(No Model.) 2 Sheets—Sheet 1.

S. A. FLOWER & W. S. RHOADES.

FIBER CURLING APPARATUS.

No. 546,660. Patented Sept. 24, 1895.

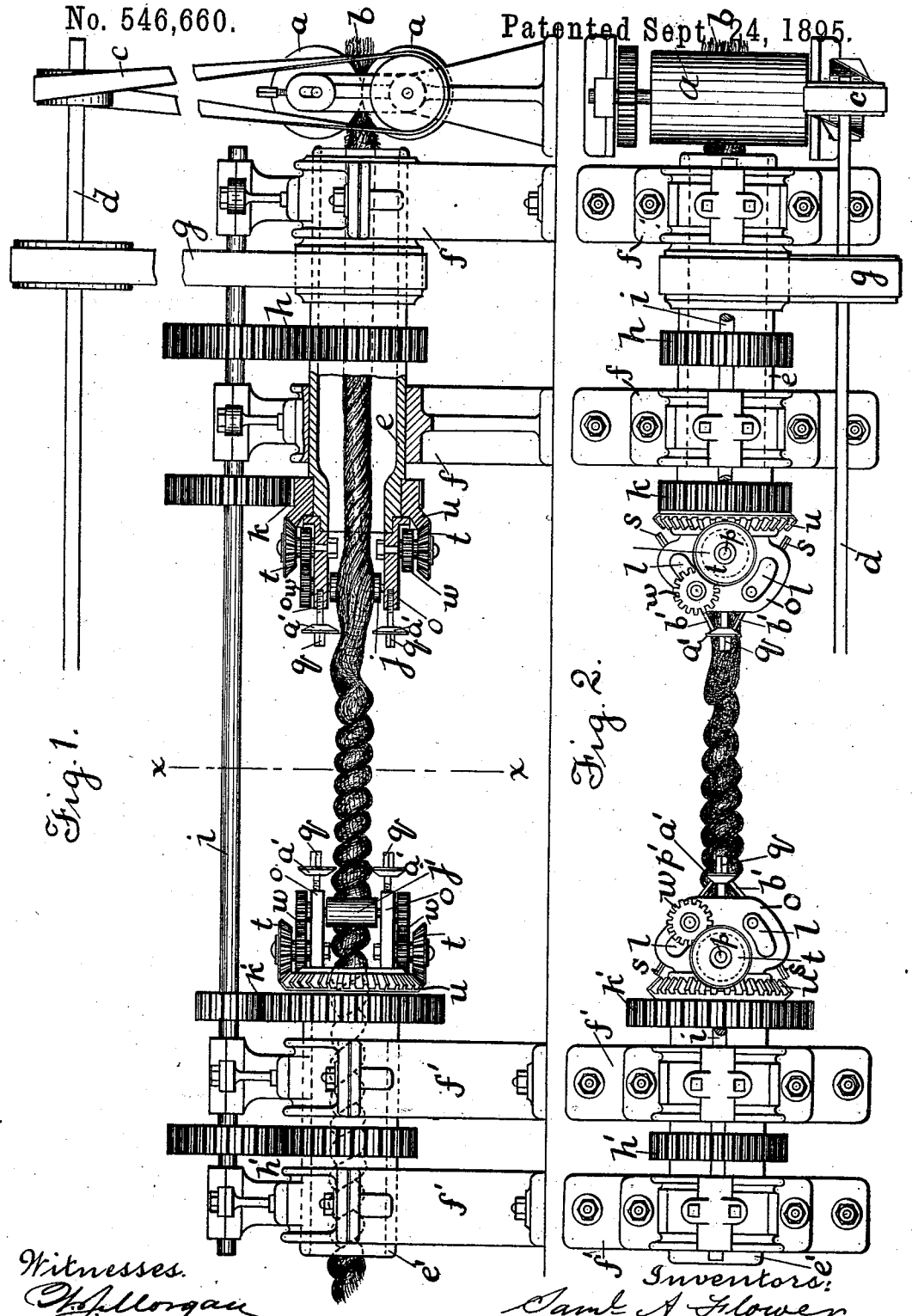

Fig. 1.

Fig. 2.

Witnesses.
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(No Model.) 2 Sheets—Sheet 2.

S. A. FLOWER & W. S. RHOADES.

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Fig. 4.

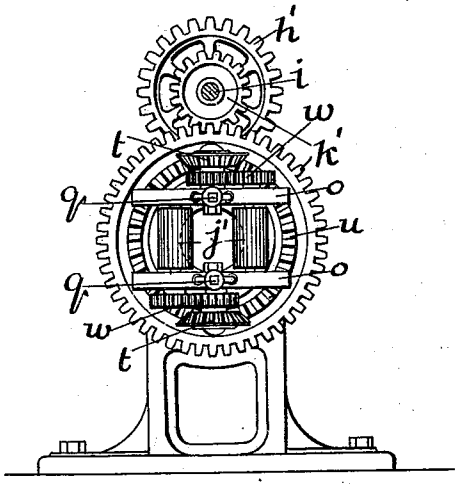


Fig. 3.

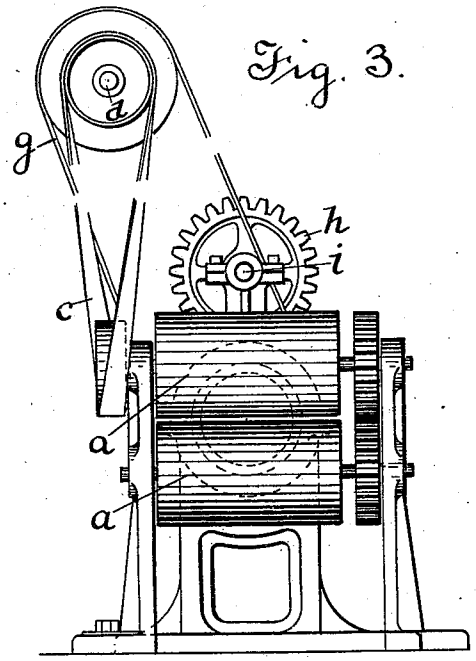


Fig. 5.

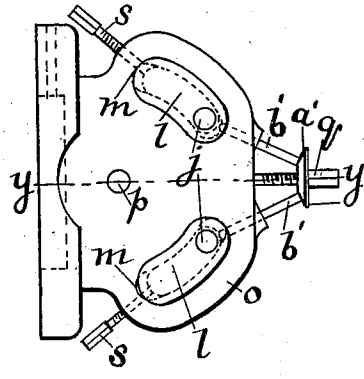


Fig. 6.

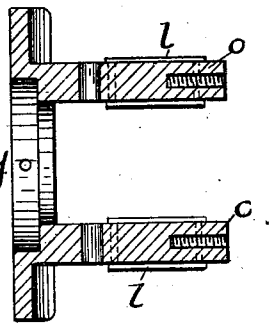
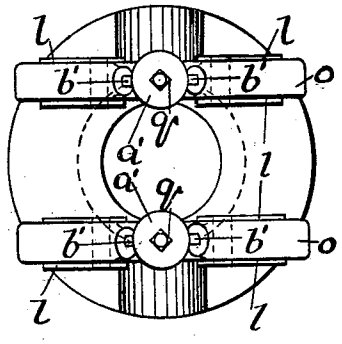


Fig. 7.



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UNITED STATES PATENT OFFICE.

SAMUEL A. FLOWER AND WILLIAM S. RHOADES, OF NEWARK, NEW JERSEY.

FIBER-CURLING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 546,660, dated September 24, 1895.

Application filed July 10, 1894. Serial No. 517,084. (No model.)

To all whom it may concern:

Be it known that we, SAMUEL A. FLOWER and WILLIAM S. RHOADES, citizens of the United States, and residents of Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Fiber-Curling Apparatus, of which the following is a specification.

Our invention consists of improved apparatus for roping and curling animal and vegetable fibers for upholstery and other purposes, as hereinafter fully described, reference being made to the accompanying drawings, in which—

Figure 1 is a side elevation of our improved curling apparatus with a part in longitudinal section. Fig. 2 is a plan view with some parts broken out. Fig. 3 is an end elevation as seen looking at the right-hand end of Figs. 1 and 2. Fig. 4 is an elevation as seen in the same direction, looking from the line *x x*, Fig. 1. Fig. 5 is a detail of one of the drawing and twisting heads in side view on an enlarged scale. Fig. 6 is a section of the drawing and twisting head-frame on line *y y*, Fig. 5; and Fig. 7 is a front elevation of the said drawing and twisting head-frame.

The essential feature of our invention consists of two drawing and twisting heads placed in line with and fronting each other, both turning in the same direction and at the same rate of speed through which the material is passed, the first one receiving the sliver of fibers and twisting them into a form of rope, and the second one receiving the rope with its feed-rolls running slower than those of the first head, whereby the rope is caused to kink and the kinks are developed in hard twisted uniform coils which remain after the rope is delivered from the second head, and when the ropes are subsequently picked produce high-grade curled fibers, whether of hair or vegetable structure.

In the drawings, *a* represents a pair of rolls for receiving the sliver *b* from whatever source it may be supplied and delivering it to the curling apparatus, said rolls being driven by the belt *c* from a suitable counter-shaft *d*, as in Fig. 1, or they may be driven in any other approved way—as, for example, in Fig. 3.

e represents the tubular stock of the first or twisting head to which the sliver is thus delivered. It is mounted in the standards *f* and is driven by a belt *g* from the same counter-shaft *d*, but may be driven in any other approved way. From this stock *e* the similar stock *e'* of the kinking-head is driven by the spur-wheels *h h'* and the shaft *i*, by which they are geared together for uniform speed of both in the same direction, but they may be geared in any other approved way. The feed-rolls *j j'* of both drawing and twisting heads are also geared with the shaft *i*, but with the differential spur-gears *k k'*, whereby the rolls *j* of the first head will deliver faster than the rolls *j'* of the second head will take up. The arrangement of gears for transmitting the drawing or feeding motion to the said rolls *j j'* is substantially the same as in ordinary heads, except that to adapt the feed-rolls for wide ranges of adjustment toward and from each other for producing kinked or coiled ropes of materially different variations in size we pivot them in bearings *l*, fitted in slots *m* of the housing-plates *o* curved to the radii of the centers *p* from which they are driven with adjusting-screws *q* and *s s* for shifting them, and instead of gearing the rolls together as they are commonly geared by spur-wheels for driving one by the other, which would not work well in such case, we provide independent bevel-wheels *t* on the opposite housing-plates *o*, mounted in the axes *p*, for getting the motion from the bevel-rims *u*, carried by the spurs *k k'*, and gear them with the rolls separately by the spur-wheels *w*, one of which being in the axes *p* and the other being adjustable in the line of the curved slots *m* enable the desired adjustments without altering the meshing of the teeth. We utilize one adjusting-screw *q* at each end of the rolls for shifting the bearings of both rolls and for a gage to insure their shifting alike by setting it radially to the axis *p* midway between the bearings of the two rolls and providing it with the bevel-collar *a'* and the push-rods *b'* connecting it with the bearings respectively, said push-rods being set in the angular relation of the bearings to the collar of the screw.

It will be seen that by reason of the two driving and twisting heads being rotated in the same direction the twist of the fibers effected by the first head is preserved, which

would not otherwise be the case, and through the effect of this twist and the delivery of the twisted rope from the first head faster than it is taken up by the second head the coils of kinks are produced. While it is better to have the two heads run at the same speed to preserve the twist imparted by the first head, it is not absolutely essential, because such variation as would not materially alter the twist would not be very detrimental.

The coiled ropes may be delivered from the second or kinking head into rotating cans as rovings for spinning are delivered from the roving-machines.

I claim—

1. In a fiber curling machine, the combination of two drawing and twisting heads placed in line and fronting each other means for rotating both in the same direction, rolls carried by said heads and means for driving the rolls receiving the fiber at a greater speed than the rolls of the other head, substantially as described.

2. In a fiber curling machine, the combination of two drawing and twisting heads provided with rolls, said heads being placed in line and fronting each other, means for gearing them together for uniform speed in the same direction, and means for causing the rolls of the head receiving the fibers to revolve at higher speed than the rolls of the other head substantially as described.

3. A drawing and twisting head provided with rolls mounted and adjustable in arcs of circles, driving wheels for said rolls located in the axis on which the rolls are adjustable, and geared with the respective rolls at their opposite ends respectively, said driving wheels having suitable means of actuating them substantially as described.

4. A drawing and twisting head provided with rolls mounted and adjustable in arcs of circles, and an adjusting screw and push rods at each end of the rolls adapted for adjusting both rolls in one direction by said screw, with opposing adjusting screws for each roll substantially as described.

Signed at Newark, in the county of Essex and State of New Jersey, this 20th day of June, A. D. 1894.

SAMUEL A. FLOWER.
WM. S. RHOADES.

Witnesses:
W. J. MORGAN,
D. F. O'MALLEY.