Feb. 24, 1959 W. WIENEKE 2,874,383

DEVICE FOR DRIVING TEMPERED STEEL INTO WALLS, CEILINGS OR THE LIKE

Filed April 5, 1955

FIG. 1

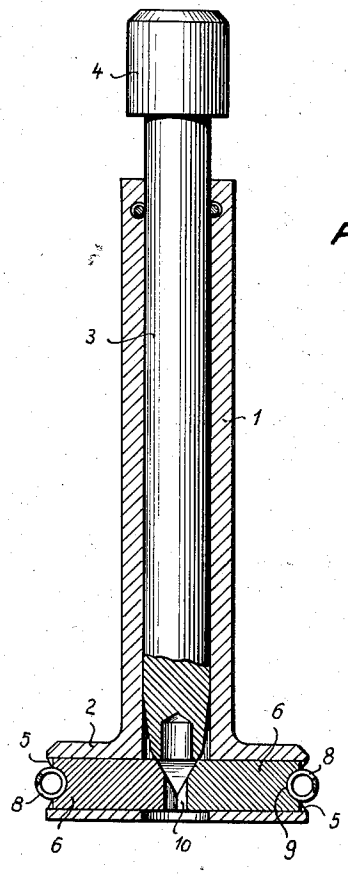


FIG. 5

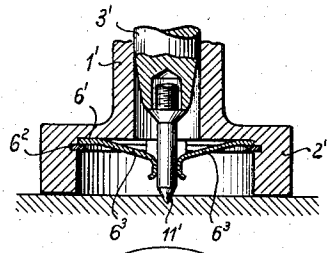


FIG. 6

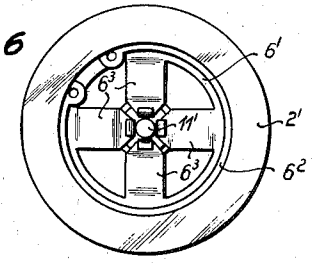


FIG. 7

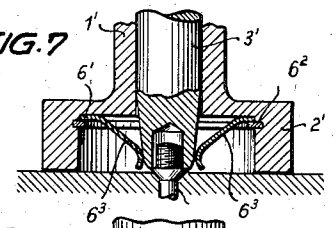


FIG. 3

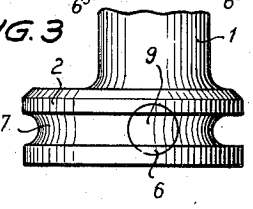


FIG. 2

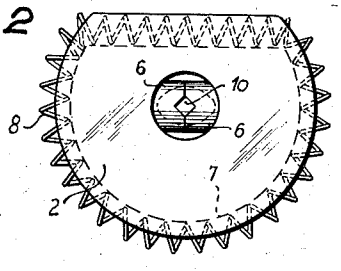
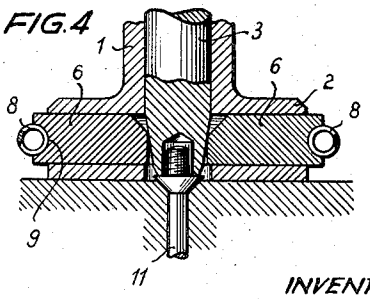


FIG. 4



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DEVICE FOR DRIVING TEMPERED STEEL INTO WALLS, CEILINGS OR THE LIKE

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2 Claims. (Cl. 1—47)

The present invention relates to a device for driving tempered steel pins into walls, ceilings or the like, and in particular to a manually operated device.

Shooting devices are known for driving of tempered steel pins, which as a rule are equipped with a threaded shaft above a flange portion for receiving members, e. g. a bottom portion of a cap, as used for mounting of electric cables. Such shooting devices are usually used mainly by larger enterprises, while manually operated driving devices, which have broader applications, are particularly suitable for smaller enterprises due to their simplified operation and more economical purchasing and maintenance costs.

The best known manually operated driving devices are drive-pins which are designed like a rivet screw. They have at one end a bore which receives and protects against damage the threaded shaft of the steel pin, so that the driving plunger engages the flange of the steel pin by its front face.

The hitting force of a hammer is transferred to the steel pin to be driven into material by means of the plunger over the flange of the steel pin. These known simple devices lack a guide for the steel pin in its drive into a wall or support. For this reason, it is rather difficult to drive the steel pin perpendicularly into the wall or the like.

Driving devices are also known for steel pins which are not equipped with a flange, where the steel pin and the plunger have equal diameter and are guided by a sleeve which has a widened head in order to provide a greater support on the base, e. g. on a wall. The degree of penetration of the plunger into a sleeve is in this case determined by a widened head operating as abutment means against the edge of the sleeve. It is, however, impossible to use in these devices a steel pin which is equipped with a flange, since no guide is provided for such flange, so that the mentioned drawbacks are still present.

In order to avoid these drawbacks, namely in order to drive tempered steel pins which are equipped with or without a flange, devices have been proposed in which the plunger is guided again by a sleeve and the steel pin is guided, in addition to the bore provided in the end of the plunger, by means of guiding tongs disposed at the end face of the sleeve.

These known devices have inherently lack of sufficient standing on the base, since the end face of the sleeve carries the movable guiding tongs and furthermore the latter interfere with a complete drive of the steel pin into a wall, if the steel pin is equipped with a flange, so that the steel pin remains still partly outside the wall in its final position, requiring an additional driving step for the steel pin after removal of the device.

Finally, the last mentioned known devices have the drawback that they can be used only for steel pins having a certain diameter complementary to the inner diameter of the sleeve, so that different devices are required for steel pins of different diameter.

It is, therefore, one object of the present invention to provide a driving device which avoids all mentioned drawbacks inherent in the known devices while maintaining all their advantages and which permits, nevertheless, economical manufacture due to the simplicity of its structure.

It is another object of the present invention to provide a device for driving tempered steel pins which comprises a sleeve having a widened head portion in which a plunger is guided, to operate as driving member and is equipped with a bore at its forward end to receive a steel pin having a flange, and which sleeve has adjacent its front end guiding tongs for the steel pin.

It is still another object of the present invention to provide a device for driving tempered steel pins which comprises a sleeve having a widened head portion and said head portion receiving ring-like or radially disposed and resiliently supported guide and clamping members around the longitudinal axis of said sleeve, which members close up the path for the steel pin and for the plunger and may be spread apart against the spring pressure due to the driving force of said plunger to the diameter of the flange of the steel pin and eventually to the diameter of the plunger, whereby the driving stroke of the plunger corresponds with the distance between the end face of the sleeve and the abutment face of the plunger, so that at the end of the stroke the end face of the sleeve and the abutment face of the plunger are disposed in the same plane.

It is also another object of the present invention to provide a plunger for said device having the forward end tapered toward its end while its rear end is widened to form a driving head functioning simultaneously as abutment member to determine the length of the driving stroke.

It is a further object of the present invention to provide a device for driving tempered steel pins which comprises a sleeve for guiding a plunger, said sleeve having a head which is equipped with one or more radially disposed bores, the latter receiving cylindrical jaws which may be inserted into said bores from the periphery of the head and are of a length equal with the length of the radius of the head, all said jaws engaging in the center of the head and defining an opening in axial direction of said sleeve in which opening the steel pin is guided and supported, and a helical spring surrounding the head of the sleeve, which spring retains the jaws in the head in their closed position and simultaneously prevents the jaws from turning upon their own axis.

It is a still further object of the present invention to provide in the last mentioned head a peripheral groove and to provide in the rear end of said jaws a complementary recess, which groove and recesses receive the helical spring, so that the jaws may be spread apart in the center of the head upon passing therethrough the steel pin and the plunger, respectively.

It is yet a still further object of the present invention to widen conically towards the steel pin the inner end of the jaws and to provide a polygonal opening in the center which opening is defined by the inner ends of said jaws.

It is also a still further object of the present invention to provide a head as part of the sleeve in the last mentioned device which head has at least at one side, preferably at a point which is not equipped with a bore, a flattened portion, in order to facilitate the handling of the device in wall corners.

It is now yet a further object of the present invention to provide a head as part of the sleeve of the last mentioned device, which head includes three or more spring blades to operate as guiding means, and which head is

widened towards its end face to permit of spreading apart of the spring blades upon passing the steel pin and the plunger therethrough.

It is also an object of the present invention to provide the last mentioned spring blades of such structure that the inner ends of said blades are directed towards the center of the head and serve as guide means for the steel pin which inner ends of said blades are bent towards the end face of said head, whereby said spring blades may be integral parts of a disk of spring steel having an outer diameter complementary with the inner diameter of said head, said disk to be inserted into the head from the side of its end face, and a spring ring resting in an inner peripheral groove of said head clamping said disk in position.

It is yet an object of the present invention to provide a head as part of the sleeve in the last mentioned device, which head has spring biased balls received by radially disposed bores of the head as guiding means for the steel pin, said bores being closed up for support of said springs by any convenient means as a pin, a screw or the like.

It is finally an object of the present invention to provide a device which not only shows a good standing on the wall and provides a double guide for the steel pin, but also brings about the advantage that the steel pin may be forced perpendicularly to and completely into the wall, regardless whether the steel pin has a flange or not, and whether the steel pin is of polygonal or circular

Figure 1 is an elevation of the device for driving steel pins of different diameter within limits, in which case the plunger only is to be changed, since the bore provided at the end face of the plunger must have a diameter complementary to that of the steel pin.

With these and other objects in view, which will become apparent in the following detailed description, the present invention will be clearly understood in connection with the accompanying drawings, in which:

Figure 1 is an elevation of the device for driving steel pins, partly in axial section;

Fig. 2 is a bottom plan view thereof;

Fig. 3 is a fragmentary side elevation of the device, the spring being omitted for better demonstration;

Fig. 4 is a fragmentary axial section thereof together with a steel pin;

Fig. 5 is a fragmentary axial section of another embodiment of the device;

Fig. 6 is a bottom plan view of the embodiment shown in Fig. 5;

Fig. 7 is a fragmentary axial section of the embodiment shown in Fig. 5 in an advanced driving stage.

Referring now to the drawing and in particular to Figs. 1 to 4, the device comprises a sleeve **1** which has a widened head **2**. A driving plunger **3** is guided in the sleeve **1** which has at its rear end a driving head **4** adapted to limit the driving stroke of the driving plunger **3** in the sleeve **1** by abutment with the rear end face of the sleeve **1**.

In the embodiment shown in Figs. 1 to 4, the head **2** is equipped with a plurality of radially disposed bores **5**, each of which receives axially movable therein a cylindrical clamping and guiding jaw **6**. The head **2** has a peripheral groove **7** which receives an endless helical spring **8**. The latter is also received by recesses **9** provided at the rear end of the respective jaws **6**, which recesses **9** are complementary with the groove **7**. The spring **8** urges thus the jaws **6** towards the longitudinal axis of the sleeve **1**. In their innermost position the jaws **6** define a square opening **10** inside of the head **2**, which opening **10** widens upon insertion of the steel pin **11** by spreading apart the jaws **6** and which opening **10** is also conically enlarged in axial direction towards the plunger **3**, so that the latter may easily penetrate the opening **10** to spread apart the jaws **6** during the driving

step of the steel pin (Fig. 4). The steel pin remains in this position upon the separation of the device from the steel pin **11**. The next steel pin may then be inserted into the bore **12** of the plunger **3** and is guided by the jaws **6** during withdrawal of the plunger **3**.

Referring now again to the drawing and in particular to Figs. 5 to 7, the second embodiment of the present invention comprises a sleeve **1'** having a widened head **2'** at its forward end, in which head **2'** a spring blade **6'** is inserted and fastened by means of a spring ring 6^2. The spring blade **6'** has resilient arms 6^3 which are bent in axial direction towards the forward end of the sleeve **1'** and serve as clamping and guiding means for a steel pin **11'**. The resilient arms 6^3 are spread apart during the driving step of the steel pin **11'**, as indicated in Fig. 5 of the drawing.

While I have disclosed several embodiments of the present invention, it is to be understood that these embodiments are given by example only and not in a limiting sense, the scope of the present invention being determined by the objects and the claims.

I claim:

1. A device for driving tempered steel pins into walls, ceilings or the like, comprising a sleeve member of substantially circular cross section, a plunger in said sleeve member and having a tapered inner end, said sleeve member having a substantially radially widened head portion, a plurality of radially disposed guiding and clamping members in said head portion and arranged in a plane perpendicularly to the longitudinal axis of said sleeve member, said guiding and clamping members engaging at their inner end the pin to be driven and being freely removable outwardly in radial direction and means for retaining said guiding and clamping members in operative position, and said guiding and clamping members being spread apart radially and pushed backwardly in said plane during the passing of said pin and the tapered inner end of said plunger, respectively, said guiding and clamping members comprising cylindrical jaws, and said head portion having a plurality of radially disposed bores receiving said jaws and having a length equal with that of said jaws, the inner ends of all said jaws defining an opening for guiding and clamping said pin, and a resilient member surrounding the outer periphery of said head portion, thereby retaining said jaws in the said respective bores, and resilient member preventing the release of said jaws.

2. A device for driving tempered steel pins into walls, ceilings or the like, comprising a sleeve member of substantially circular cross section, a plunger in said sleeve member and having a tapered inner end, said sleeve member having a substantially radially widened head portion, a plurality of radially disposed resilient guiding and clamping members in said head portion and arranged in a plane perpendicularly to the longitudinal axis of said sleeve member, said guiding and clamping members engaging at their inner end the pin to be driven and being freely removable outwardly in radial direction and means for retaining said guiding and clamping members in operative position, and said guiding and clamping members being spread apart radially and pushed backwardly in said plane during the passing of said pin and the tapered inner end of said plunger, respectively, said head portion having a peripheral groove and the rear end of said jaws having a complementary groove, said spring being received by said grooves, and said jaws being spread apart against the force of said spring upon passing said pin and said plunger, respectively, through said opening.

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