

No. 654,892.

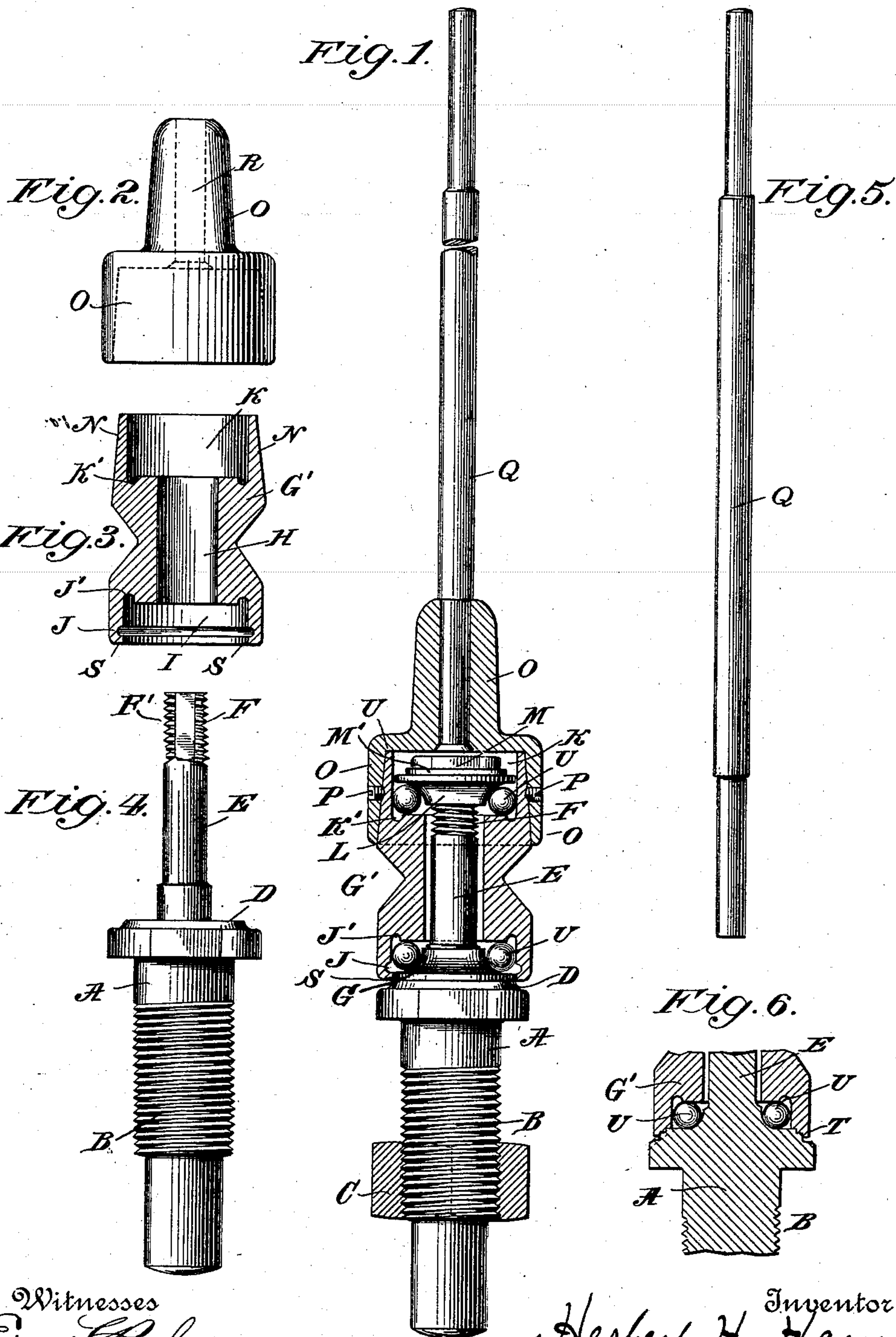
Patented July 31, 1900.

H. H. HAM.

BALL BEARING SPINDLE FOR SPINNING FRAMES.

(Application filed Sept. 8, 1899.)

(No Model.)



Witnesses
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UNITED STATES PATENT OFFICE.

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OF SAME PLACE.

BALL-BEARING SPINDLE FOR SPINNING-FRAMES.

SPECIFICATION forming part of Letters Patent No. 654,892, dated July 31, 1900.

Application filed September 9, 1899. Serial No. 729,911. (No model.)

To all whom it may concern:

Be it known that I, HERBERT H. HAM, of the borough of Manhattan, city of New York, county and State of New York, have invented certain new and useful Improvements in Ball-Bearing Spindles for Spinning-Frames, of which the following is a specification.

My present invention is an improvement upon spindles now most generally used in many respects, among them in the fact that in spindles as heretofore made the bolster is bored interiorly and the spindle extends from above downwardly through the bolster and engages with a bolster-case at its lower end; also, there is no suitable means to prevent the escape of the lubricant; also, the spindles now on the market are much more expensive than mine.

I am aware that heretofore the attempt has been made to make spindles with solid bolsters and ball or roller bearings, but so far as I am aware they have never been successful, because, first, of the complexity of their construction; second, the difficulty of maintaining the lubricant within the moving parts; third, the impossibility of using a dry lubricant; fourth, the lack of adjustability of the parts, so that lost motion consequent upon wear may be taken up, and, fifth, the instability of the parts or chattering of the spindle after a slight use, consequent upon the lack of adjustable devices, as above stated. Under my present invention the parts are of the simplest form, they are few in number, are of such character that they are not likely to wear rapidly, the machine is adapted to use a dry lubricant, provision is made for lubricating the upper set of balls equally with the lower set, adjustable features are present, whereby the spindle may be made to run silently and smoothly irrespective of the degree of its use, and the parts may be interchangeable, so that the wear or fracture of a single part can be in a moment replaced by a new one.

I have demonstrated that my spindle, notwithstanding the fact that it embodies the ball-bearing principle, can be made and sold commercially far below the cost of the spindles now most largely used.

Referring to the drawings hereof, Figure 1

illustrates an elevation, partly in vertical section, of the apparatus complete, the spindle being broken off. Fig. 2 illustrates in elevation the cap to which the spindle is attached or which forms part of it, as preferred. Fig. 3 illustrates a vertical sectional view of the whirl. Fig. 4 illustrates an elevation of the bolster. Fig. 5 illustrates an elevation of the spindle. Fig. 6 illustrates a detail of the parts adjacent to the lower ball-bearing.

A (see Fig. 4) is the bolster. It is solid from end to end. B are threads at or near its lower part, upon which engages the nut C, whereby the bolster is rigidly fastened in the spinning-frames.

D is an annular seat to support the cone of the lower ball-bearing.

E is an upwardly-projecting stem provided with screw-threads F at its upper end, whereby the upper ball-bearing cone and adjusting-nut are attached and manipulated.

G is the cone of the lower ball-bearing. It is preferably, but not necessarily, made separate from the bolster as a highly-finished case-hardened part, which is supported upon the seat D of the bolster, as shown.

G' (see Fig. 3) is the whirl. It is bored centrally, as at H, for the reception of the stem E of the bolster and at its lower part has a recess I, provided with annular grooves J J' to aid in holding the lubricant. At its upper end there is another recess K, provided with a recess K' at its lower part.

L (see Fig. 1) is the cone for the upper ball-bearing, which is bored and threaded centrally to engage with the screw-threads F, and it is provided with a lock-nut M, whereby it may be exactly adjusted. The side of the stem E is cut away, as seen at E', so as to square that side, and a washer M', having a hole in it of the same shape as the cross-section of the stem at the cut-away or squared part, is placed on the stem between the cone L and the nut M, so that the parts referred to will act as a lock for the cone when once adjusted.

The upper part of the whirl is preferably, but not necessarily, tapered exteriorly, as shown at N. O is a cap, tapered interiorly to conform to the exterior taper of the part N of the whirl and is adapted to make a snug fit with it and be rigidly clamped thereto by set-

screws P P. This is my preferred construction, because where there is a slight taper given to these parts a more accurate joint between the two can be made than where they are parallel-sided, and I find in practice that when this construction is employed economy in manufacture results. Obviously, however, the parts can be made of such shape as preferred and connected together in any suitable manner.

Q is the spindle. It is made as shown best in Fig. 5 and enters the opening R in the upper extremity of the cap O, passing downwardly to near the lower end of the opening referred to.

The extreme lower edge S of the whirl (see Figs. 1 and 3) fits quite closely to the edge or base of the lower ball-bearing cone G, so that there will be no escape of the lubricant at this point. The lubricant which I prefer to use is a suitable preparation of plumbago or equivalent material, and it quickly closes such slight opening as there may be at this joint, so that there is no escape of it. In order, however, to preclude all possibility of the escape of lubricant, I sometimes make the lower bearing as shown in Fig. 6, in which the parts are the same as above indicated, excepting that the cone is shown as made solid with the bolster and the lower edge T of the whirl G' is rabbeted and the coacting part of the bolster is likewise rabbeted, so that this stepped construction will with certainty preclude the escape of the lubricant whatever it may be.

U U are the balls.

The assembling and operation of the parts are obvious and do not require specific description. I call especial attention to the fact, however, that all of the parts are of the simplest possible construction, that the single adjustment of the cone for the upper ball-bearing by means of the set-nut M takes up all lost motion both laterally and vertically, and by this simple device all chattering of the spindle can be prevented; also, that by reason of the channels J, J', and K' the lubricant will be held adjacent to the balls at all times and that it cannot escape from these bearings, that the spindle is detachable from the whirl by simply loosening the set-screws P, that the spindle as a whole is so constructed that its parts when assembled are inseparably connected together, so that it may be made, assembled, and adjusted at the shop of the manufacturer and sold in a complete condition ready for immediate use to the trade

generally; also, that all the running parts—to wit, the bolster, the whirl, and the ball-bearings and coacting parts—may likewise be so made and sold as entities, leaving the manufacturer to supply such special form of cap and spindle as the requirements of his business, which may be peculiar, demand; also, that a single part—to wit, the upper cone, with its set-nut M—provides means whereby the entire apparatus may be quickly and easily adjusted and lost motion taken up, and, lastly, that a dry lubricant may be used without danger of its escape to injure the goods being woven.

I do not limit myself to the details of construction described, since it will be obvious to those who are familiar with this art that alterations may be made therein without departing from the essentials of the invention.

I claim—

1. The combination of a solid bolster provided with means whereby it may be attached to the spinning-frame, ball-bearing surfaces supported upon the bolster, means whereby the said bearings may be adjusted relative to each other, a whirl provided with ball-bearing surfaces and also with recesses for the retention of the lubricant connecting with the said ball-bearing surfaces, and a spindle attached to the whirl, for the purposes set forth.

2. The combination of a solid bolster provided with means whereby it may be attached to the spinning-frame, ball-bearing surfaces supported upon the bolster, means to adjust said ball-bearings toward and from each other, a whirl provided with ball-bearing surfaces and having recesses to receive the lubricant and prevent its escape, and a spindle attached to the whirl, for the purposes set forth.

3. The combination of a solid bolster, ball-bearing surfaces upon the bolster, a whirl recessed at its upper and lower ends and having ball-bearing surfaces within the recesses and having also depressions or receptacles connecting with its bearings for the retention of the lubricant, for the purposes set forth.

Signed at New York, in the county of New York and State of New York, this 25th day of August, A. D. 1899.

HERBERT H. HAM.

Witnesses:

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