

UNITED STATES PATENT OFFICE.

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KNOB ATTACHMENT.

SPECIFICATION forming part of Letters Patent No. 530,624, dated December 11, 1894.

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To all whom it may concern:

Be it known that I, FRANCIS H. RICHARDS, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Fastening Devices, of which the following is a specification.

This invention relates to that class of attachments or clamping-couplings adapted for removably fixing hubs, knobs and like parts to spindles or like rods by means of clamping-devices; the object being to provide a simple and powerful two-part fastening-device in which the hub or stem constitutes the spindle-clamp, and in which the clamp-sleeve has no longitudinal movement relative to the other parts during the operation of securing the hub or stem in its proper position upon the spindle.

When my improvement is applied to the stem of a door-knob, this may be placed with the end of its clamp-sleeve or stem closely against the escutcheon or bearing-plate upon the door, and then rigidly fixed in place without any longitudinal movement of any part thereof relatively to the spindle. At the same time the separate spindle-clamp heretofore generally used in this class of knob-attachments is dispensed with, and a knob-fastening is produced which is simple and durable in construction, effective in its operation, and of low cost to manufacture.

In the drawings accompanying and forming a part of this specification, Figure 1 is a vertical longitudinal section of a door-knob furnished with my improvements, the view being taken on line 1—1 of Fig. 2, and the usual squared spindle being shown in side elevation. Fig. 2 is an end view of the knob-attachment looking from the right-hand in Fig. 1. Fig. 3 is a side elevation of the knob-stem. Fig. 4 is an end view of the same looking from the right-hand of Fig. 3, a portion of the knob being broken away. Fig. 5 is a side elevation of the clamp-sleeve. Fig. 6 is an end view of the same. Fig. 7 is a longitudinal section of said sleeve, and Fig. 8 an enlarged sectional detail of the spindle, knob-stem and clamp-sleeve taken on line 8—8, Fig. 1.

Similar characters designate like parts in all the figures.

The spindle S is, or may be, as shown in the drawings, of the usual squared cross-sectional

form and of uniform diameter throughout the length thereof. The hub or stem 6 of the knob K is shown having a suitable central opening and should be fitted to slide freely and closely upon the spindle S. Said stem should also be slitted longitudinally through one or both sides as shown at 5, to make the walls yielding. These walls, in the form of knob-stem herein shown, are preferably two in number, being designated by 6', 6''. See Fig. 4.

The yielding walls of the knob-stem each have formed thereon, as herein shown, peripherally thereof, a suitable number of inclined or wedge-like bearing-faces or steps, 9, the planes of the bearing-faces of one wall spirally coinciding with those of the other wall, and forming together a continuous inclined spiral path or wedge, which preferably occupies a considerable portion of the length of the hub. Said bearing-faces of the hub or stem are adapted to be engaged by the similar but reversely-arranged bearing-faces, 10, formed upon the interior of the thimble or clamp-sleeve 8. For assembling the fastening-device, said clamp-sleeve is turned upon the knob-stem, after the manner of putting a nut on a bolt, until the sleeve rests against the stop-shoulder 12, this operation being performed prior to the placing of the knob on the spindle. The bearing-faces 9 upon the stem and the bearing-faces 10 within the sleeve are relatively so formed as to closely intermesh, and so that the sleeve may still be readily turned for assembling and disassembling the parts.

In assembling the parts and securing the knob-stem on the spindle, the clamp-sleeve is first placed upon the stem in loose engagement with the abutment or shoulder 12, the outer end of said clamp being, when in this position, preferably flush with the outer end of the stem, as clearly shown in Fig. 1. At this time the walls of the stem are not compressed, and said stem is in a condition to be freely slid lengthwise of the spindle. The knob-stem being now placed upon the spindle in the required position, the clamp-sleeve will be forcibly turned forward (usually by means of a wrench engaging a hexagonal or squared portion, 13, thereof) in the proper direction, as indicated, for instance, by the arrow shown in Fig. 2. This will force the abutting end

11 against the abutment 12 of the stem, (said
abutment preventing any forward longitudinal
movement of the sleeve with relation to
the stem,) and, by the reaction of said force,
5 cause the wedge-like bearing-faces 10 of said
sleeve to ride upward upon the inclined bearing-
faces 9 as shown by the dotted line 21 in
Fig. 3, thereby compressing or closing to-
gether the yielding walls 6', 6'' of the stem.
10 This lateral or closing movement of the said
walls is, of course, proportionate to the rotary
movement of the sleeve, having regard to the
differences in the pitch of the bearing-faces
in the circular path of travel of said sleeve.
15 The hub or stem being rigidly closed upon
the spindle by so powerful a wedge-device as
described, is securely held against either lat-
eral or longitudinal movement on the spindle,
and with the clamp-sleeve forms a simple and
20 effective knob-attachment, in which there is
no longitudinal movement whatever of any
part upon or relatively to the spindle during
the operation of fastening and unfastening
the hub or stem to and from the rod or spin-
25 dle. This is an important desideratum, since
it permits the hub or stem to be first accu-
rately adjusted to its exact position, and then
to be firmly secured in place, without any
allowance being made for the longitudinal
30 movement of any of the parts. Heretofore
such an allowance has generally been neces-
sary for properly placing door-knobs upon
their spindles when these are in the door
ready for use. This feature obviates the ne-
35 cessity for using any rose, or tongue-and-
groove devices, to cover the joints of the
structure.

The described construction of the fasten-
ing-device results in a very rigid, compact
40 and powerful knob-stem and attachment, with
no parts to become loose and rattle, and hav-
ing all the requirements of a first-class arti-
cle. At the same time, the construction is
such that the fastening-device may be easily
45 manufactured by simple, well-known and in-
expensive means and methods, thereby pro-
ducing a device of superior character at a low
cost.

When the spindle is of an angular cross-
50 sectional form as shown in the drawings, and
is smaller than the bore of the stem, this in-
closing is forced into a slightly irregular ex-
ternal shape, so that its peripheral lines are
not truly circular. For accommodating this
55 deviation and to effect a proper distribution
of the pressure over the spindle-surfaces
within the stem, the sleeve is made of small

thickness relatively to the diameter thereof,
so that it will, when forcibly tightened, read-
ily conform in cross-sectional shape to the 60
irregularities of the closed stem, and thereby
maintain the perfect coaction of the several
parts of the fastening. In practice, also, the
sleeve, by reason of its relatively small thick-
ness, and being of elastic metal (preferably 65
bronze), expands somewhat, and thus over-
comes the effect of any slight differences in
the shape and size of the spindle at different
points in the length thereof.

The diametrical inclination, indicated by 70
the dotted line 20, Fig. 1, of the wedge-faces
relatively to the spindle, should correspond
substantially with the normal angle of re-
pose, or come within about the minimum and
maximum limits of five and twenty-five de- 75
grees, respectively, from said spindle, or from
the axis of the stem. In practice, I prefer
said angle should be about ten degrees, sub-
stantially as shown in the drawings, and that
the wedge-faces should be one-eighth to one- 80
sixth of an inch wide, for use in knob-fasten-
ings of ordinary sizes.

I do not limit myself to the use of a hub or
stem having two yielding walls 6', 6'', since
it is obvious that said stem may be slitted to 85
form three or more yielding walls, or may
have only one slit, and consequently only one
such wall. The construction shown, however,
is deemed preferable, the slits 5 being, pref-
erably, where an angular spindle is used, in 90
alignment with the plane of the opposite an-
gles or corners of said spindle. Neither is
my invention limited to the use of a spindle
that is square, or of any particular angular
cross-section, for a round spindle may be 95
used if desired.

Having thus described my invention, I
claim—

The herein-described two-part fastening-
device for knobs, it consisting of a compressi- 100
ble tubular stem bored to receive a spindle and
having on the compressible portion thereof
inclined wedge-bearings, substantially as de-
scribed, and having a fixed clamp-sleeve abut-
ment, combined with a clamp-sleeve having 105
internal inclined bearings adapted for en-
gaging with the bearings of the stem, and hav-
ing its inner end in engagement with said
abutment, and adapted to be turned for com-
pressing the stem, substantially as described. 110

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Witnesses:

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