(No Model.) 4 Sheets—Sheet 1.

R. BROOKS & O. E. WAIT.

Machine for Scoring Bobbins.

No. 238,083. **Patented Feb. 22, 1881.**

Fig. 1.

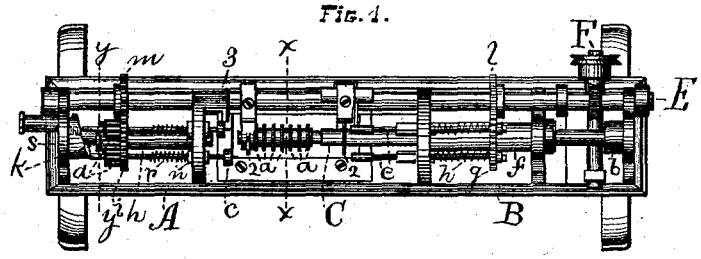


Fig. 2.

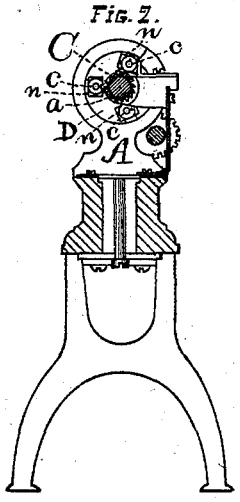
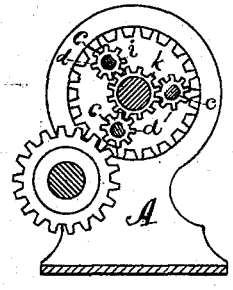


Fig. 3.



Witnesses.

John Edwards Jr.

Lyman S Burr

Inventor.

Reuben Brooks

Oscar E. Wait

By James Shepard Atty

(No Model.) 4 Sheets—Sheet 2.

R. BROOKS & O. E. WAIT.

Machine for Scoring Bobbins.

No. 238,083. Patented Feb. 22, 1881.

Fig. 1.

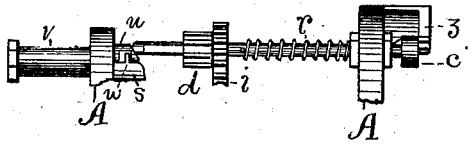


Fig. 6.

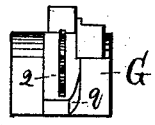


Fig. 5.

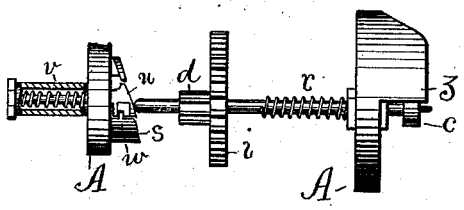


Fig. 7.

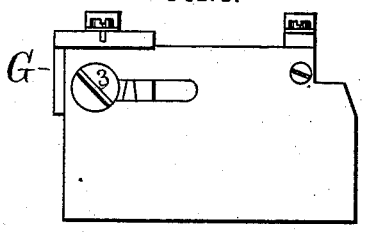


Fig. 10.

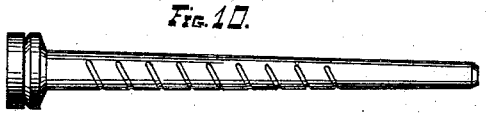


Fig. 8.

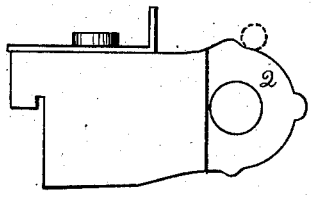
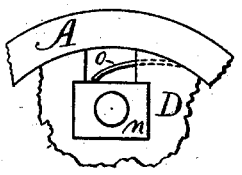


Fig. 9.



Witnesses.

John Edwards Jr.

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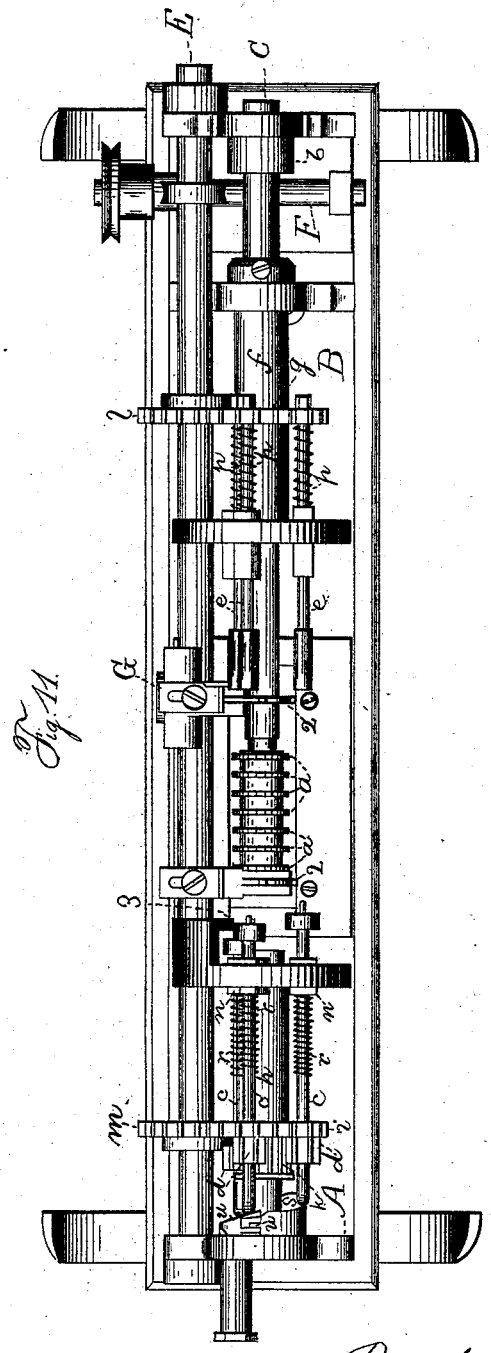
By James Shepard Atty.

(No Model.) 4 Sheets—Sheet 3.

R. BROOKS & O. E. WAIT.

Machine for Scoring Bobbins.

No. 238,083. Patented Feb. 22, 1881.



Witnesses.
John Edwards Jr.
C. H. Riggs

Inventors
Reuben Brooks
Oscar E. Wait
By James Shepard
Atty

(No Model.) 4 Sheets—Sheet 4.

R. BROOKS & O. E. WAIT.

Machine for Scoring Bobbins.

No. 238,083. **Patented Feb. 22, 1881.**

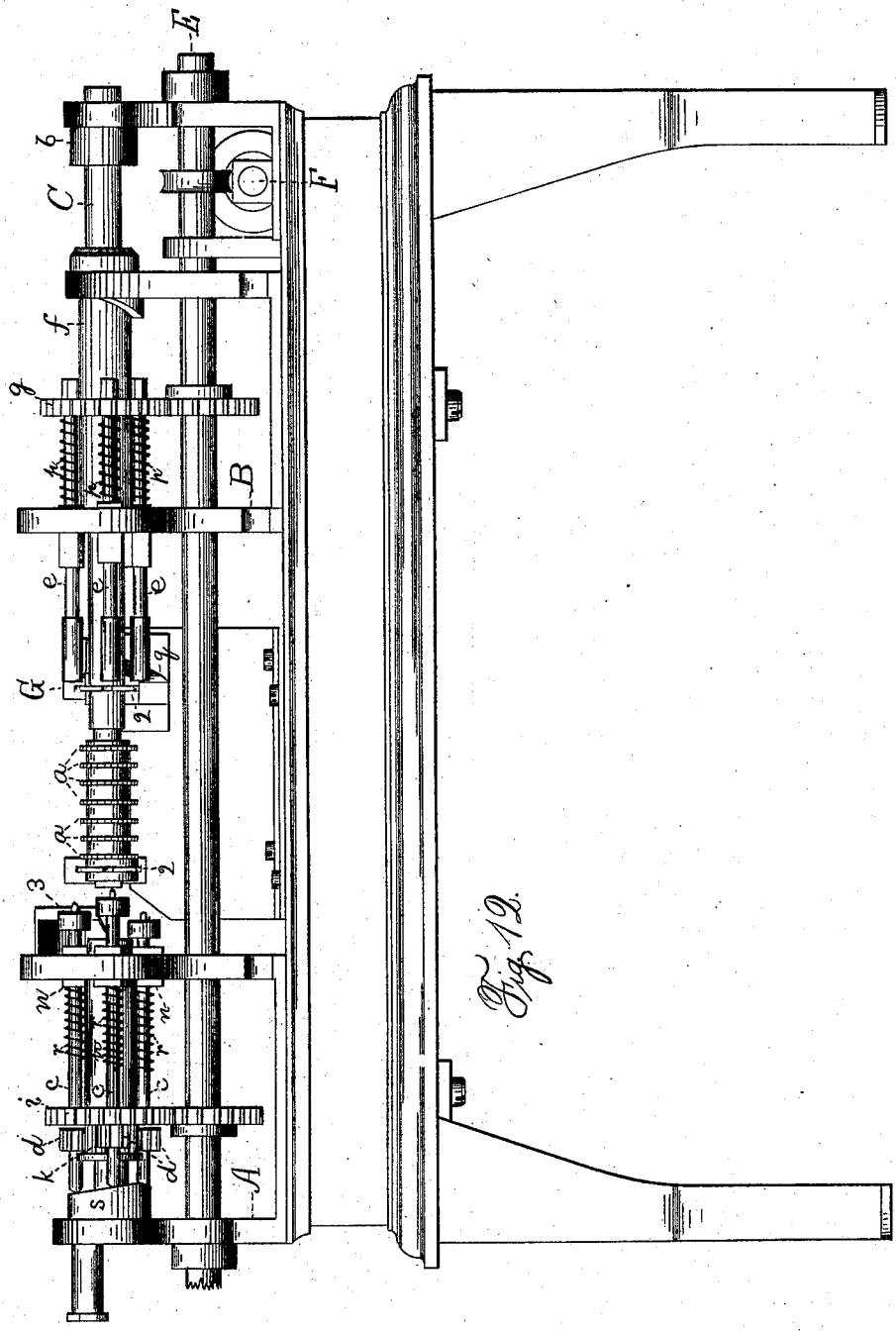


Fig. 12.

Witnesses.
John Edwards Jr.
C. H. Riggs

Inventors.
Reuben Brooks
Oscar E. Wait
By James Shepard Attys

UNITED STATES PATENT OFFICE.

REUBEN BROOKS, OF ROCKPORT, MASSACHUSETTS, AND OSCAR E. WAIT, OF WOONSOCKET, RHODE ISLAND, ASSIGNORS OF ONE-FOURTH TO P. W. GOULD, OF PITTSFIELD, MASSACHUSETTS.

MACHINE FOR SCORING BOBBINS.

SPECIFICATION forming part of Letters Patent No. 238,083, dated February 22, 1881.

Application filed May 3, 1880. (No model.)

To all whom it may concern:

Be it known that we, REUBEN BROOKS, of Rockport, in the county of Essex and State of Massachusetts, and OSCAR E. WAIT, of Woonsocket, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in a Machine for Scoring Bobbins, of which the following is a specification.

Our machine is designed for use in scoring the bobbins patented to Oscar E. Wait, above named, December 17, 1878, No. 210,977.

In the accompanying drawings, Figure 1 is a plan view of a machine for scoring bobbins which embodies our invention. Fig. 2 is a transverse vertical section of the same, taken on line *x x* of Fig. 1, as viewed from the right. Fig. 3 is a transverse vertical section of a part of said machine, taken on the line *y y* of Fig. 1, as viewed from the left. Fig. 4 is a detached view, showing the longitudinal movement of the live-spindles, the parts being viewed downward and a little obliquely from the front. Fig. 5 is a like view of the same viewed obliquely downward from the rear. Fig. 6 is a front elevation of certain cams for acting upon the small end of the bobbin and the dead-spindles. Fig. 7 is a rear elevation of the same parts together with the frame, to which said cams and others are secured. Fig. 8 is a side elevation, on an enlarged scale, of one of the cams or guides for acting upon the sides of the bobbin-barrel. Fig. 9 is an enlarged view of one of the spindle-bearings and part of the rotary head which carries the same. Fig. 10 is a side view of a bobbin as scored by our machine. Fig. 11 is a plan view of the machine upon a larger scale than Fig. 1, and Fig. 12 is a front elevation of the same.

The form of the machine very much resembles an ordinary lathe, and consists of a bed with head and tail blocks mounted thereon. We will designate A as the head-block because it carries the live-spindles, and B as the tail-block which carries the dead-spindles.

In the tail-block B there is a central spindle or shaft, C, which carries a series of revolving cutters, *a a*, on the end thereof and between the head and tail block. This shaft and its cutters are designed to be connected to any proper driving-pulley by means of a belt running over the pulley *b*. In both the head and the tail blocks there is a rotary head bearing spindles, those in the rotary head D of the head-block A being live-spindles, *c c c*, driven by planet-wheels *d d d*, and those in the head of the tail-block being dead-spindles *e e e*. The rotary head of the tail-block is mounted on a hollow shaft or hub, *f*, through which the spindle C passes, and the gear *g* is rigidly secured to said hub, so as to move with it and the rotary head. The head D is also carried on a hollow shaft or hub, *h*, to which the gear *i* is attached, said hub being mounted upon a stationary shaft in axial line with the spindle C. Upon this stationary shaft there is a stationary wheel, *k*, about which the planet-wheels *d d d* revolve, and into which they mesh.

Upon the rear of the machine, and extending from end to end, there is a shaft, E, which is driven slowly by means of a worm-gear connection with the transverse shaft F. This shaft E is provided with gears *l m*, which respectively mesh into and drive the gears *g i*. The spindles in both heads are arranged to move longitudinally, and at their confronting ends to move radially in the heads. They are supported at one end by the gear-wheels *g i*, through which they pass, and at the opposite ends by a radially-slotted disk or head D, only one of which is shown, and in each case the frame of the tail-block is bored out to form a bearing for the edge of the slotted disk or head, as shown in Figs. 2 and 9, the slotted disks in each head being alike. In the head D the spindles *c c c* pass through bearings or boxes *n*, which are forced inward toward the axis about which they revolve by a spring, *o*, Fig. 9. The portions of the spindles *e e e* which lie in the radial slots of the head are merely enlarged and squared, a like spring bearing upon said squared portion to force them in the same direction as the boxes *n* of the head D.

Springs *p* upon the spindles have a constant tendency to force the spindles endwise toward the head-block, and the stationary side cam, *q*, Figs. 6 and 12, forces them in the opposite direction against said spring. The inner ends of said spindles *e* are provided with a female center suitable to receive the small end of a bobbin-barrel.

The planet-wheels *d d d* are so fitted to the

spindles *c*, by means of a spline or its equivalent, that the spindles may move longitudinally in said wheels, while at the same time a rotary movement of said spindles with the wheels is necessitated. The heads of these spindles are provided with male centers adapted to fill and fit into the bore in the head end of the bobbin, and by the side of said male centers there are small spurs which enter the bobbin and cause it to rotate with said spindles.

Springs *r* on the spindles *c* have a constant tendency to force them toward the stationary cam *s*, which acts upon the tails of said spindles to force them toward the tail-block. A portion, *u*, of the face of said cam is made spring-actuated by being detached from the rest of this cam and mounted upon a sliding rod in the spring box *v*, which contains a spring, as shown in Fig. 5, said spring being strong enough to overcome the power of the springs *r*, and acting to force the spindles in the opposite direction. A stop, *w*, Figs. 4, 5, and 11, limits the motion of this spring-actuated portion *u*. A guard, *z*, on the head-block acts against a portion of the heads of the spindle *c* and prevents the spring-actuated portion from moving the spindles until they pass by said guard.

At each end of the series of cutters *a a* there are two stationary cams or guides, 2 2, one of which is shown in side elevation by Fig. 8. Its fellow cam is mounted upon the block G with the side cam, *q*, Fig. 6, and this block is held in position on its frame by a screw, 3, Fig. 7, which passes through a longitudinal slot, whereby said block and its cams may be adjusted to bobbins of different lengths.

A suitable hopper may, if desired, be placed over the cams 2 2, so as to deposit the bobbins automatically thereon, in which case the bobbins will be stacked one above the other and the bottom bobbin taken out successively as in taking similar articles from hoppers in other and ordinary machines. The bobbins are first prepared ready for scoring in any ordinary manner. They are held one at a time either by hand or in the bottom of a hopper with the respective ends of their barrels resting upon the upper side of the stationary cams or guides 2 2, and just a little back of the summit of the cutters, and with the head of the bobbin toward the head-block. The cutters are given a rapid rotary motion, and a slow motion is imparted to the shaft F, thereby causing the heads to revolve in such a direction as to bring the top of the heads to the front. The tail of the spindle, which first comes up in the rear, strikes the cam *s* and is moved forward until its front end is prevented from further movement by contact with the guard *z*. At this time the tail of the spindle is on the spring-actuated portion *u* of said cam, and as the cam cannot, by reason of the guard, move the spindle, the spindle moves the spring-actuated portion of the cam backward against its spring into the position represented in Fig. 4. Just about this time the head of the spindle disengages the guard *z*, and the spring-actuated portion of the cam springs forward, carrying the spindle with it into the position represented in Fig. 5. In making this sudden longitudinal movement the male center and spur of the spindle engage the bobbin previously placed in proper position in the predetermined path of said spindle. At or about the same time one of the spindles *e* of the tail block is liberated from the upper end of the side cam *q*, and under the action of spring *p* it also snaps suddenly toward the bobbin, to engage the small end of its barrel in the female center of said spindle, whereby both ends of the bobbin are grasped and centered. The springs *o* have a tendency to hold the sides of the bobbin-barrel against the cams or guides 2 2 as the bobbin is carried on with the heads. When the bobbin reaches the summit of the cutters the cams have raised it gradually, so as to clear said cutters until it rides over the first projection and falls on the upper and first concentric face or guide on the edge of the cam 2, (see Fig. 8,) in which the broken circle represents the position of the bobbin-barrel.

The size of the cams or guides 2 2 is such that when the bobbin-barrel rests upon the concentric faces the cutters will cut into the side of the barrel to the required depth. The heads pass on, carrying the bobbin around, and, by the mechanism before described, also rotating the bobbin on its own axis and moving it endwise, thereby scoring the bobbin not only around its barrel, but around it in a spiral direction, the pitch of the spiral being determined by the incline of the cam *s*. The middle forward projection between the two concentric faces of the cams again lifts the bobbin out of the reach of the cutters, thereby leaving the plain, unscored, longitudinal surface 4, Fig. 10; but upon passing said projection the cutters again act as before, after which a third projection disengages them. The tail end of the spindle *c* just about this time jumps the shoulder of the cam *s*, (which shoulder is upon the under side and not shown,) thereby suddenly withdrawing the spindle from the bobbin. At the same time the side cam, *q*, begins to act to withdraw the spindle *e*, so that the bobbin is released and falls from the machine. The relative size of the planet-wheels and gear which rotate the spindles *c c c* upon their own axis is such as to impart to the bobbin about one revolution on its own axis in making that part of a revolution about the cutters that is required to carry the bobbin over both the concentric faces and immediately connected projections of the cams 2 2. After the spindles drop the bobbin they go on upward and forward to take another bobbin, and proceed as before described. All of the spindles in each set operate in like manner.

From the foregoing it will be seen that our machine has the following leading characteristics, viz: The pitch of the scores in the bobbin-barrel is determined by the relative longitudinal movement of the bobbin and cutters. The alternate scored and longitudinal plane

surfaces of the bobbin are caused by the relative movement of the bobbin and cutters to and from each other under the action of springs and cams or guides having concentric faces, divided by projections or swells. There are other characteristics peculiar to our machine, but these which we have thus particularized might be embodied in a machine very different in form from ours, but in fact so as to contain much of the same mechanism, as for instance, a machine with only one pair of spindles, which may be moved longitudinally by means of cams and springs, the live-spindle rotating only upon its own axis, in which case the cam for imparting this endwise motion would rotate with the live-spindle and act against a stationary pin. The series of cutters would be placed on a spring-actuated and swinging frame by the side of said spindles, and the revolving cutters moved to and from the bobbin by an arm acted upon by a cam on the live spindle, said cam having the concentric faces with elevations between to produce the scored and unscored longitudinal surface on the bobbin-barrel, as hereinbefore described.

We are aware that various combinations of spindles, cutters, cams, and springs have heretofore been used, and also shown in prior patents, for cutting screw-threads, for making wooden shoes for turning articles of wood, and for various other purposes, none of which are claimed by us; but so far as we know we are the first to invent machinery of any kind for automatically scoring bobbin-barrels, and more especially we are the first to invent machinery for automatically scoring the same in which the cutter has an intermittent action, so as to leave a plain surface extending longitudinally over the bobbin-barrel, and with a scored surface upon either side of said plain surface; neither do we know of any prior machine which can possibly be used for said purpose without material modification.

We claim as our invention—

1. In a bobbin-machine the live and dead spindles, arranged in pairs, in combination with cams for moving one spindle of each pair longitudinally, driving mechanism for rotating the live-spindles upon their own axes, and cams for moving the inner ends of both spindles transversely to their axes, substantially as described, and for the purpose specified.

2. The combination of the pair of spindles for holding concentrically and slowly rotating the bobbin, the series or gang of cutters *a*, each of which is adapted to cut a groove or score by itself, and springs and cams so located and timed with reference to the axes of the bobbin and cutters, and mechanism which drives the cutters, as to impart the hereinbefore-described intermittent cutting action of the cutters by changing the distance between said axes during a partial revolution of the round bobbin-barrel, substantially as described, and for the purpose specified.

3. The combination of the series of revolving cutters, and the series of live and dead spindles concentrically mounted with reference to the axis of said cutters, and revolving about said axis and planetary wheels, or equivalent mechanism to rotate the bobbins held in said spindles upon their own axes, substantially as described, and for the purpose specified.

4. In a bobbin-machine, the rotary heads carrying live and dead spindles, the inner end of which spindles are fitted in radial slots in said heads, and adapted for reciprocating radially within said slots, substantially as described, and for the purpose specified.

5. In a bobbin-machine, the rotary heads carrying live and dead spindles, the inner ends of which spindles are fitted in radial slots in said heads, in combination with the cams 2 2 and springs *o*, substantially as described, and for the purpose specified.

6. In a bobbin-machine the series of live-spindles, in combination with the springs *r*, cam *s*, having a spring-actuated portion, *u*, and the guard *z*, substantially as described, and for the purpose specified.

7. The series of live-spindles and dead-spindles, actuated by suitable springs to move radially inward as they revolve about a common axis, in combination with the series of cutters and cams or guides 2 2, acting upon the respective ends of the bobbin-barrel, substantially as described, and for the purpose specified.

8. The combination of the series of revolving cutters, the series of live and dead spindles, concentrically mounted with reference to the axis of said cutters, suitable driving mechanism for slowly revolving said spindles around the cutters, and cams for imparting a reciprocating radial movement to the inner ends of said spindles, substantially as described, and for the purpose specified.

9. The combination of the series or gang of cutters *a*, each cutter of which is adapted for and designed to cut a groove or score by itself, the pair of spindles for holding concentrically and slowly rotating the bobbin, and the two sets of cams and springs, one of which is organized in the combination, substantially as described, so as to impart the hereinbefore-described intermittent cutting action of the cutters during a partial revolution of the round bobbin-barrel by changing the relative position of the axes of the cutters and bobbin, and the other set so organized in the combination, as hereinbefore described, to impart a reciprocating motion relative to the axes of the cutters and bobbin during each revolution of said bobbin, substantially as and for the purpose specified.

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OSCAR E. WAIT.

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CHAS. M. HOLMES.
Witnesses for Wait:
EDWIN ALDRICH,
EDWARD THURBER.