(No Model.) 2 Sheets—Sheet 1.

B. PIERS.

MACHINE STUD.

No. 458,186. Patented Aug. 25, 1891.

FIG. 1.

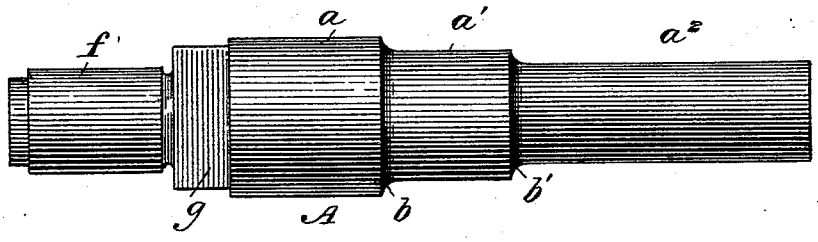


FIG. 2.

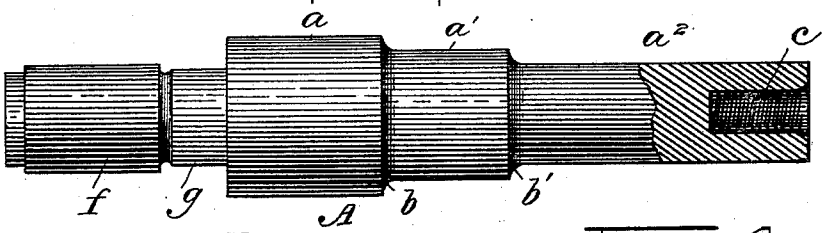


FIG. 3.

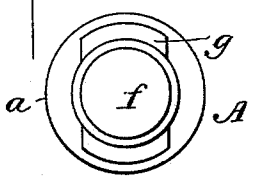


FIG. 4.

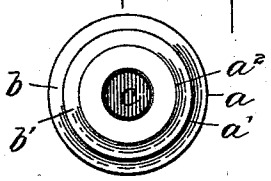
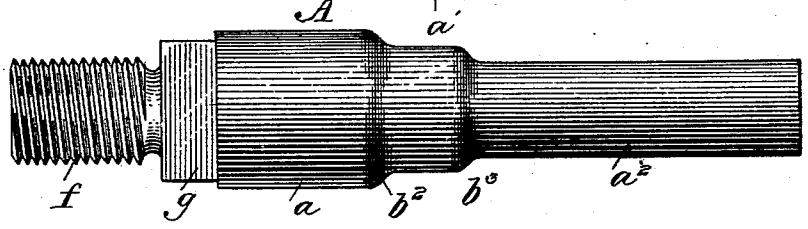


FIG. 5.



WITNESSES

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(No Model.) 2 Sheets—Sheet 2.

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FIG. 6.

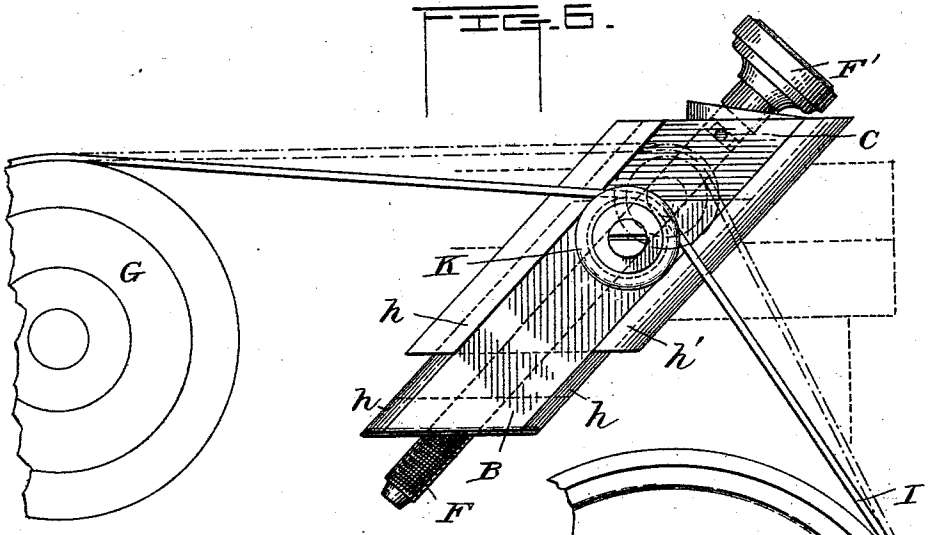


FIG. 7.

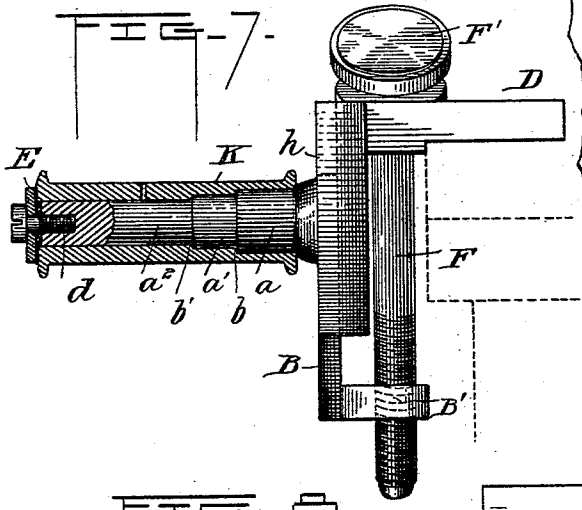
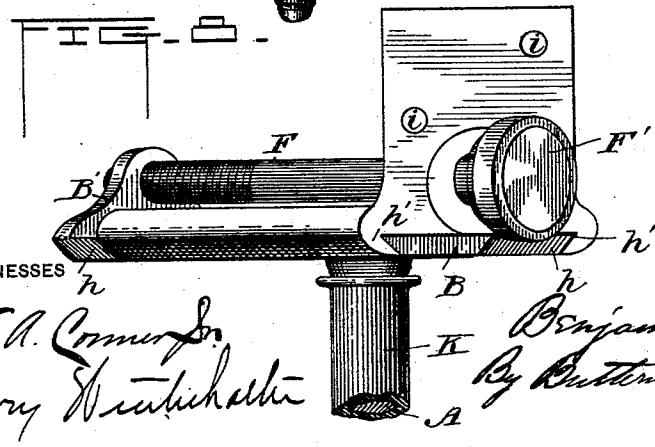


FIG. 8.



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UNITED STATES PATENT OFFICE.

BENJAMIN PIERS, OF XENIA, OHIO.

MACHINE-STUD.

SPECIFICATION forming part of Letters Patent No. 458,186, dated August 25, 1891.

Application filed April 20, 1891. Serial No. 389,657. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN PIERS, a citizen of the United States, residing at Xenia, in the county of Greene and State of Ohio, have invented certain new and useful Improvements in Machine-Studs; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

In machines of various kinds used for agricultural and manufacturing purposes, and particularly lathes and cotton and woolen machinery, a large number of studs or spindles are employed, and on account of present inferior methods of construction frequent breakage occurs, thus necessitating frequent renewal of such parts, and thereby increasing the cost of maintenance and rendering such machinery expensive to the manufacturer. According to present methods such studs or spindles are usually constructed with an axial portion or spindle proper having a uniform diameter throughout to receive a corresponding bore in the nave or hub of the pulley, sleeve, or roller fitted upon the stud, the latter being provided with a forged collar at the base and a screw-threaded shank for attachment to the bed-plate or other part of the machine, and in use such studs are not only liable to break by reason of an insufficient thickness of metal at the base or point where the greatest strength is required, but they soon become worn and unfit for use.

The object of my invention is to overcome these difficulties and to provide an improved stud which may be readily replaced when worn, combined with improved belt-tightening devices, and means for taking up the wear of studs or spindles of the character above mentioned; and to this end my invention consists in an improved stud or spindle and mechanism combined therewith, all as hereinafter described, and particularly pointed out in the claims at the end of this specification.

In the accompanying drawings, in which like letters of reference are used to designate like parts, Figure 1 represents a side view of the finished blank or stud turned and bored preparatory to forming the screw-threads upon the shank thereof. Fig. 2 is a top view of the same partly in section; Fig. 3, an end view of the base or shank end of the stud; Fig. 4, a reverse end view; Fig. 5, a side view showing a slight modification in the formation of the axial portion of the stud. Fig. 6 is an end view showing one of the studs formed integral with the adjustable slide of a belt-tightener attached to the bed-frame of a lathe, the latter being indicated in dotted lines; Fig. 7, a rear view, partly in section, of the belt-tightening device with attached stud; and Fig. 8, a top view of the same.

In the drawings, A represents the stud, having a differential axis or axial portion indicated by the letters a a' a^2, the diameter of the part a being greater than that of the part a' and that of the latter being greater than the diameter of the part a^2, each section or portion a a' a^2 being preferably formed of a uniform diameter the entire length of the section, the shoulders b b' at the intersection of the parts a and a^2 with the part a' being abrupt, as shown in Figs. 1 and 2, or tapering, as shown at b^2 b^3, Fig. 5.

The spindle or axial portion proper of the finished article is formed integral with a cylindrical shank f of any desired length, having screw-threads thereon and adapted to receive a binding-nut, the base of the shank being flattened, as shown at g, to fit an elongated slot in the bed-plate or other portion of the lathe or machine to which it is attached, so as to serve as a key to prevent the stud from turning. The axial portion of the stud is preferably composed of three or more integral portions or sections of unequal diameters, although the number of sections may be varied as desired, the several sections diminishing in size from the base of the stud toward the free end thereof, so as to provide the greatest thickness of metal at the point where the stud is subjected to the greatest strain and to decrease the thickness of the metal toward the point or end where the least strength is required; but each section or portion of the axis is of uniform diameter its entire length, so that the combined effect of the several parts or sections is the same as if the axis were of a uniform diameter from the base to the free end thereof. This construction overcomes the usual tendency of a sleeve or hub fitted to a conical axis to slip endwise and bind against the confining-nut or other means

for holding the same in place and at the same time affords all the advantages of a conical axis, in which the metal gradually decreases in diameter as it recedes from the point requiring the greatest strength. The free end of the stud is bored out and screw-threaded interiorly, as shown at *c*, to receive the headed screw-bolt or set-screw *d*, Fig. 7, by which the sleeve or roller journaled upon said stud is secured in place thereon, a suitable washer or washers E being placed upon the screw-bolt *d* between the end of the spindle and the head of the bolt, as shown. The nave or hub of the wheel being provided with a bore corresponding interiorly with the exterior formation of the axis or spindle will cause the parts to wear evenly and uniformly, and as they become worn the wear may be taken up by simply adding a washer or washers and tightening the screw-bolt *d*, so as to force the roller or hub of the wheel inward against the shoulders *b b'*. The enlarged portion *a* of the stud also takes the place of the forged washer or flange usually employed at the base of the stud, and provides a thickness of metal extending a suitable distance outward to provide sufficient strength at this point, where the greatest strength is required, while the portions *a' a²* provide a decreasing thickness of metal toward the free end of the stud and yet afford sufficient strength at all points, the part *a²* being of sufficient length to provide an extended bearing and the whole being adapted to provide a spindle or stud of superior strength which is not liable to break in use and which may be used for an indefinite period and until considerably reduced in size before it becomes necessary to substitute a new stud, as has been necessary with studs of this general character heretofore in use on account of the wabbling by reason of the uneven bearing-surface when the stud becomes slightly worn. In Figs. 6, 7, and 8 I have shown one of these studs preferably formed integral with the diagonally-arranged slide B, which is adapted to move vertically in a guide-bracket C and has beveled edges *h* fitting correspondingly-beveled portions *h'* in the guideway of the bracket C, forming a dovetailed connection therewith, so as to hold the stud in place in said guide. The stud may of course be formed separate and attached to the slide, but I preferably form the stud integral therewith. The bracket C has a lateral extension D, provided with suitable perforations, as at *i*, to receive screws or bolts, by which it may be secured to the bed-plate of a lathe or other portion of a machine in the desired position. The slide B is provided with a lateral extension B', having an interiorly-screw-threaded opening to receive the diagonally-arranged adjusting-bolt F, having the thumb-wheel or enlarged head F', by which said bolt may be turned so as to raise and lower the slide, this bolt being swiveled or suitably journaled at its upper end in the lateral extension D of the bracket, by which it is retained in a fixed position relatively to the bracket, but may be notched to effect the proper adjustment of the slide.

G and H represent pulleys about which passes the belt I. The bracket C is arranged, as shown, between said pulleys with the belt I resting upon the sleeve or roller K, fitted to the stud on the slide B, so that when the slide is raised, as indicated in dotted lines in Fig. 6, the belt will be tightened and may be loosened on the reverse movement of the slide.

This improved device provides a very efficient means for tightening the belt with great nicety of adjustment, and by means of the diagonal arrangement the slide may be moved either up or down to any desired extent, but with a very slow movement, which results in a perfect adjustment of the belt and renders the device particularly applicable to lathes and machinery in which great nicety of adjustment is required in tightening the belts.

It is obvious that the parts may be modified in a number of ways without departing from the spirit of my invention, and hence I do not desire to be limited to the exact construction described and shown. It has heretofore been proposed, however, to construct a shaft or spindle in sections reduced in size from the main portion of the spindle toward the end of the same, and hence I do not claim such construction broadly.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In combination with the machine-stud having an axial portion composed of sections of unequal diameters decreasing in size from the base of the stud toward the free end thereof, each section being of uniform diameter its entire length, the rotatable sleeve fitted on said stud and having a differential bore corresponding interiorly with the exterior formation of said axial portion of the stud, and means for securing the sleeve upon the stud, substantially as described.

2. In combination with the stud constructed substantially as described, the slide rigidly secured thereto, the bracket having the diagonally-arranged side plate or guideway for said slide, and the diagonally-arranged adjusting-screw swiveled to the bracket and having its free threaded end adjustably connected to the slide, said stud being arranged at right angles to the slide, substantially as described.

3. The herein-described belt-tightening device, comprising the bracket having a lateral extension for attachment to a machine and a diagonally-arranged guideway rigid therewith, the adjustable slide fitted in said guideway, carrying the stud which projects therefrom at right angles to the slide, a rotatable sleeve fitted on said stud, and an adjusting-screw swiveled in said bracket and having

its screw-threaded end fitted in a correspondingly-threaded opening in a lateral extension of the slide, substantially as described.

4. A machine-stud comprising an axial portion composed of sections of unequal diameters decreasing in size from the base of the stud toward the free end thereof, each section being of uniform diameter its entire length, said axial portion being formed integrally with a screw-threaded shank having a flattened base or key, whereby the stud is adapted to be detachably connected to a machine, substantially as described.

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

BENJAMIN PIERS.

Witnesses:
JOHN LITTLE,
SAML. R. DILLENCOURT.