper and lower set of cord-drums, an upper and lower set of cop-spindles, an upper and lower set of faller-wires, with a mule-carriage and a single quadrant or winding-on motion, as herein set forth.

4. The combination of the cords *k*, sheaves *l*, and weights *m* with a mule-carriage and head-stock, as and for the purpose set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HEINRICH MORITZ SCHÖN.

Witnesses:
JOHN H. STEUART,
HENRY VAN ARSDALE.