

M. O. STEERE.

SHUTTLE.

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Patented June 21, 1910.

2 SHEETS—SHEET 1.

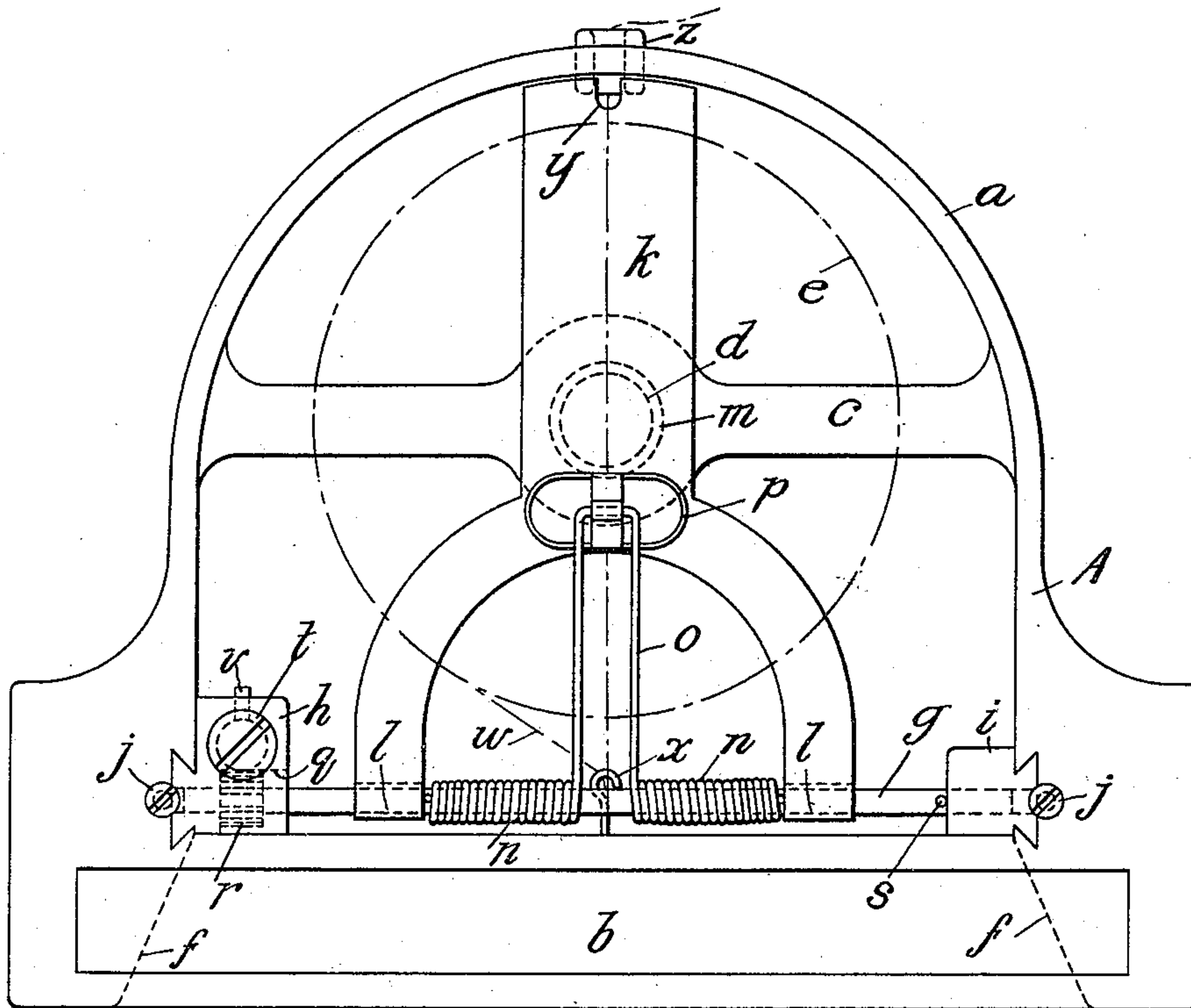


Fig. 1.

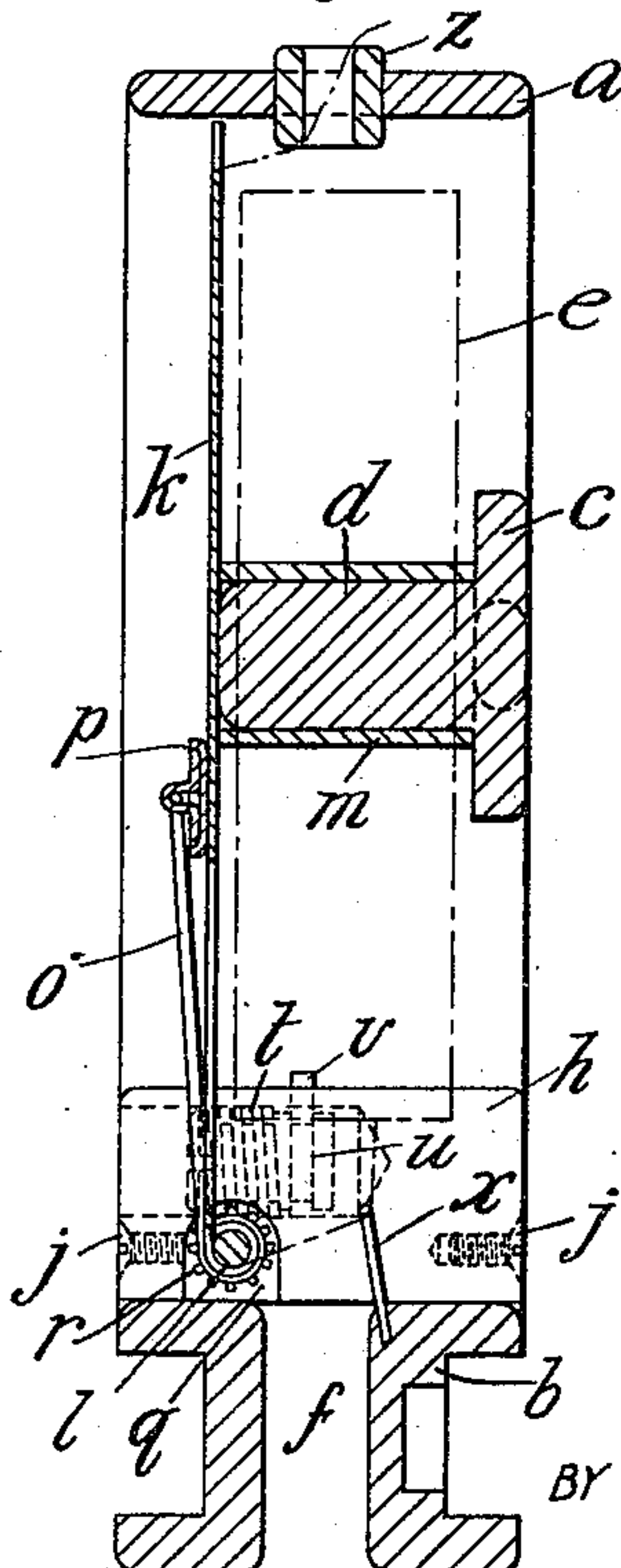


Fig. 2.

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# UNITED STATES PATENT OFFICE.

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## SHUTTLE.

961,817.

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*To all whom it may concern:*

Be it known that I, MERRILL O. STEERE, a citizen of the United States, residing at Pawtucket, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Shuttles, of which the following is a specification.

My invention relates to shuttles for narrow-ware looms and consists of improvements in the manner of arranging and holding the filling supply and in the method of applying tension to the yarn with means for adjusting the amount of tension as required.

The object of my improvement is to increase the capacity of the shuttle and to provide for a uniform tension of delivery of the yarn from start to finish of unwinding with a convenient means for adjusting the amount of tension.

The invention is described in the following specification, illustrated by the accompanying drawings, in which:

Figure 1 is a front elevation of my improved shuttle; Fig. 2, a vertical sectional view taken through the center of Fig. 1; Fig. 3, a front elevation of the shuttle showing a modification in the form of the tension device; Fig. 4, a vertical section taken through the center of Fig. 3; Figs. 5 and 6, views showing details of construction.

In the drawings A represents a form of shuttle adapted for use in narrow-ware looms, having a base-piece *b* fitted to slide in the race-way of the lay and an arch-piece *a* adapted to protect the bobbin from contact with the warp threads. A cross-tie *c* extends longitudinally across the back of the shuttle between the two sides of the arch *a* and from its center projects a stud or pintle *d* adapted to receive the bobbin *e*, represented by dot-and-dash lines. I have shown the shuttle as constructed in one piece and I prefer to make it of metal, such as aluminum, for instance, so that the arch and tie-piece may be made of relatively thin section, which, while providing sufficient strength will be relatively light. To further lighten the structure the base-piece *b* is cored out along its length, or otherwise formed with a cavity or clearance, as shown at *f* in Fig. 2.

As shown in the drawings my improved shuttle is especially designed for the use of disk or lozenge shaped cops or bobbins. A much greater quantity of yarn can be compacted in cops of this form than in the usual "quill" and, therefore, the shuttle will run

several times as long in the loom without stopping to replenish the supply of filling. I am aware that cops of this form have before been used in narrow-ware loom shuttles, but heretofore it has been found difficult to provide a uniform tension of delivery of the yarn with the usual tension devices employed.

My improved tension device consists of the following arrangement: Extending parallel with the base of the shuttle is a rod *g*, seated in bearings in the blocks *h* and *i*. The blocks *h* and *i* are preferably dovetailed into the sides of the shuttle and secured by the screws *j—j* etc. whose heads are countersunk in the face of the shuttle and in the blocks, slightly overlapping the latter. A bifurcated member *k* is hinged on the rod *g* with the extremities of its legs *l—l* bent to surround the rod. The member *k* normally rests against the end of the pintle *d* and bears against the end of the tube *m* on which the cop is wound to hold the latter in place in the shuttle. The member *k* can be swung back away from the pintle to allow the placing of the cop in the shuttle. Between the legs of the member *k* a wire spring *n* is coiled around the rod *g* with its ends driven through holes in the rod. The central portion of the spring is bent up in a U-shaped loop *o* at the end of which is pivoted a button *p* adapted to bear against the member *k*. The ends of the coils of the spring *u* serve to locate the member *k* longitudinally of the rod *g* and the pressure of the button *p* against the member, under action of the spring, keeps the member in place against the pintle *d*. The block *h* is formed with a counterbore or recess *q* and located in this recess is a pinion *r* secured to the rod *g*. The pinion *r* bottoms in the recess *q*, and with the pin *s* driven through the rod *g* adjacent the block *i*, serves to locate the rod in its bearings. The block *h* is bored transversely to receive a screw or worm *t* which engages the teeth of the pinion *r*. The inner end of the worm *t* is formed with a peripheral groove *u* and a pin *v* driven down through the top of the block *h* engages this groove to hold the worm in position while allowing it to be turned. The end of the worm *t* is slotted to receive a screw-driver so that it may be turned by hand. The turning of the worm *t* rotates the pinion *r* and, thereby, the rod *g*, so that the spring *n* may be wound up or unwound to adjust its



tension and vary the pressure of the button  $p$  against the member  $k$ . By locating the pinion  $r$  and worm  $t$  within the block  $h$  these parts are so inclosed as to prevent the thread or yarn from catching in them and, further, the housing serves to protect them from lint and dust which would be liable to interfere with their free operation. The thread or yarn  $w$  is led from the cop  $e$  down through an eye  $x$ , fastened in the base of the shuttle, thence under the rod  $g$  and up between the button  $p$  and the member  $k$ . The yarn  $w$  then leads through an opening  $y$  at the top of the member  $k$  and is threaded through the eye  $z$  at the center of the arch  $a$  of the shuttle. The button  $p$  acts to apply tension to the delivering yarn and this tension can be adjusted according to the variety of material being used and to suit the character of the fabric being woven therefrom by regulating the tension of the spring  $n$ .

In Figs. 3 and 4 is shown a modification of the tension device. With this form of arrangement the rod  $g$  has bearings in the sides of the shuttle with a counterbore 2 to receive the pinion  $r$ . The pinion  $r$  can be arranged to bottom in the counterbore and with the pin 3 will locate the rod longitudinally, or a pin 4 might be used at the opposite end of the rod to prevent its movement in one direction. The worm  $t$  has a bearing in the transverse bore 5 in the side of the shuttle, see Figs. 5 and 6, and, as here shown, is held in place by a threaded stud 6 formed with a "teat" 7 adapted to engage the groove  $u$  in the worm  $t$ . The screw stud 6 may be set down against the worm to act as a check to lock it from accidental turning after the rod has once been adjusted to regulate the tension on the yarn. As shown in the embodiment illustrated in Figs. 3 and 4 the member 8 is hinged on the rod  $g$  by its two legs 9 and 10 as in the previously described arrangement, but the action of the spring 12 is opposite to that of the spring  $n$  first described. Hinged on the rod  $g$  is a second member or plate 14 arranged to bear against the back of the member 8, see Fig. 4. The spring 12 is coiled about the rod  $g$  on the outside of the two legs 9 and 10 and formed with a V-shaped loop 13 which extends upward to bear on the back of the plate 14. The tendency of the spring 12 will be to swing the two members 8 and 14 outward, away from the pintle  $d$ . After the cop or bobbin  $e$  is placed in the shuttle the member 8 is carried up to its vertical position against the action of the spring 12 and is held in place by a spring clip or latch 15 secured on the under side of the arch of the shuttle. The latch 15 may be riveted at 16 and is formed to encircle the eye  $z$  with a loop or bend 16<sup>a</sup> at its end which projects through an opening 17 at the top of the member 8. The latch 15 snaps down

on to the member 8 to hold it in position, and to release the member 8, when applying a bobbin to the shuttle, it is only necessary to lift the latch with the finger and allow the member to swing outward under action of the spring 12. The thread  $w$  leads down from the bobbin  $e$  through the eye  $x$ , then through an opening 18 in the plate 14, thence upward between the plate 14 and member 8 where tension is applied to the thread by pressure of the plate 14. The thread is then led out through an opening 19 in the member 8 and back through the hole 20, then up through the eye  $z$ . This latter course of the thread provides for its clearing the periphery of the cop when drawing through the eye  $z$ .

With the usual arrangement in shuttles adapted for disk cops the tension is applied by means of a spring-pressed arm bearing on the periphery of the cop. With such an arrangement, as the cop decreases in diameter during the unwinding of the thread, the arm moves inward toward the axis of the cop and it will be evident that the force of the spring will be lessened as the arm moves inward. Owing to the considerable disparity between the full diameter of the cop and the diameter of its core the arm must have a long range of movement and the pressure of the spring will be varied proportionally, so that the tension on the yarn will be much greater at the beginning of the unwinding than at the finish. This variation in tension of delivery of the yarn during the weaving will cause irregularities in the fabric, narrowing the latter under increased tension and widening it under the influence of decreased tension. With my improved arrangement the yarn delivers freely by the unrolling of the cop and the applied tension remains uniform from start to finish of delivery. Further, the tension may be adjusted to the requirements of the weaving with the greatest ease and despatch and, once adjusted, the tension cannot be disturbed accidentally by shock or jar or in handling the shuttle while replenishing the filling supply.

It will be evident that further modifications might be made in the structure and arrangements of the parts of my device without departing from the scope of my invention.

Therefore, without limiting myself to the exact construction shown and described, what I claim is:

1. In a shuttle for disk-shaped cops, the combination with a base-piece and an arch surmounting the same, of means on which to pivot the cop, a hinged member adapted to hold the cop in place, a second member adapted to bear against the first member to apply tension on the yarn, guiding means to lead the yarn between the members, and



a spring to press the second member against the first member.

2. In a shuttle for disk-shaped cops, the combination with a base-piece and an arch surmounting the same, of a pintle on which to pivot the cop, a hinged member adapted to bear against the end of the pintle to hold the cop in place, a member adapted to bear against the hinged member to apply tension on the yarn, guiding means to lead the yarn between the members, a spring to press the second member against the hinged member, and means to adjust the tension of the spring.

3. In a shuttle for disk-shaped cops, the combination with means to support the cop, of a hinged member adapted to hold the cop in position, a member adapted to bear against the hinged member to apply tension on the yarn, guiding means to lead the yarn between the members, a rod rotatable in bearings in the shuttle, a spring coiled around the rod and formed with an extension to press the second member against the hinged member, and means to rotate the rod to adjust the tension of the spring.

4. In a shuttle, the combination with means for holding the cop, of a tension device comprising a member adapted to bear against said holding means, a guide to lead the thread between said member and the holding means, a rotatable rod, a spring coiled around the rod with its ends secured thereto and formed with an extension adapted to apply pressure to the tension member, a pinion fast on the rod, and a worm engaging the pinion to turn the rod and adjust the tension of the spring.

5. In a tension device for shuttles the combination with two members between which the thread draws, guiding means to lead the thread between said members, of a rod *g* rotatably supported in bearings, a spring coiled around the rod with its ends secured

thereto and formed with an extension adapted to apply pressure to press one tension member against the other, a pinion *r* on the rod *g*, a worm *t* having a bearing adjacent one of the bearings of the rod and adapted to engage the pinion, said worm formed with a peripheral groove, and a screw stud 6 having its end formed to engage the groove in the worm and adapted to be set down against the latter to prevent the worm from accidental turning.

6. In a shuttle for disk-shaped cops, the combination with the base and arch of the shuttle, of means for supporting the cop, a rotatable rod extending along the base of the shuttle, a bifurcated member formed with legs hinged on the rod, a spring coiled around the rod between the legs of said member with its ends secured to the rod and formed with a U-shaped extension extending upward from the rod, a button hinged on said extension and adapted to bear on the hinged member, means to guide the yarn between the button and the hinged member, and means to turn the rod to adjust the tension of the spring.

7. In a shuttle for disk-shaped cops, the combination with the base and arch of the shuttle, of means for supporting the cop, blocks *h* and *i* dovetailed into the sides of the shuttle, a rod *g* having bearings in the blocks, a pinion *r* on the rod *g* located in a counterbore in the block *h*, a worm *t* having a bearing in a transverse bore in the block *h*, a member *k* hinged on the rod *g*, and a spring *n* coiled around the rod with its ends secured thereto and formed with an extension adapted to bear against the member *k*.

In testimony whereof I affix my signature in presence of two witnesses.

MERRILL O. STEERE.

Witnesses:

CHAS. T. CORP,  
GRACE W. BROWN.