(No Model.) 2 Sheets—Sheet 1.

A. H. DIXON & W. J. GRADWELL.

STOP MOTION MECHANISM FOR DOUBLING FRAMES, &c.

No. 358,257. Patented Feb. 22, 1887.

FIG. 2

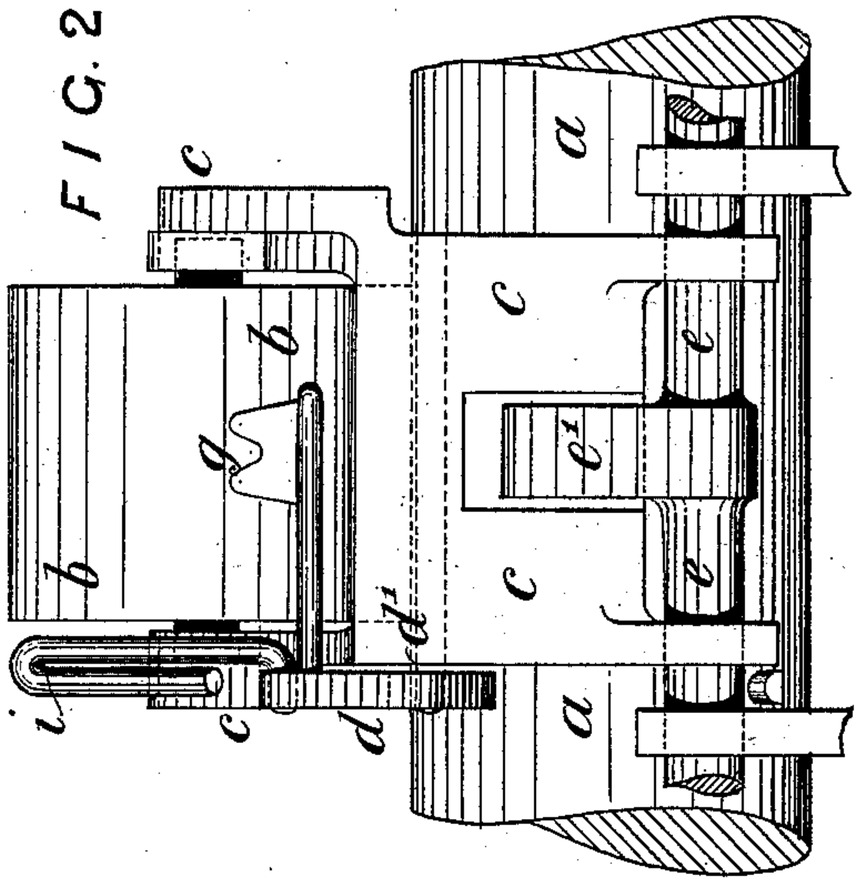


FIG 4

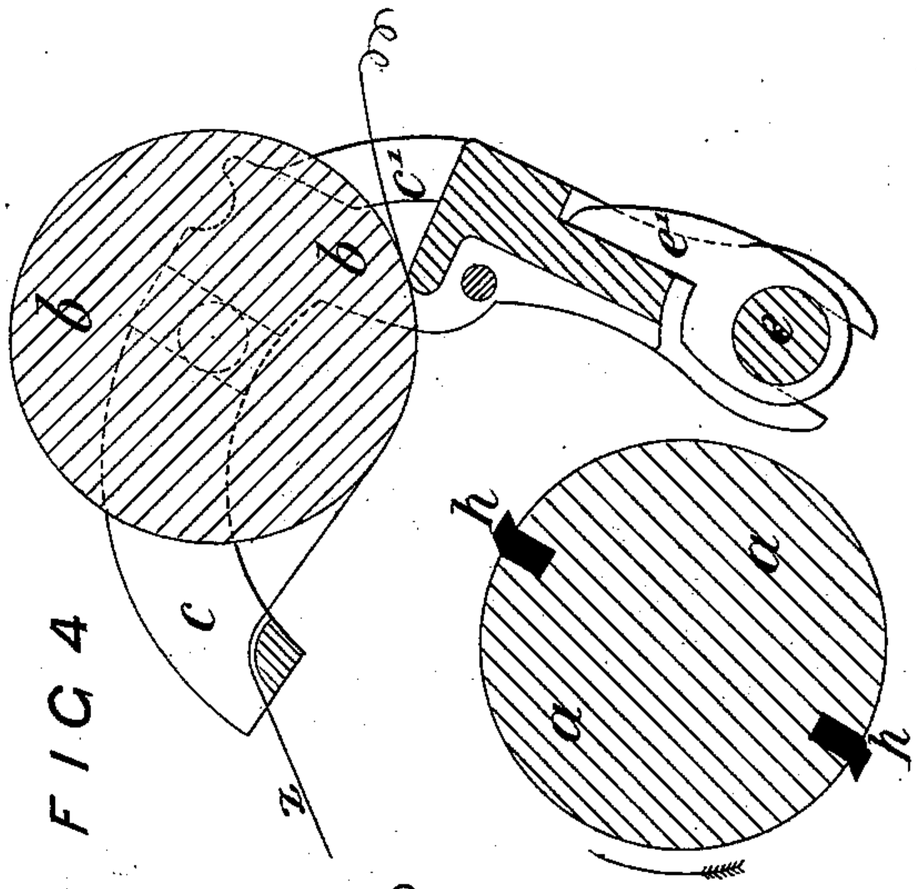


FIG. 1.

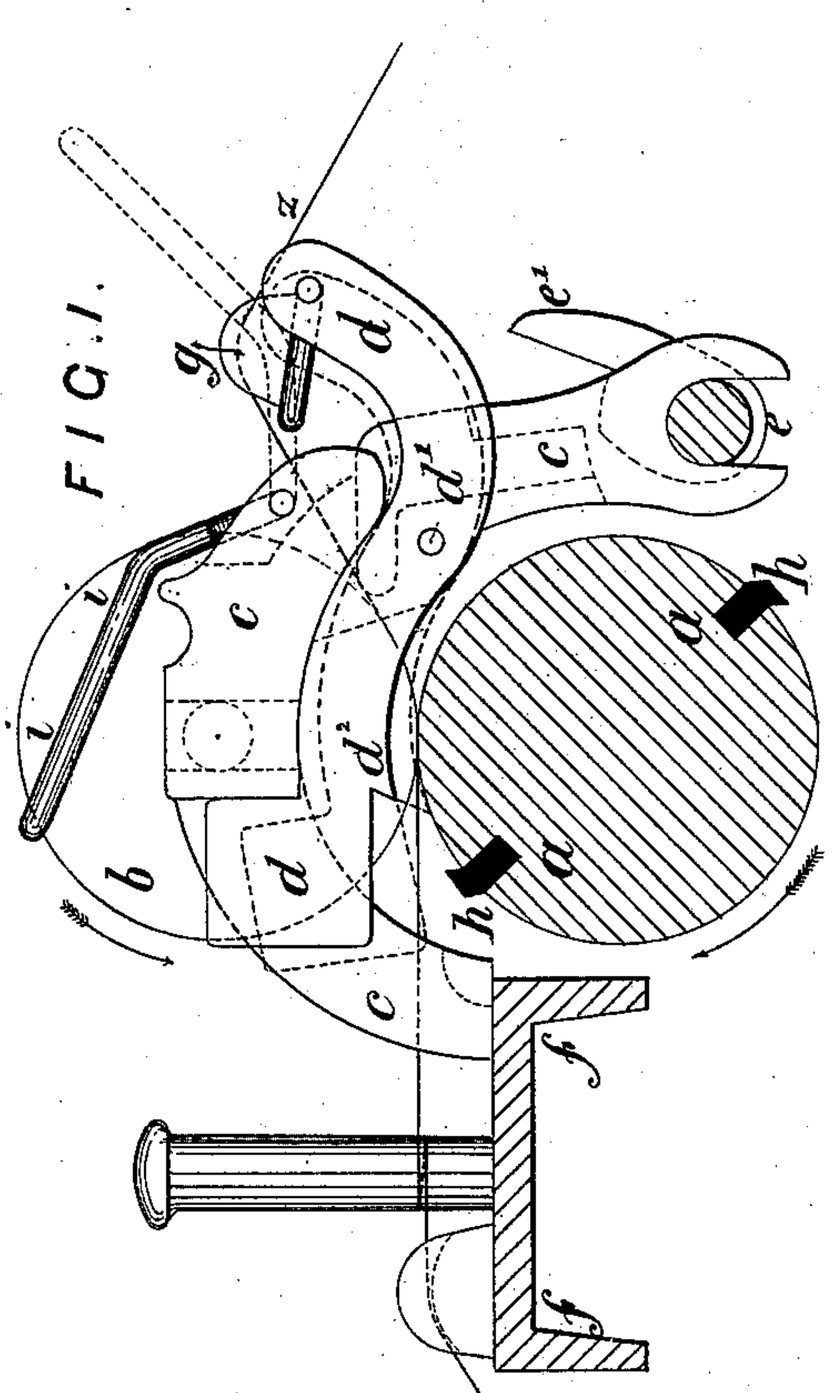
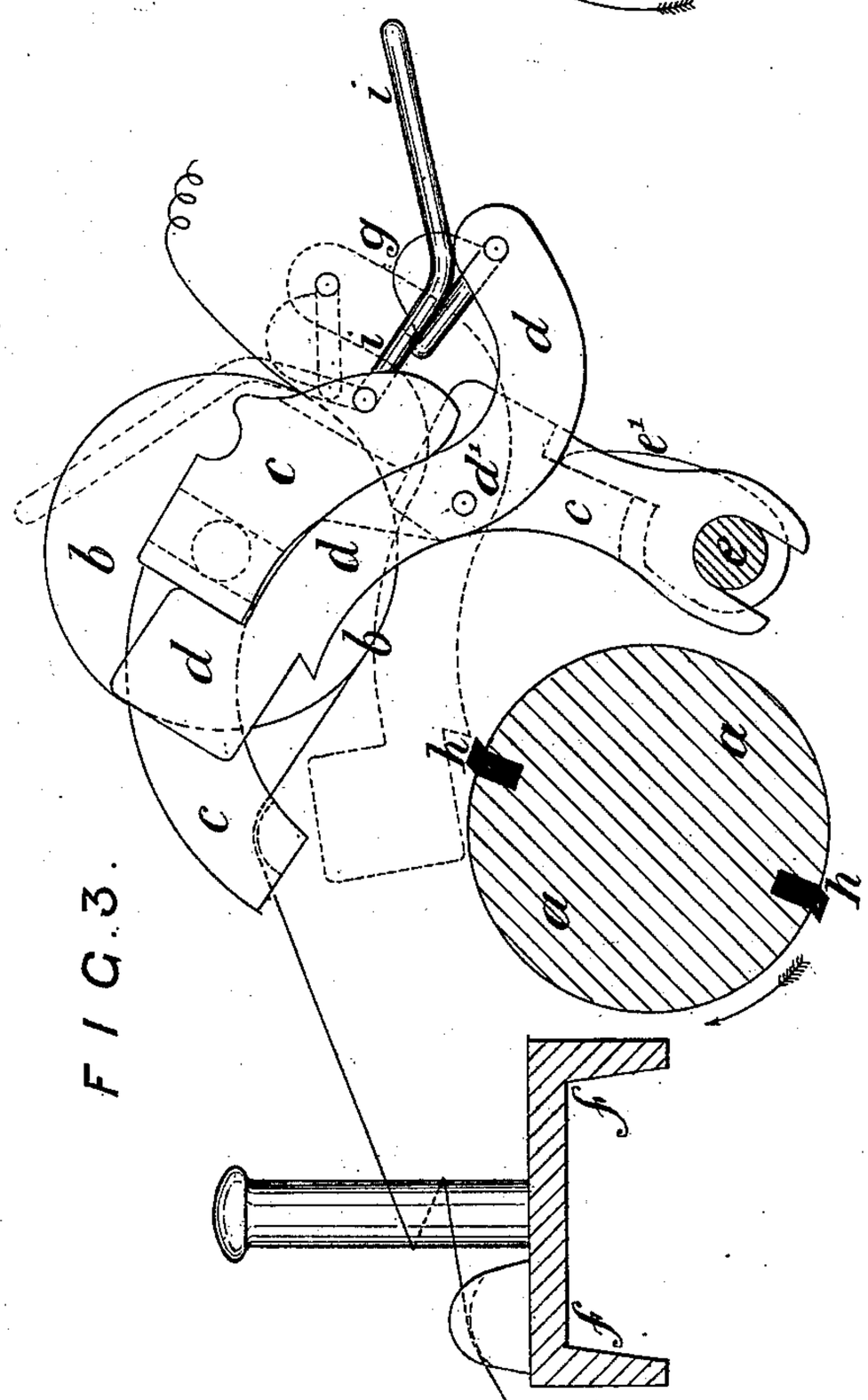


FIG. 3.



Witnesses:
Hamilton O. Turner.
William F. Davis

Inventors:
A. H. Dixon & Wm J. Gradwell
by their Attorneys
Howson & Sons

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FIG 6

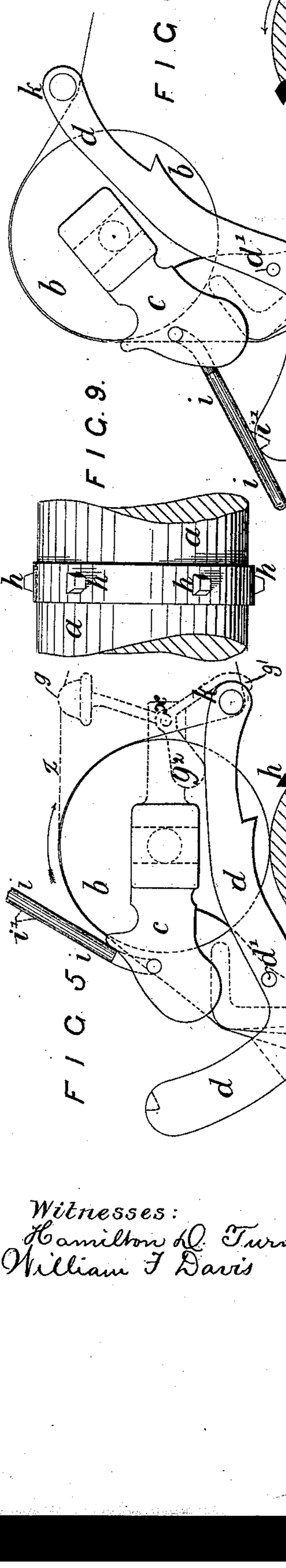

FIG. 8.

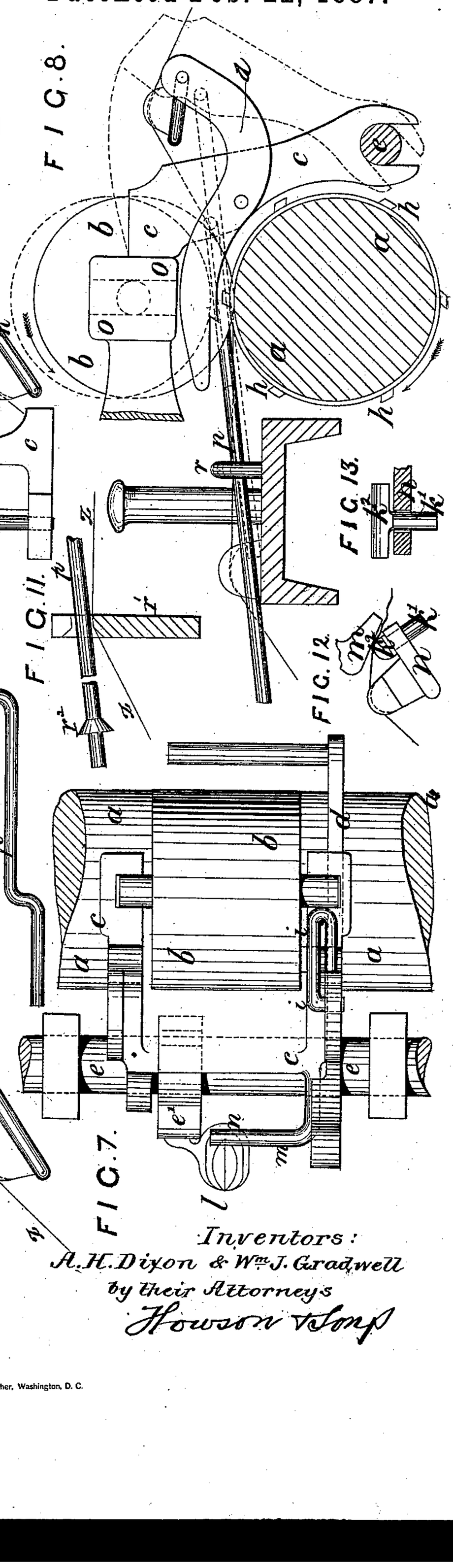

FIG. 9.

FIG. 10.

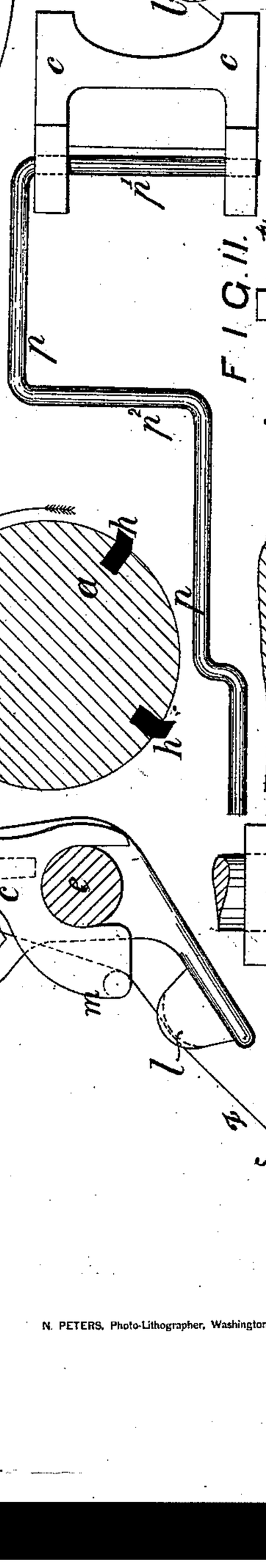

FIG. 11.

FIG. 13.

FIG. 12.

FIG 5.

FIG. 7.

Witnesses:
Hamilton Q. Turner.
William F Davis

Inventors:
A. H. Dixon & Wm J. Gradwell
by their Attorneys
Howson & Sons

UNITED STATES PATENT OFFICE.

ALFRED HERBERT DIXON AND WILLIAM JAMES GRADWELL, OF MANCHESTER, COUNTY OF LANCASTER, ENGLAND.

STOP-MOTION MECHANISM FOR DOUBLING-FRAMES, &c.

SPECIFICATION forming part of Letters Patent No. 358,257, dated February 22, 1887.

Application filed April 14, 1886. Serial No. 198,819. (No model.) Patented in England September 4, 1885, No. 10,466.

To all whom it may concern:

Be it known that we, ALFRED HERBERT DIXON and WILLIAM JAMES GRADWELL, subjects of the Queen of Great Britain and Ireland, and residing at Manchester, county of Lancaster, England, have invented certain Improvements in Stop-Motion Mechanisms for Doubling and Twisting Frames, (for which we obtained a patent in Great Britain, No. 10,466, dated September 4, 1885,) of which the following is a specification.

Our invention relates to means for arresting the rotation of the top roller in the frames used in the doubling and twisting of yarn at the times when the yarn breaks, in order to prevent the waste which arises from the yarn coiling upon the said roller, as is well understood, or from becoming attached to adjacent yarns, so as to form three or four fold or lashed ends.

Figure 1, Sheet 1, represents a sectional side view, and Fig. 2 a front view, of our apparatus with the parts in the normal positions which they retain so long as the yarn represented by *z* does not break. Fig. 3 corresponds with Fig. 1, with the exception that the parts are represented in the positions assumed on the breakage of the yarn. Fig. 4 is a sectional view of the rollers, rod, and a swing-frame, which appear in Fig. 3.

In the said figures, *a* is the bottom roller; *b*, the top roller. *c* is the aforesaid swing-frame, and *d* is the stop-catch lever. The said swing-frame is forked at its lower end to rest upon a rod, *e*, which extends in front of the bottom roller from one bearing-standard to another, and is provided with a back rest, *e'*, which supports the swing-frame when it is thrown over on the breakage of the yarn.

During the regular working the swing-frame is supported by reason of its front end resting on the guide-rail *f*. The swing-frame is formed with bearing-grooves to receive the journals of the top roller, as in the case of the ordinary cap-bar.

The stop-catch lever *d* is pivoted to the swing-frame at *d'* in such a manner that the said lever is free to turn upon its pivot with a slight degree of friction. One end of this stop-catch lever is provided with a projecting finger, which carries a glass yarn-guide, *g*, and the said lever is so balanced upon its pivots as that the end which carries this yarn-guide has a tendency to rise. The yarn on its way from the rollers to the spindle passes over this yarn-guide, and the tension of the yarn is sufficient to overcome the said tendency of the yarn-guide to rise, so that during the regular working the guide is held down. The stop-catch lever is formed with a tooth or catch, d^2, and the bottom roller is provided with projecting studs, teeth, or pins *h h*, or it might be depressions. So long as the yarn-guide *g* is held down by the yarn the tooth d^2 clears the studs *h* as they are carried past it by the revolution of the roller. An arm, *i*, is hinged by its lower end to the swing-frame. By preference we make this arm of wire, and bend one end so that it will enter and turn in a hole drilled in the swing-frame. We may, however, make this arm of any suitable material or shape. When this arm is turned over from its position indicated by the full lines, Fig. 1, it rests upon the stop-catch lever, as indicated by the dotted lines, and its weight is sufficient to keep down the thread-guide *g* in the absence of the yarn.

The action of the parts is as follows: So long as the yarn *z* continues intact the parts remain in the position as indicated in Fig. 1. On the breaking of the yarn the stop-catch lever moves into the position indicated by the dotted lines in Fig. 1, whereby the tooth d^2 is lowered, so that one of the studs *h* will strike the said tooth, and the swing-frame will thereby be pushed over into the position shown in Figs. 3 and 4. When the swing-frame has been so pushed over, one of the studs *h* strikes the extreme end of the stop-catch lever, and by raising the same lifts the tooth d^2 clear, supposing the said lever to be left in the position indicated by the dotted lines in Fig. 3; but in practice the impetus given to the swing-frame when it is pushed over causes the arm *i* to swing outward and to fall upon the outer arm of the stop-catch lever, which is thereby sustained clear of the bottom roller in the position indicated by the full lines in Fig. 3.

When the swing-frame is pushed over, it lifts the top roller clear away from the bottom

roller, but the journals of the latter drop in their bearing-recesses until the roller is sustained by a cross-bar, c', which forms part of the swing-frame, the rotation of the roller being at once arrested, and as the yarn passes between the roller and this cross-bar the yarn is nipped and held between the roller and the bar, as indicated in Fig. 4, so that it is prevented from falling upon the bottom roller and wrapping around the same. By being thus nipped the broken yarn end is also prevented from becoming attached to the yarn on either side, whereby the formation of three or four fold or lashed ends is prevented, and also by the yarn being kept lapped around the top roller and the end retained in position for the operator to piece up readily there is less loss of time than in ordinary cases of breakage. When the swing-frame is restored to its normal position at the time of piecing, the arm i is permitted to rest upon the stop-catch lever, so as to keep the tooth d^2 clear of the studs until the tension of the yarn is sufficient for the purpose, when the said arm is lifted up, so that it rests upon the swing-frame, as in Fig. 1.

Referring to Sheet 2 of the drawings, Figs. 5, 6, and 7 illustrate a modification adapted for cases wherein the bottom roller runs in a direction contrary to the example shown on Sheet 1. In this instance the tooth on the stop-catch lever is kept clear of the studs on the bottom roller by the yarn passing below a finger, k, upon the said lever, and the rod e is fixed behind the bottom roller, instead of in front of the same. The yarn on its way to the roller passes over a fixed guide, l, and below a finger, m, upon the lower part of the swing-frame. When the swing-frame is pushed over on the breakage of the yarn, the parts assume the positions indicated in Fig. 6, and the yarn is nipped between the finger m and a fixed part, n, which projects from the rod e and carries the guide l.

To obviate the difficulties in piecing which exist when the yarn is led under the finger k, we may lead the yarn over a guide, g, as shown in dotted lines at Fig. 5, the guide g being pivoted at x on an extension of the swing-frame c and weighted at g^2. When the yarn breaks, the guide falls inward and the tail g' is moved clear of the catch d, which drops or is pushed into contact with one of the studs h, whereby the swing-frame c is raised. Where it is found desirable to lock the catch d clear of the studs h, so as to keep the catch d uplifted when the spring-frame is replaced, we may form a stop, i', as shown in dotted lines in Figs. 5 and 6, on the arm i, the said stop dropping into a notch in the catch d. This locking arrangement will be found useful to prevent premature "knocking off" in cases where the yarn becomes slack when the frame is stopped.

A modification of our stop-motion, which we use in cases wherein the ordinary cap-bar is retained, is illustrated by Figs. 8 and 10. In this example the top roller is kept in position by the cap-bar o, and the upper end of the swing-frame rests against this cap-bar. Hinged to the swing-frame is a lifting-bar, p, which is represented in plan in Fig. 10, and in the example is made of wire, and is cranked so that one part, p', rests in holes drilled in the swing-frame, and another part, p^2, extends parallel with the part p' and with the axis of the rollers. The free or tail end of the bar rests upon the rail f, and is formed with a bend or elbow, which comes in contact with a stop, r, when the swing-frame is pushed over, and thereby limits the movement of the swing-frame. When the yarn breaks, the swing-frame is thrown over, as in the examples already described, and the bar p is thereby drawn forward, so that the part p^2 comes between the two rollers and raises the top roller, as indicated in Fig. 8. The rotation of the top roller is thus at once arrested, the bar p acting as a brake, and at the same time the yarn is nipped between the roller and the bar. This bar p thus performs substantially the same function in raising, arresting, and supporting the top roll as does the bar c', Fig. 4, in the construction above described.

Fig. 11 illustrates an alternative method of limiting the swinging-over movement of the swing-frame and at the same time of nipping the yarn. In this construction the yarn is led through a notched plate, r', through which also passes the rod p, provided with an enlargement, r^2, in such a position that when the swing-frame is thrown back on the breaking of a strand the enlargement r^2 will come into contact with the plate r, and at the same time grip and hold the yarn against the plate.

In any of the examples there may be only one stud or tooth on the bottom roller, or any desired number other than the indication, and recessed teeth may be formed in the bottom roller in lieu of the projecting teeth. If desired, a toothed ring may be applied to the bottom roller, as indicated in Fig. 9.

In treating very fine counts of yarn we have sometimes found that unless the nipping-surfaces are so exactly finished as to be in contact at all points in their breadth such fine yarn is not always nipped and held, and is allowed to lap on the roller. To obviate this we make one of the nipping-surfaces—such, for example, as that shown in Figs. 5 and 6—so that it shall rock in its support and accommodate itself to the opposite nipping-surface. For example, in Figs. 12 and 13 a nipping-block, k^2, is formed with a rounded back, and has a shank, k', which loosely enters a hole in the part n, the looseness of its fit allowing it to yield slightly to one side or to the other. When the swing-frame is thrown up, the part m comes into contact with the said rocking nipping-block k^2, which yields to one side or the other, so as to obtain equal contact throughout their entire length, so that at whatever point the yarn may be it will be nipped and held. It will be evident that such a rocking contact-surface might be applied to the swing-frame instead of to the part n.

By providing the lower roller with stop projections, and combining therewith the swing-frame with its pivoted catch-lever and devices to support the upper roller clear of the lower one, when a yarn breaks I obtain a simple, compact, and effective stop-motion.

We claim as our invention—

1. The combination of the top roller and lower roller, the latter having projections on its periphery, with a swing-frame carrying a pivoted catch-lever adapted to come into contact with the projections on the lower roller when a yarn breaks, and devices, substantially as set forth, whereby the upper roller is supported clear of the lower roller, all substantially as described.

2. The combination of the top and lower rollers, the latter having projections on its periphery, with a swing-frame in which the top roller is mounted, a pivoted catch-lever carried by the swing-frame and adapted to come into contact with the projections on the lower roller when the yarn breaks, and thereby move the swing-frame over with the upper roller clear of the lower one, all substantially as described.

3. The combination of the top and bottom rollers, the latter having projections on its periphery, with a swing-frame, in which the top roller is mounted, a pivoted catch-lever carried by the swing-frame, and a pivoted arm, *i*, on the swing-frame, to act as a counter-weight, all substantially as specified.

4. The combination of the top and bottom rollers, the latter having projections on its periphery, with a swing-frame, in which the top roller is mounted, a pivoted catch-lever carried by the swing-frame, and a pivoted arm, *i*, carrying a stop, *i'*, to engage with the said catch-lever, substantially as and for the purpose described.

5. The combination of the upper and lower rollers, the latter having projections on its periphery, with a swing-frame, *e*, carrying the upper roller, a catch-lever pivoted to the swing-frame, and a cross-bar, *c'*, on the latter, with which the upper roller can come into contact on the breaking of a yarn to grip the broken end, all substantially as set forth.

6. A stop-motion provided with nipping-surfaces for the broken end, one of said nipping-surfaces consisting of a self-adjusting block, *k*, substantially as set forth.

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

ALFRED HERBERT DIXON.
WILLIAM JAMES GRADWELL.

Witnesses:
WM. SWINGS,
C. CHADWICK.