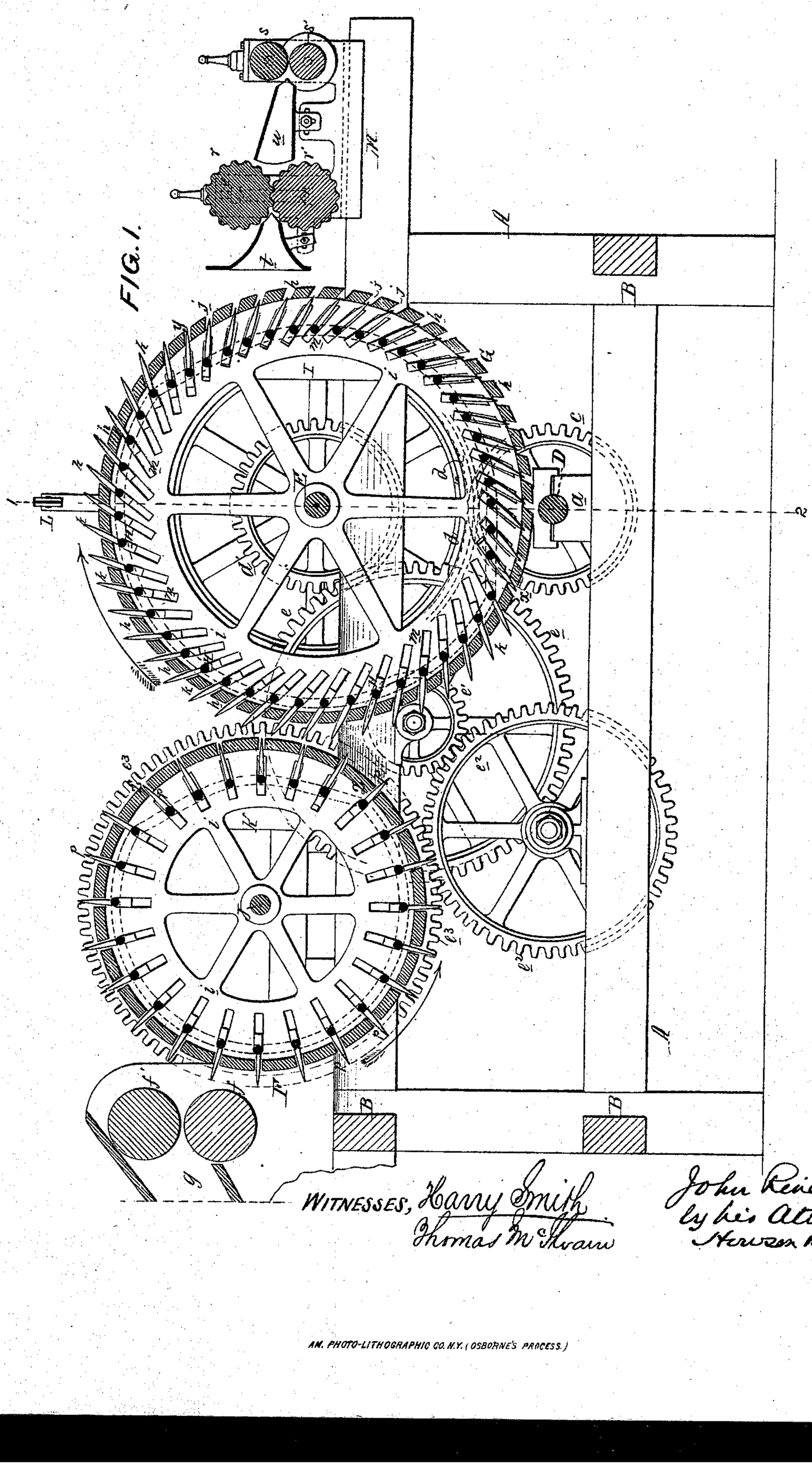
2 Sheets--Sheet 1.

J. RINEK.

Machine for Heckling Hemp, Flax, &c.

No. 131,708. Patented Sep. 24, 1872.

FIG. 1.



WITNESSES, Harry Smith
Thomas McElwain

John Rinek
by his Attys
Howson & Son

2 Sheets--Sheet 2.

J. RINEK.

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FIG. 3.

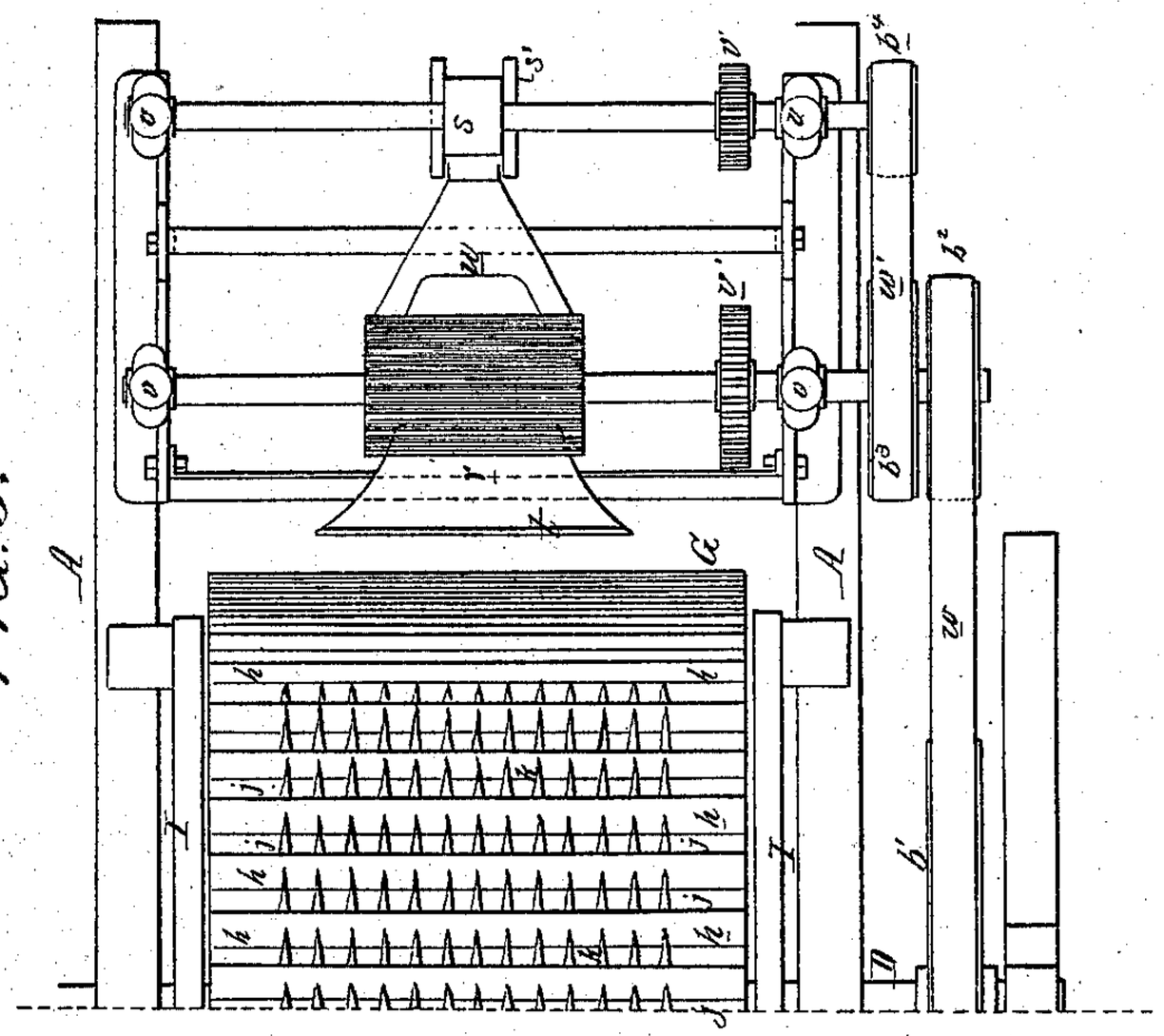
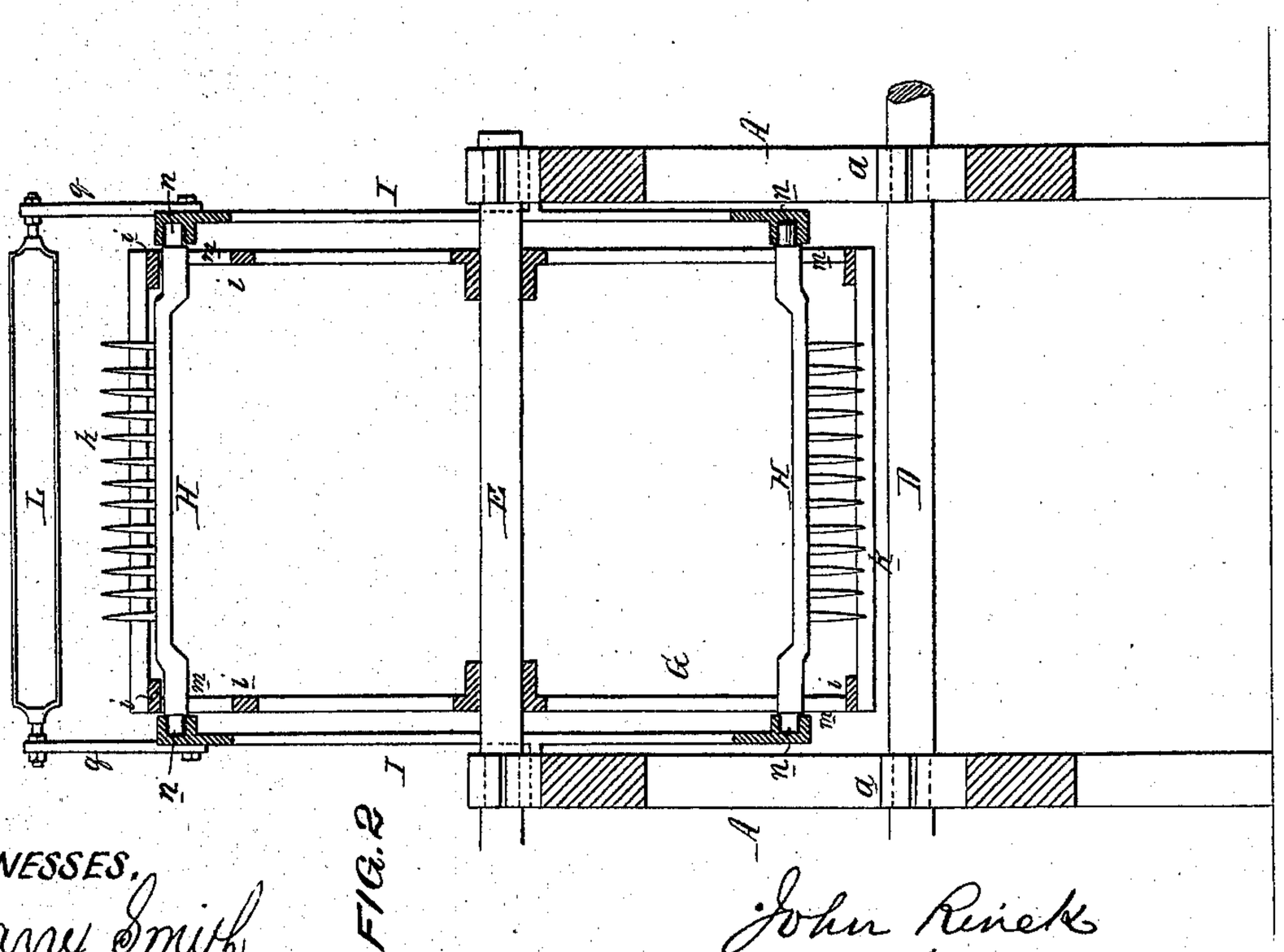


FIG. 2.



WITNESSES.

Harry Smith

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John Rinek

by his Attys.

Howson and Son

UNITED STATES PATENT OFFICE.

JOHN RINEK, OF EASTON, PENNSYLVANIA.

IMPROVEMENT IN MACHINES FOR HACKLING HEMP, FLAX, &c.

Specification forming part of Letters Patent No. **131,708**, dated September 24, 1872.

To all whom it may concern:

Be it known that I, JOHN RINEK, of Easton, Northampton county, Pennsylvania, have invented a Machine for Drawing or Hackling Hemp, Flax, &c., of which the following is a specification:

My invention consists of mechanism, too fully explained hereafter to need preliminary description, for drawing out and straightening the fibers of hemp, flax, &c., and for forming the same into a sliver suitable for spinning, the mechanism being especially applicable to the preparation of fibers for rope-making.

In the accompanying drawing, Figure 1, Sheet 1, is a vertical section of my improved drawing or hackling machine; Fig. 2, Sheet 2, a transverse section on the line 1 2, Fig. 1; and Fig. 3, a plan view of one end of the machine.

A and A′ are the opposite side frames of the machine, secured together by cross-pieces B; and in bearings *a a* on the said side frames runs the main driving-shaft D, furnished at one end with a driving-pulley, and with a pulley, b^1, hereafter referred to, and at its opposite end with a cog-wheel, *c*, which gears into a larger cog-wheel, *d*, on a shaft, E, to which, between the side frames, is hung a large drawing-cylinder, G, armed with advancing and retreating teeth, as will be fully described hereafter. The shaft E is also provided with a smaller cog-wheel, *d′*, which drives a train of wheels, *e*, e^1, e^2, and e^3, and thus transmits motion to a drawing-cylinder, F, smaller than the cylinder G, and to geared feed-rolls *f* and *f′*, arranged at a point adjacent to the cylinder F, and at the end of a trough, *g*, through which the crude material is fed to the machine. The surface of the cylinder G is composed of a number of narrow wooden slats, *h*, secured at their opposite ends to the flanged plates *i* which form the ends of the cylinder, the said slats being separated from each other sufficiently to form parallel slots *j*, at equal distances apart, through which extend the rows of hackling-teeth *k*, (see Fig. 1,) there being one row of teeth for each slot. Each row of teeth is secured to a bar, H, contained within the cylinder, and guided at its opposite ends by oblique slots *m* formed in the ends *i i* of the said cylinder, the extreme outer ends of each bar being also adapted to cam-like grooves *n* formed in fixed plates I I secured to the side frames, so that as the cylinder revolves the bars shall, in following the course of the cam-grooves, be caused to slide to and fro in their guiding-slots *m*, which will cause the rows of teeth *k* to project from between the slats of the cylinder during a portion of the revolution of the same, and to be retracted during the remaining portion of such revolution. (See Figs. 1 and 2.) The cam-grooves are so arranged in the present instance that, as the cylinder revolves in the direction of its arrow, the teeth shall project from the surface of the same from the point *x* to the point *y*, and be retracted at the latter point to again emerge at *x*. (See Fig. 1.) The rows of teeth *k* do not radiate from the center of the cylinder-shaft E, but are inclined forward in the direction of the rotation of the cylinder to an extent coinciding with the obliquity of the guiding-slots *m*. (See Fig. 1.) The cylinder F, before referred to, is secured to the same shaft J to which the gear-wheel e^3, from which it derives its motion, is attached. It is arranged as close as possible to the larger cylinder G, and is similar to the latter, being composed of slats and end plates, and having advancing and retracting teeth *p*, controlled by fixed cam-grooves in plates *k k*, secured to the frame of the machine. The teeth *p*, however, are somewhat shorter, and in the present instance further apart, than the teeth *k*, and they radiate from the center of the cylinder-shaft J, instead of being arranged obliquely, as on the cylinder G. The cam-grooves of the plates *k k* are so arranged that, as the cylinder F rotates in the direction of its arrow, its teeth *p* shall be drawn back from the point *z* to the point *z′* in passing the projecting teeth of the cylinder G, and shall be projected and held outward during the remaining portion of the revolution of the cylinder, so as to seize and draw the crude material from between the feed-rollers *f* and *f′*. The grooved guiding-plates I I, at either side of the cylinder G, are connected together at the top and thus prevented from yielding to the strains to which they are subjected by a brace, L, Fig. 2, extending over the top of the cylinder and secured to the said plates by rods *q q* projecting upward from the same. The guiding-plates K K of the cylinder F might also be

braced in the same manner. A single head, M, carrying two sets of drawing-rollers, *r r'* and *s s'*, is secured to the top of the frame of the machine, adjacent to the cylinder G; and to the said head are also secured two funnel-shaped conductors, *t* and *u*, the former occupying a portion of the space between the cylinder G and the rollers *r r'*, and the latter being arranged between the two sets of rollers. Both of these conductors are made adjustable upon the head, in the manner which will be readily understood on reference to Fig. 1, and the conductor *u* is of less capacity than, and forms a continuation of, the conductor *t*, and serves to reduce the width and thickness of the sliver, which is considerably reduced in the first instance in passing through the conductor *t*, from the cylinder G, to the first set of drawing-rolls. (See Fig. 3.) The rolls of each set have movable bearings and can be adjusted toward and from each other by means of screws *v*, and they are geared together, as shown at *v'*, Fig. 3, and all receive their motion from a pulley, b^1, on the driving-shaft, connected to pulleys b^2, b^3, and b^4 on the spindles of the lower rolls by belts *w* and *w'*. The rolls *r r'* are longer and of larger diameter than the rolls *s s'*, and are fluted or corrugated, as best observed in Fig. 1, and the upper roll *s* of the second set is overlapped by flanges of the lower roll. (See Fig. 3.)

It will be observed that all of the pulleys and belts are arranged at one side of the machine and all of the cog-gearing at the other. This enables the parts to be economically disposed and access to be readily obtained to the cog-wheels when it becomes necessary to change them for the purpose of altering the relative rates of speed of the several cylinders and rolls.

The hemp, flax, or other crude fibrous material to be treated for the purpose of straightening out the fibers and reducing the whole to a uniform sliver, suitable for rope-making, &c., is introduced to the machine through the trough *g*, is passed between the feed-rolls *f* and *f'*, thence beneath the cylinder F, then over the cylinder G, and finally through the conductors *t* and *u* and between the two sets of drawing-rolls *r r'* and *s s'*. The whole of the cylinders and rolls rotate at a certain determined and positive speed, the feed-rolls *f* and *f'* first drawing the material into the machine, the toothed cylinder F receiving it from between the said rolls and carrying it around to the cylinder G, the latter drawing it from the cylinder F, and the two sets of rolls *r r'* and *s s'* finally drawing it from the said cylinder G. The teeth *p* of the cylinder F seize the fibrous material as it is delivered from the feed-rolls, and, by carrying and slightly drawing the same, serve to partially straighten the fibers. They also serve to retain the material upon the cylinder in carrying it around to the cylinder G; but before reaching the latter the said teeth are retracted, as shown in Fig. 1, so that the material may be released and at once seized by the teeth *k* of the cylinder G and carried over onto the latter without risk of carrying the fiber around the cylinder F or of breaking or tangling the said fibers, which would be apt to be the case if both sets of teeth, moving at different rates of speed, were acting upon the same portion of the material simultaneously. The teeth *k* of the cylinder G, owing to the manner in which they are inclined, enter the material gradually, or, in other words, pierce the same, so as to obtain at once a firm hold and draw it away from the cylinder F, whereas, if they were arranged radially, they would strike the material with their sides instead of with their points, and would, therefore, have a tendency to push the material away from the cylinder, instead of at once taking hold of the same. As the surface of the cylinder G moves at a greater speed than that of the cylinder F, the fibers will be still further drawn out and straightened in being carried over the same, and the straightening process is completed by the drawing-rolls *r* and *r'*, which drag the material from the cylinder G, the teeth *k* of the latter being retracted at a point opposite the said rolls, as before described, so as to offer no undue resistance to this final drawing operation. The rolls *r* and *r'* and conductor *t* form the material into a flat sliver, which is further reduced in both width and thickness by passing through the conductor *u* and between the rolls *s s'*. The surfaces of the two sets of rolls move at the same speed, so that there is no further drawing in the conductor *u* between the same, the said rollers *s s'* being merely intended to act as condensers for the sliver. From the machine the sliver is conducted into and coiled within the usual cans, to be afterward spun into strands or yarn for rope-making, &c.

I claim as my invention—

In a drawing or hackling machine, the combination of a cylinder, F, having radial advancing and retracting teeth, with a cylinder, G, having oblique advancing and retracting teeth *k*, the latter operating, in respect to the teeth of the cylinder F and to the drawing-rolls, substantially as and for the purpose described.

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

JOHN RINEK.

Witnesses:

W. H. HILDEBRAND,

THOMAS RINEK.