(No Model.) 2 Sheets—Sheet 1.

J. W. SHEPHERD, W. AYRTON & C. SIDDALL.

COP BUILDING MECHANISM FOR SPINNING MACHINES.

No. 343,498. Patented June 8, 1886.

FIG. 2.

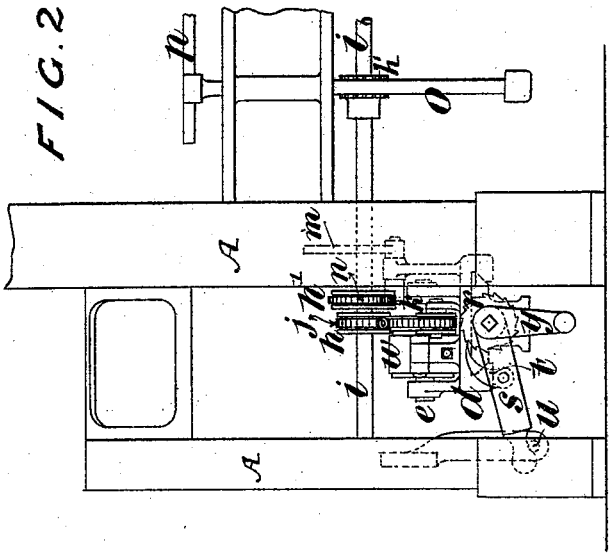


FIG. 5.

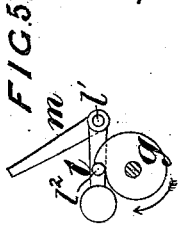


FIG. 4.

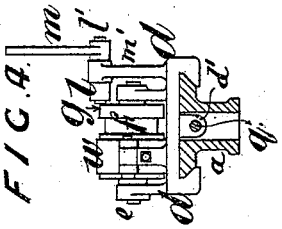


FIG. 8.

FIG. 1.

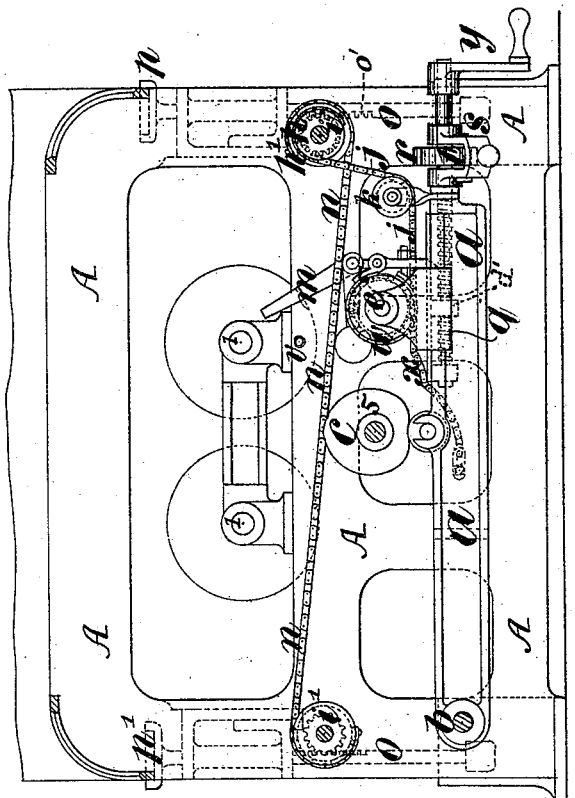
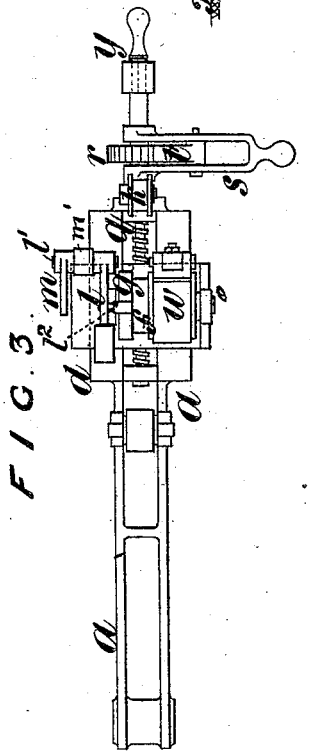


FIG. 3.



Witnesses

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(No Model.) 2 Sheets—Sheet 2.

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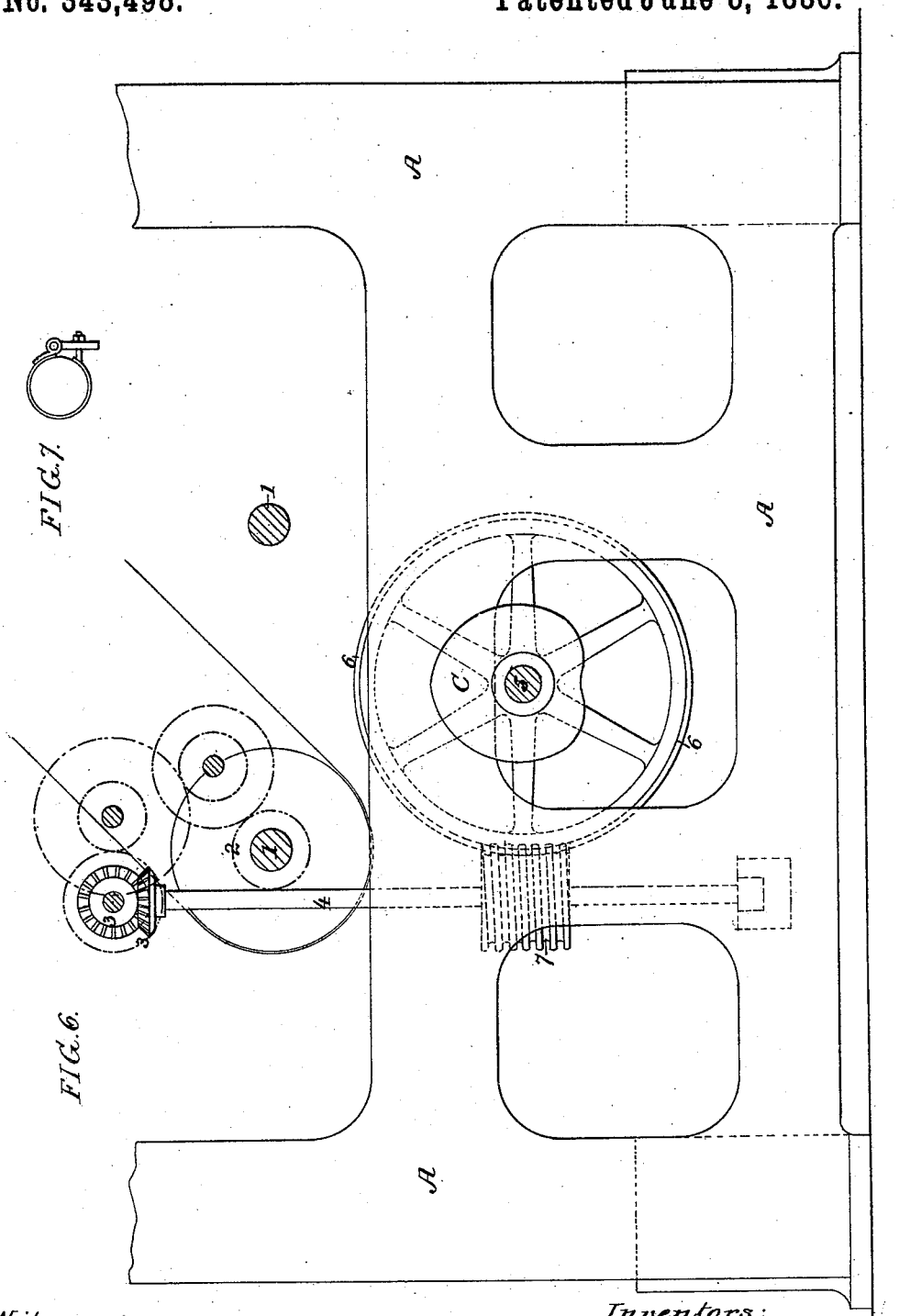

FIG. 7.

FIG. 6.

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UNITED STATES PATENT OFFICE.

JAMES W. SHEPHERD, WILLIAM AYRTON, AND CHARLES SIDDALL, OF MANCHESTER, COUNTY OF LANCASTER, ENGLAND.

COP-BUILDING MECHANISM FOR SPINNING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 343,498, dated June 8, 1886.

Application filed April 30, 1885. Serial No. 163,958. (No model.) Patented in England June 4, 1884, No. 8,560; in France April 24, 1885, No. 168,474, and in Belgium April 25, 1885, No. 68,639.

To all whom it may concern:

Be it known that we, JAMES WHALEY SHEPHERD, WILLIAM AYRTON, and CHARLES SIDDALL, subjects of the Queen of Great Britain and Ireland, and all residing at Manchester, county of Lancaster, England, engineers, have invented certain Improvements in Cop-Building Mechanism for Spinning-Machines, (for which we have obtained a patent in Great Britain, No. 8,560, dated June 4, 1884; in France, No. 168,474, April 24, 1885, and in Belgium, No. 68,639, April 25, 1885,) of which the following is a specification.

Our invention relates to the construction of ring spinning and doubling frames; and it consists of certain improvements in the mechanism for effecting the copping motion of the lifting-rail, as fully described and claimed hereinafter.

In the accompanying drawings, Figure 1 is a sectional elevation of one end of part of a ring-spinning frame. Fig. 2 is a front elevation of the same end of the frame. Fig. 3 is a plan view of the lever and its attachments for imparting motion to the copping-rail. Fig. 4 is a transverse section of the same. Fig. 5 is a detached view of part of the device. Fig. 6, Sheet 2, is a view drawn to a larger scale, illustrating the gearing which may be employed. Fig. 7 is a view of a portion of the device detached, and Fig. 8 is a detached view of the connected ends of the chain.

A represents the frame of the machine, in bearings in which is mounted the cam-shaft 5, carrying the heart-shaped cam C, for imparting motion to the devices for operating the copping-rails *p p'* on opposite sides of the machine. These copping-rails are carried by vertical rods *o*, which are provided with racks *o'*, Figs. 1 and 2, gearing into pinions *h'* on the copping-shafts *i*. These shafts receive an oscillating or rocking motion, as hereinafter set forth.

Motion may be imparted to the cam-shaft 5 by any suitable mechanism, and in Fig. 6 we have illustrated a form of gearing which may be used for this purpose. 1 1 are the main shafts, and one of these shafts carries a pinion, 2, which, through the medium of gear-wheels (indicated by dotted lines in Fig. 6) and bevel-gear 3, imparts a rotary motion to a vertical shaft, 4. This shaft carries a worm, 7, engaging with a worm-wheel, 6, mounted on the cam-shaft 5. The heart-cam C acts on a lever, *a*, which is pivoted on a fulcrum, *b*, on the frame of the machine. This lever is provided toward its outer end with planed sides for the reception of a carriage, *d*, which carries a cross-shaft, *e*. Upon this shaft is fixed a pulley, *f*, and a stop-cam, *g*, the latter being illustrated separately in Fig. 5. The pulley *f* is connected with a pulley, *h*, on the copping-shaft *i* by means of a chain, *j*, which is fastened at one end to the pulley *f*, and at the other end to the pulley *h*, and which passes beneath a guide-pulley, *k*, carried on the outer end of the lever *a*, so that as the lever is caused by the cam C to vibrate on its fulcrum *h* the copping-shaft *i* is caused to rock to and fro.

In order to prevent the pulley from being turned by the strain upon the chain *j*, we provide the locking device illustrated in Fig. 5. A weighted lever, *l*, carried by a shaft, *l'*, which is mounted in a bracket, *m'*, on the carriage *d*, is provided with a pin or bowl, *l''*. This pin rests on the periphery of the stop-cam *g*, and under normal conditions engages with a projecting portion of this cam, as illustrated in Fig. 5, to thereby prevent the rotation of the pulley *f* under the strain of the pull on the chain *j*. The shaft *l'*, which carries the weighted arm L, has fixed to its opposite end a projecting arm, *m*, which, when the carriage *d* is moved on the lever *a* under the conditions hereinafter described, is adapted to come into contact with a pin, *v*, Fig. 1, on the fixed frame. The copping-shaft *i'*, at the opposite side of the frame from the shaft *i*, is connected to the latter by means of a chain, *n*, which at one end passes around and is connected to a pulley, *h'*, on the shaft *i*, and at the other end it passes around and is connected to a similar pulley on the shaft *i'*, as illustrated in Fig. 1. By this means the rails *p p'* are caused to rise and fall in unison.

The building of the cops in winding is effected by the following devices: In suitable bearings in the lever *a* is mounted a longitudi-

nal screw-shaft, *q*, which is adapted to a threaded nut, *d'*, on the under side of the sliding carriage *d*, Figs. 1 and 4. To the outer end of this screw-shaft is fixed a ratchet-wheel, *r*, with which is adapted to engage a pawl, *t*, on a forked lever, *s*, which is carried by but free to vibrate on the screw-shaft. The outer end of this forked lever is adapted to rest upon a fixed support, *u*, as shown in Fig. 2, so that as the outer end of this lever rises and falls under the action of the cam C the forked lever *s* will vibrate on the shaft *q*, and as the lever descends the pawl *t*, engaging with the teeth of the ratchet-wheel *r*, will cause the latter, and with it the shaft *q*, to turn to the extent of one or more teeth at each descent of the rails. The screw-shaft *q*, as shown in the drawings, is provided with a left-hand screw-thread, so that at each descent of the lever *a*, and consequent partial rotary motion of the screw-shaft, the carriage *d* will be caused to slide away from the pulley *k*. and consequently, through the medium of the chain *j*, to lift the rails *p p'* a little higher. As the range of reciprocating motion of the rails remains the same, the cops will be built up in the usual manner. When the building up of the cops has been completed, the carriage *d* has receded sufficiently far to bring the upper end of the arm *m* into contact with the fixed stop *u*, so that the lever *l* will be thereby raised to lift the retaining-pin *l²* from the projecting portion of the cam *g*, and the pulley *f* will be thereupon free to turn under the weight of the copping-rails and devices carried thereby. A friction-brake, *w*, of any suitable construction—such as the strap form illustrated in Figs. 1, 2, 3, 4, and 7—may be provided to prevent the ring-rails from falling too rapidly. A second chain, *x*, Figs. 1 and 8, is attached at one end to the pulley *f*, and at the other end is adjustably connected at a suitable point to the lever *a*, leaving, under normal conditions, a slight slackness in the chain. In the detached view, Fig. 8, the chain *j* is shown in black, and the chain *x* cross-hatched. When the pulley *f* is revolved by the descent of the copping-rails, the slack of the chain *x* is taken up. To reset the parts for the next operation of the frame, the pawl *t* is thrown out of gear with the ratchet on the shaft *q*, and the latter is turned by means of a handle, *y*, so as to run the carriage *d* back toward the pulley *k*. This movement will cause the chain *x* to turn back the pulley *f* in the direction indicated by the arrows, Figs. 5 and 8, until the carriage has been brought back to its starting-point. The pulley *f* will then have been turned back to the position indicated in the said views, and the pin or bowl *l²* on the lever *l* will have dropped back into engagement with the projecting portion of the cam *g*, to retain the latter and the lever *f*.

We claim as our invention—

1. The combination, substantially as set forth, of the frame, the lever *a*, and means, substantially as described, for vibrating the same, the sliding carriage *d*, mounted on the lever, and means, substantially as set forth, for sliding the carriage, with the pulley *f*, mounted on the carriage, a copping-shaft carrying a pulley, *h*, connecting-chain *j*, a copping-rail, and intermediate devices, a chain, *x*, connecting the pulley *f* with the said lever, and devices, substantially as specified, for retaining the said pulley *f* from rotating and for releasing it.

2. The combination, substantially as specified, of the frame, a lever, *a*, and means, substantially as described, for vibrating the same, the sliding carriage *d*, mounted on the lever, and devices, substantially as set forth, for sliding the carriage, with a pulley, *f*, on the carriage, copping-shaft, connecting chain, copping-rail, and devices intermediate of the rail and shaft, a cam, *g*, and locking-lever *l*, having an arm, *m*, and a stop, *v*, on the frame.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

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WM. AYRTON.
CHARLES SIDDALL.

Witnesses:
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