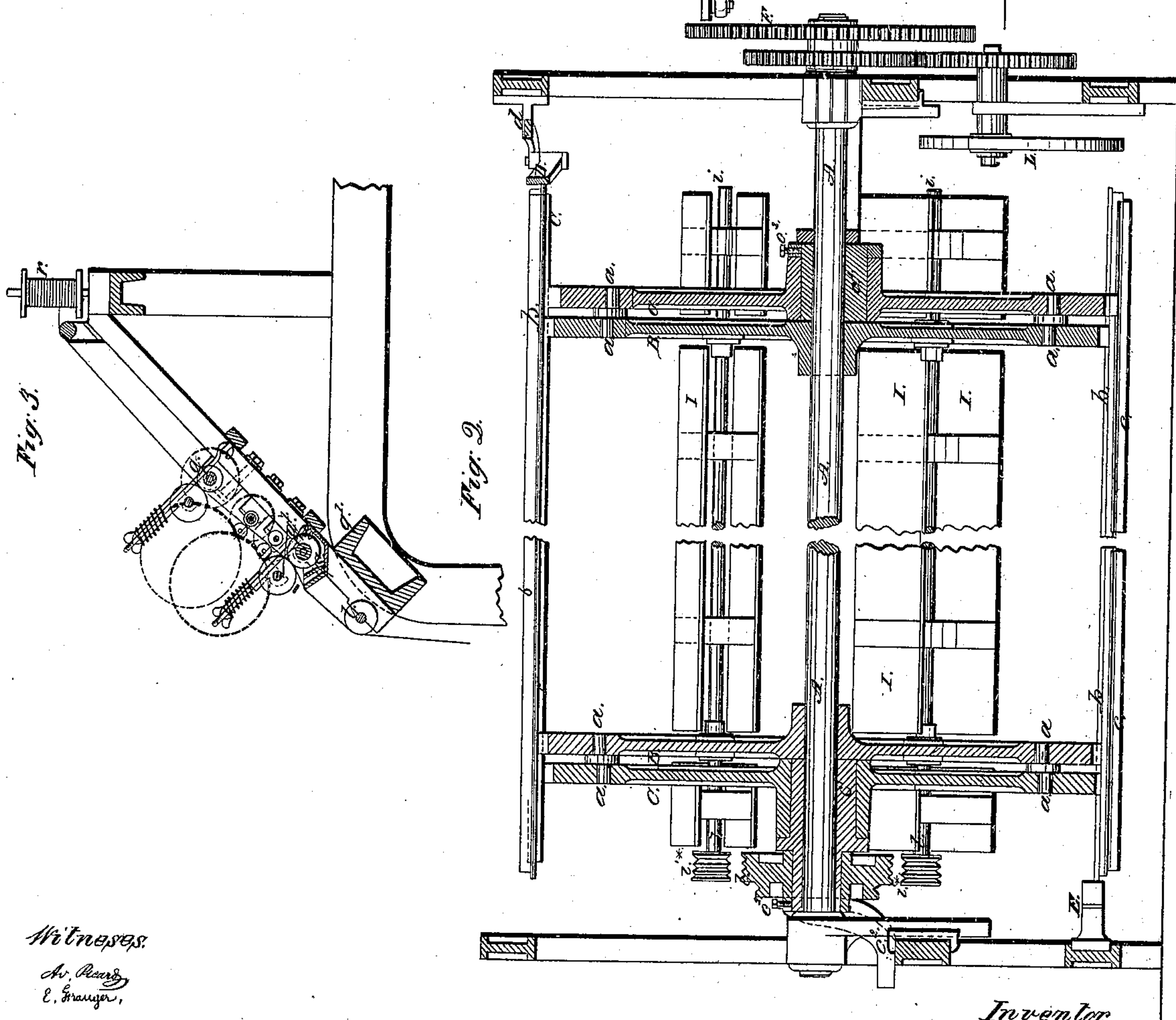
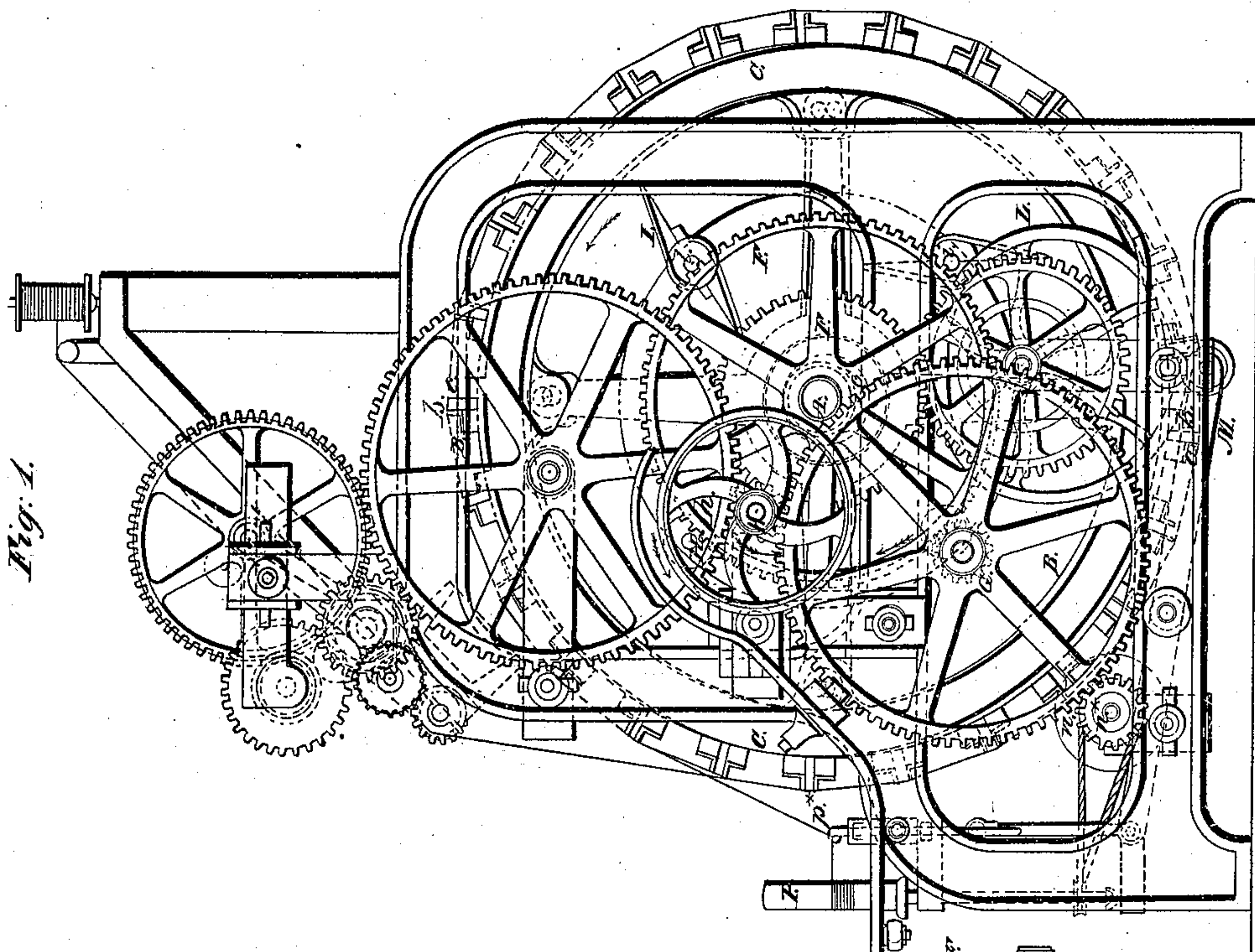


*P. Heilmann.*  
*Machine for Dressing Yarn.*

*Sheet 1. 2 Sheets.*

*N<sup>o</sup> 34,494.*

*Patented Feb. 25, 1862*



*Witnesses:*

*W. R. R. R.  
 E. Granger,*

*Inventor*

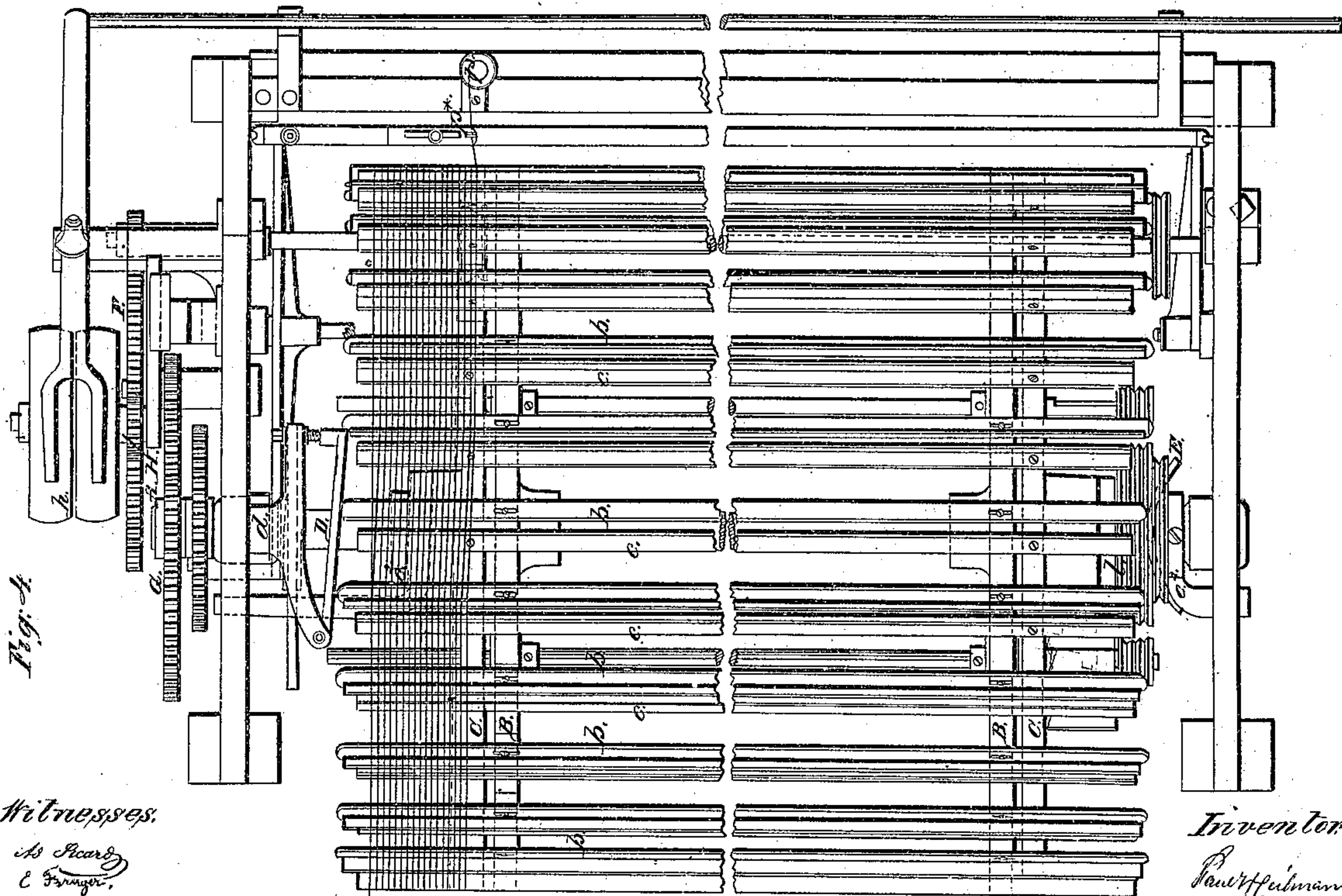
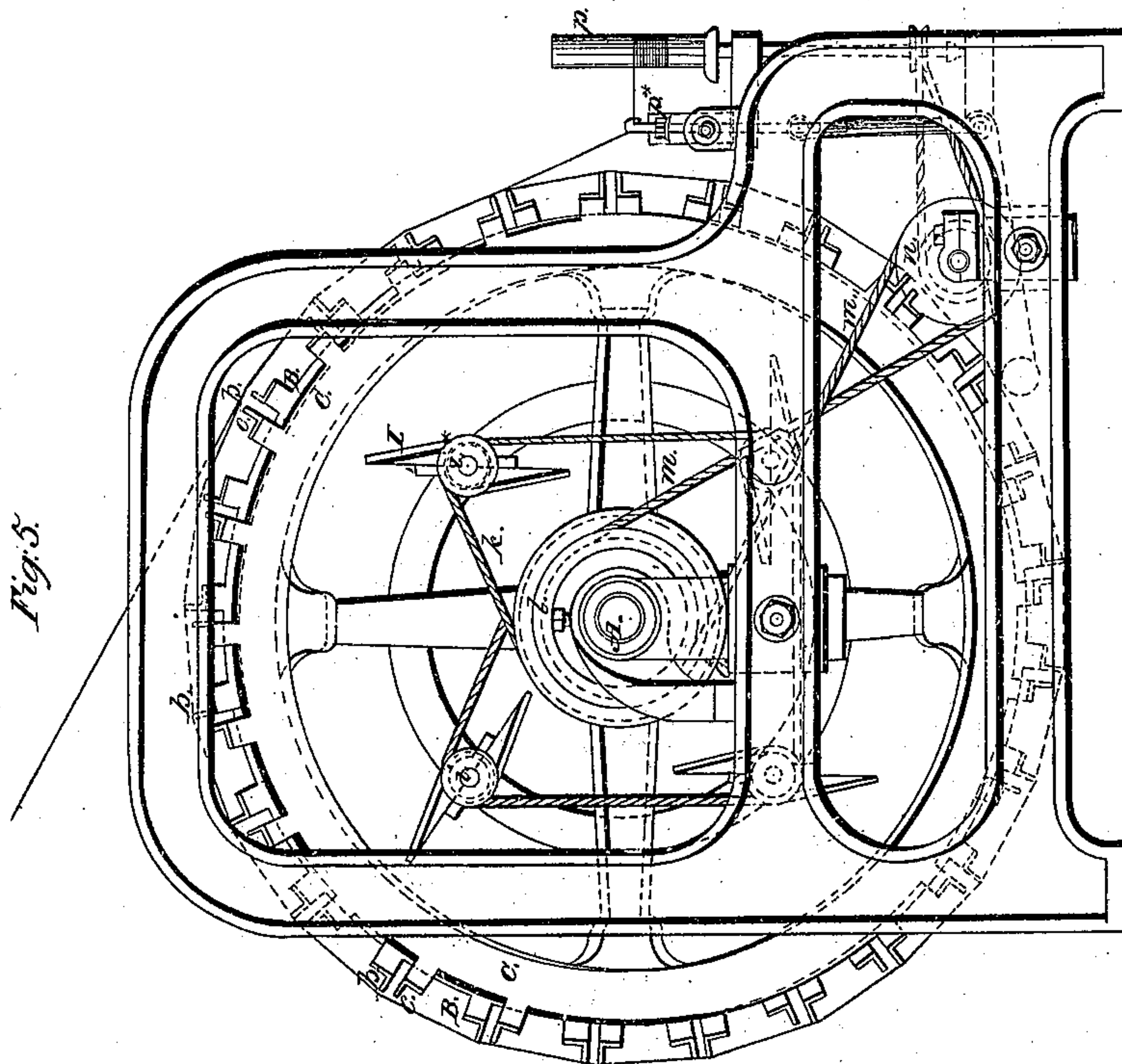
*P. Heilmann*



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*Patented Feb. 25, 1862.*



*Witnesses.*

*As Sec'd  
C. F. Meyer.*

*Inventor*

*P. Heilmann.*



# UNITED STATES PATENT OFFICE.

PAUL HEILMANN, OF MULHOUSE TOWN, FRANCE.

IMPROVEMENT IN MACHINERY FOR SUBMITTING YARNS TO THE ACTION OF LIQUID.

Specification forming part of Letters Patent No. 34,494, dated February 25, 1862.

*To all whom it may concern:*

Be it known that I, PAUL HEILMANN, gentleman, of Mulhouse Town, in the French Empire, have invented Improved Apparatus for Submitting Yarns and Threads to the Action of Liquid and Gaseous Bodies; and I do hereby declare that the following is a full and exact description of my said invention.

The object of this invention is to submit lengths of yarn or thread while in motion to the action of liquid or gaseous bodies for the purpose of sizing, mordanting, dyeing, or drying the same and preparing them for spinning or weaving. This is effected by drawing the yarn or thread off cops or bobbins and winding the same around drums or reels in the form of a helix or one coil of thread beside the other (a space being left between each coil) and giving the drums or reels a continuous rotatory motion either in the air or immersed in a bath, whereby the yarn or thread will be exposed to the action of the fluid (whether gaseous or not) in which it is rotating. While thus rotating the reels will deliver out of the machine or apparatus as much thread at one end of the helix as they take up at the other end. By this arrangement any length of thread can be operated upon and in the case of dyeing or drying submitted to the action of the operating agents sufficiently long to insure the perfect action of the dyeing or drying agents. The agents employed in connection with the improved machinery may be air, either heated or not, if the object be to dry the yarn or thread; baths of mordants or dye-stuffs, if the object be to dye them; size or glue, if the object be to stiffen them, or any other agent or agents proper to obtain the desired effect, or a combination of them.

This invention is specially applicable to the winding or drawing off from the cocoons of raw silk, which by this means will be delivered out of the machine or apparatus in a dry state and can be immediately wound onto bobbins.

As an illustration of the use of this invention I have shown in the accompanying drawings an arrangement of machinery adapted for carrying out the operation of sizing and drying yarn simultaneously, the object being to give tenacity to the yarn by causing an adhesion of the fibers. In this machine the

sizing is effected on the passage of the yarn to the reels.

In Sheet I Figure 1 is an end elevation of the improved reeling-machine; Fig. 2, a longitudinal section, the middle part being broken away to contract the length of the figure. Fig. 3 is a detached view showing the sizing apparatus in vertical cross-section. Fig. 4 is a plan view of the reeling-machine, the sizing apparatus being removed; and Fig. 5 is an elevation of the opposite end of the machine to that shown at Fig. 1.

The machine consists, mainly, of two reels set one within the other and mounted, the one loosely and the other as a fixture, on the same shaft, but eccentrically with respect to each other.

A is the reel-shaft carried in bracket-bearings attached to the main frame. The reels are each composed of a pair of wheels B B C C, the former of which are keyed to the shaft A, while the latter are mounted loosely on eccentric-bosses  $c'$ , loose on the shaft A, but held stationary by being clipped at their extremities by bracket-pieces  $c^2$ , attached to the main framing. On the peripheries of the wheels B B C C metal laths  $b b c c$  are affixed by means of screws. The laths  $b b$  are slotted to receive the attaching-screws, and they are thus allowed to receive a slight endwise motion as the compound reels rotate in order to shog or shift the coils of yarn or thread upon the reels in a lateral direction or parallel with their axes, and thereby make room for fresh yarn or thread to be wound thereon. The eccentricity of the reels is intended to facilitate this shogging movement, the laths  $b b$  of the reel B being caused by such eccentricity first to lift the several coils of yarn or thread from the reel C, as illustrated at the top of Figs. 1 and 5, preparatory to their movement endwise in one direction, and afterward to transfer it back to the reel C, as illustrated at the bottom of said figures, at a distance in a lateral direction from where they took it, every coil being shogged or shifted at every point where it rests on a lath as that lath arrives at a given point in its revolution, so that the whole of the yarn or thread is shifted bodily on the reel C. The movement endwise of the laths  $b b$  to produce the lateral movement of the coils of threads is effected dur-



ing the rotation of the reels by the ends of the said laths being severally brought in succession into contact with a fixed adjustable guide D, carried by a bracket-arm *d*, at the upper part of the main framing, (see Fig. 2,) and the return motion is produced by their opposite ends being in succession pressed against a fixed guide E, attached to the lower part of the end framing. The wheels B C at each end of the reels are connected together by eccentric coupling-pins *a a*, which pass through holes made in the arms of the wheels and work freely therein to allow for the eccentric axial motion of the coupled wheels. Rotary motion is given to the reels by a spur-wheel F, keyed on the axle of the reel-shaft A and gearing into a pinion on the boss of an intermediate wheel G, which receives motion from a spur-pinion on the main driving-shaft. Within the reels a set of four fans is mounted for the purpose of producing a circulation of air between and around the coiled threads. These fans consist of leaves of wood or sheet metal I, mounted on rotating shafts *i i*, which are supported in socket-bearings in a ring cast on the wheels C C. The fans will therefore rotate with the reels; but in order to give the fans an axial motion their shafts *i i* are provided with pulleys *i' i'*, over which pass bands *k* from a pulley *l* loose on the shaft A. A band *m* from the pulley *l* passes to a pulley *n*, mounted on a stud-axle at the lower part of the main framing, and attached to this pulley *n* is a spur-pinion *n'*, which gears into the intermediate wheel G, before mentioned, which itself receives motion from the main driving-shaft H. It will now be understood that on motion being given to this shaft H through its driving-pulley *h* the reels and the fans within them will be caused to rotate, and the yarn to be dried being guided onto the reels by means of guides set at suitable distances apart the several lengths of yarn will be wound onto the reels until a sufficient accumulation has been effected thereon. The precise amount of yarn to be thus accumulated will be determined by the length of time necessary to submit it to the currents of air. When this accumulation has been once attained, the ends of the first coils are to be led to rotating bobbins *p* by means of traveling guides or eyes *p'*, which have an up-and-down motion communicated to them by a rotating cam L and rock-lever M in the usual manner of laying threads on bobbins. The delivery of the yarn onto the bobbins will then be continuous, the yarn taken up being pushed forward laterally

by the shogging motion already explained to take the place of that wound off the reels by the bobbins.

The sizing or gumming apparatus, which is intended to impart that tenacity to the yarn usually derived from the twisting together of the fibers consists of a series of pressing-rollers *q q*, which take the yarn from a line of bobbins *r* in the condition in which it is delivered from the bobbin and fly or swing frame and pass it between a pair of drawing-rollers *q'*, the lower one of which is fluted and rotates in a size or gumming trough *s*. The soft yarn in passing between these rollers *q'* becomes saturated with a gumming solution, and in this state it is passed over a guide-roller *t* to the reeling apparatus, onto which it is lapped, as before explained. This reeling apparatus while transmitting the lengths of yarn to the bobbins *p* subjects it to currents of air set in motion by the rotating fans, and thus the lengths of yarn are dried before being delivered out of the machine and may without further preparation be used in the loom.

When yarn or thread is to be submitted to the mordanting or dyeing process, the sizing or gumming apparatus is not employed; but in lieu thereof the reels are caused to rotate in a mordanting or dye bath, and thus expose the yarn or thread for a suitable period (determined by the length of yarn or thread allowed to accumulate on the reels, as before explained with respect to drying the sized yarn) to the action of the bath.

In the application of my invention to the process of dyeing or mordanting, as above mentioned, the fans within the reels are dispensed with and the yarn dried by means of fans or other drying apparatus suitably arranged outside of the bath.

Having now set forth the nature of my invention and explained the manner of carrying the same into effect, I wish it to be understood that I claim—

Submitting yarns or threads to the action of gaseous and liquid bodies, for the several purposes above described, by means of a system of reels operating substantially as herein set forth.

In witness whereof I, the said PAUL HEILMANN, have hereunto set my hand and seal this 31st day of October, in the year of our Lord 1860.

PAUL HEILMANN. [L. S.]

Witnesses:

AD. PICARD,  
ED. FRAUGER.