

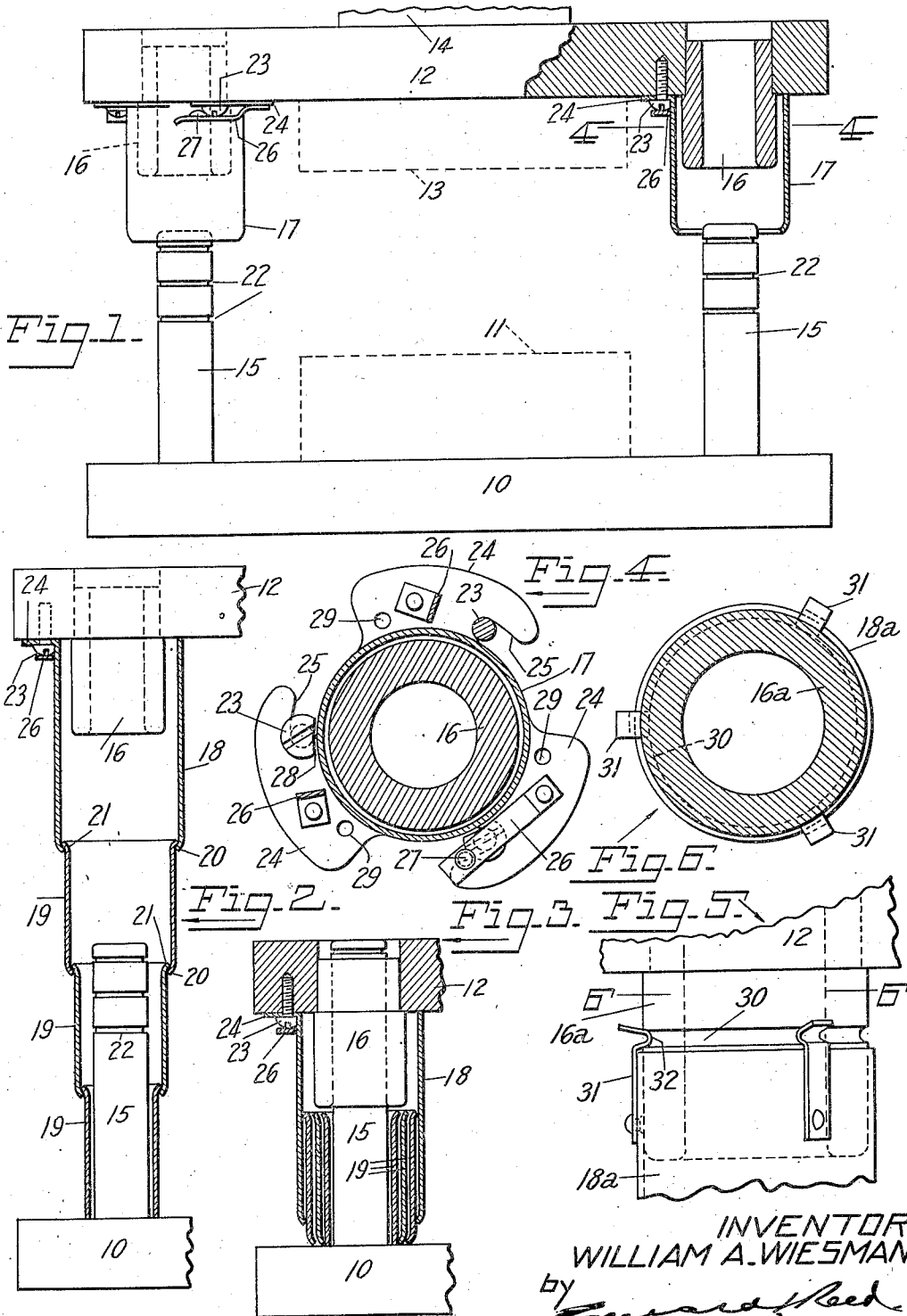
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COVER FOR LEADER PINS

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COVER FOR LEADER PINS

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This invention relates to a cover for a leader pin of a die set or the like.

As ordinarily used in a punch press the die set comprises a base or die shoe on which is mounted the die, and a movable member or punch holder which carries the punch. The die shoe is provided with guide members, commonly called leader pins, and the punch holder is provided with guideways, usually in the form of bushings which project below the punch holder and embrace the leader pins as the punch holder moves downwardly so as to guide the punch in accurate relation to the die. When the punch holder is fully retracted these bushings are spaced some distance above the upper ends of the leader pins and it is possible for the operator's hand to enter this space between the pin and the bushing as he manipulates the work and injury sometimes results. Likewise the work will sometimes enter this space, particularly when large sheets are being operated upon, and this interferes with the proper placing of the sheet on the die and sometimes results in injury to the sheet. Further, when the punch holder is retracted the leader pins are exposed to dust and dirt and grit may accumulate thereon and cause injury thereto. Also it is possible for metal cuttings or chips to adhere to the bushing, due to the lubricant thereon, and to be carried upward therewith so that when the punch holder moves downwardly these chips will wedge between the bushing and the leader pins, and this sometimes results in very serious damage to the die set. It has been proposed heretofore to provide guards for the leader pins but these have not been satisfactory and have not gone into extensive use. This has been due in part to the inefficient character of the guards and in some cases to their heavy and expensive character. Further, these guards in some instances interfered seriously with the applying of lubricant to the leader pins and the bushings, which made their use objectionable.

One object of the present invention is to provide a cover or guard for a leader pin which will be of very simple but highly efficient construction and which may be produced at a low cost.

A further object of the invention is to provide such a cover which will adequately protect the leader pin and the bushing against dust and against the adherence of chips thereto.

A further object of the invention is to provide such a cover which can be quickly and easily attached to and detached from the punch holder so that it may be quickly moved out of the way to permit of the lubrication of the leader pin.

A further object of the invention is to provide means for attaching the cover to the punch holder or removing the same therefrom by the manipulation of the cover itself and without the use of tools.

Other objects of the invention may appear as the device is described in detail.

In the accompanying drawings Fig. 1 is a front elevation, partly in section, of a die set equipped with leader pin covers embodying my invention; Fig. 2 is a sectional detail view of a modified form of the cover showing the punch holder in its elevated position; Fig. 3 is a similar view showing the punch holder in its lowermost position; Fig. 4 is a sectional view taken on the line 4—4 of Fig. 1, showing one form of attaching device; Fig. 5 is a detail view showing the modified form of attached device; and Fig. 6 is a section taken on the line 6—6 of Fig. 5.

In these drawings I have illustrated my invention, including certain modifications thereof, and have shown the same as applied to a die set of a type commonly employed in punch presses, but it will be noted that the invention may take various forms and may be applied to various apparatus where similar protection is desired.

As here shown the die set comprises a base or die shoe 10, which supports the die 11, and a punch holder 12, which carries the punch 13, and is here shown as directly connected with a ram 14. The die shoe is provided with a plurality of upright leader pins 15. In a small die set two such pins may be sufficient, as here shown, but in larger die sets there are usually four or more such leader pins. The punch holder is provided with guideways to receive the respective leader pins and guide the punch in its movement toward the die, these guideways usually being in the form of hardened steel bushings 16 mounted in and rigidly secured to the punch holder, the bores of the bushings being accurately finished to fit the respective leader pins.

When the die holder is in its elevated or fully retracted position, as shown in Fig. 1, the bushings 16 will be spaced some distance above the upper ends of the respective pins and in order to prevent the operator's hand or the work from entering the space between one of these pins and its bushing I have provided a cover for the leader pin which is carried by the punch holder and is of such a character that it will bridge the space between the bushing and the pin when the punch holder is in its fully retracted position. This cover is preferably in the form of a tubular device which is mounted about the bushing in line with

the leader pin and is rigidly secured to the punch holder so that it will move therewith. In that form of the device shown in Fig. 1 this cover comprises a single tubular element 17 which preferably consists of a section of thin metal tubing and which is of such length that when the punch holder is fully retracted the lower end of the cover will overlap or lie close to the upper end of the leader pin. Such a device adequately prevents the entrance of anything between the upper end of the pin and the bushing and will in some measure protect the bushing against the adherence of metal chips thereto. However, it does not protect the leader pin against dust, grit and the like which may come in contact therewith and adhere thereto, due to the lubricant thereon. Therefore, I prefer that form of the device shown in Figs. 2 and 3 in which the cover comprises a plurality of telescoping sections slidably mounted one within the other and of such length that when the punch holder is fully retracted the lowermost section of the cover will be close to or in contact with the die shoe 10. As shown in Fig. 2 this telescoping cover comprises an upper section 18 which is mounted on the punch holder and a plurality of lower sections 19 of successively decreasing diameters, each lower section being mounted in the next higher section for free sliding movement therein, so that the cover will be extended by gravity as the punch holder moves upwardly. In practice the lowermost section has little or no movement and remains at all times in contact with or close to the die shoe. The several sections of the tubular device or cover may be formed in any suitable manner but preferably they are cut from thin metal tubing and the lower end of each upper section is bent inwardly, as shown at 20, to form a shoulder, while the upper end of each lower section is bent outwardly, as shown at 21, to form a shoulder which cooperates with the shoulder 20 to prevent the withdrawal of the lower section through the lower end of the upper section. This permits of the sections to be very quickly and easily formed at small expense and to be quickly assembled by inserting each lower section through the upper end of the next higher section. The upper section 18 is preferably of a length substantially greater than the length of the lower sections so that when the punch holder is moved to its lowermost position, as shown in Fig. 3, the several lower sections will nest one within the other in the lower portion of the upper section 18 and will lie below the bushing 16 so that the latter will not contact therewith.

The cover may be attached to the punch holder in any suitable manner but, as has been stated, it is highly desirable that the connection should be of such a character that the cover may be quickly applied to and removed from the punch holder so as to permit of the ready lubrication of the leader pin and bushing. When the cover is so detached from the punch holder it will move downwardly about the leader pin into engagement with the die shoe and the upper portion of the leader pin, which is provided with lubricant grooves 22, will be exposed so that lubricant may be readily applied thereto. In the case of the telescoping cover the sections will move to the positions shown in Fig. 3 but the punch holder will be in its elevated position.

As illustrated in Figs. 1 to 4 both forms of the cover are provided with the same kind of attaching device, which is of such a character that it may be moved by the rotation of the cover, either

the single section 17 of Fig. 1, or the upper section 18 of Fig. 2, to move the same into attaching relation with cooperating attaching members carried by the punch holder. In this particular form of the device the punch holder has mounted therein, about the bushing 16, a series of headed studs, preferably in the form of screws 23, the heads of which are spaced short distances from the lower surface of the punch holder. The upper end of the cover is provided with a series of laterally extending lugs 24, each of which is provided with an arcuate slot 25 which is open at one end and is adapted to receive the studs 23, the slots being of a width less than the diameter of the heads of the studs. Thus by a mere rotation of the cover, or of the upper section thereof, it can be attached to or detached from the punch holder. To prevent the accidental disconnection of the cover from the punch holder one or more of the attaching lugs 24 is provided with a yieldable detent which is here shown as a spring finger 26 having near its ends a projection 27 so arranged that when the lugs are in proper engagement with the studs the projection 27 will engage the heads of the studs and hold the cover against rotation. When the studs are in the form of screws they may be prevented from rotating, so as to loosen them, by flattening one side of each screw head, as shown at 28, and arranging the same so close to the cylindrical wall of the cover that the screw cannot rotate. This attaching device is also adapted to serve as a templet to enable the workman, in stalling the cover to accurately locate the studs or screws 23 in the punch holder. For this purpose each lug is provided with an aperture 29 and these apertures are spaced one from the other a distance corresponding to the spacing of the slots 25. By placing the cover, or the upper section thereof, about the bushing 16 and centering the same with relation thereto the workman is enabled to insert an implement through the apertures 29 and mark the location of each screw on the punch holder, then after removing the cover he drills and taps the punch holder at the indicated locations to receive the screws. Preferably the attaching lugs 24 are formed integral with the cover by bending outwardly parts of the upper end portion of the section of tubing from which the cover is formed, those portions of the tubing between the lugs being cut away so that the lugs may lie flat against the lower surface of the punch holder.

The particular attaching device above described is very efficient and is especially desirable when the leader pin covers are to be attached after the bushing has been hardened and inserted in the punch holder, but when the covers are to be supplied with the die set itself the attaching means may take a less expensive form, as shown in Figs. 5 and 6. As there shown the bushing 16a is provided with a circumferential groove 30 and the cover 18a has secured thereto and extending beyond its upper end resilient detents 31, the upper ends of which are bent upon themselves to form projections 32 which may be sprung into the groove 30 by merely pressing the cover upwardly about the bushing, and will likewise be withdrawn by a downward pull on the cover, the upper and lower surfaces of the projection 32 being inclined to cause the detents to yield under pressure. The groove 30 may be quickly and inexpensively formed in the bushing during the process of manufacture and before the bushing is hardened.

While I have shown and described one embodiment of my invention, together with certain modi-

fications thereof, I wish it to be understood that I do not desire to be limited to the details thereof as various modifications may occur to a person skilled in the art.

5 Having now fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a die set or the like comprising a base, a guide pin carried by said base and a member movable toward and from said base and provided with a guideway to receive said guide pin, a tubular device carried by said movable member in line with said guide pin and of such length that it will bridge the space between said guideway and said pin when said movable member is in its retracted position, and quickly detachable means for securing said tubular device to said movable member.

2. In a die set or the like comprising a base, a guide pin carried by said base and a member movable toward and from said base and provided with a guideway to receive said guide pin, a tubular device carried by said movable member in line with said guide pin and of such length that it will bridge the space between said guideway and said pin when said movable member is in its retracted position, and means operable by the manipulation of said tubular device for connecting the latter with and disconnecting the same from said movable member.

3. In a die set or the like comprising a base, a guide pin carried by said base and a member movable toward and from said base and provided with a guideway to receive said guide pin, a tubular device carried by said movable member in line with said guide pin and of such length that it will bridge the space between said guideway and said pin when said movable member is in its retracted position, cooperating means carried by said movable member and said tubular device respectively for detachably securing said tubular device to said movable member, one of said means comprising a resilient member.

4. In a die set or the like comprising a base, a guide pin carried by said base and a member movable toward and from said base and provided with a guideway to receive said guide pin, a tubular device carried by said movable member in line with said guide pin and of such length that it will bridge the space between said guideway and said pin when said movable member is in its retracted position, supporting members carried by said movable member, and parts carried by said tubular device and movable by the rotation of said device into and out of supporting engagement with said supporting members.

5. In a die set or the like comprising a base, a guide pin carried by said base and a member movable toward and from said base and provided with a guideway to receive said guide pin, a tubular device carried by said movable member in line with said guide pin and of such length that it will bridge the space between said guideway and said pin when said movable member is in its retracted position, headed studs carried by said movable member, and slotted lugs carried by said tubular device and movable into and out of engagement with the respective lugs by the rotation of said tubular device.

6. In a die set or the like comprising a base, a guide pin carried by said base and a member movable toward and from said base and provided with a guideway to receive said guide pin, a tubular device carried by said movable member in line with said guide pin and of such length that

it will bridge the space between said guideway and said pin when said movable member is in its retracted position, headed studs carried by said movable member, and slotted lugs carried by said tubular device and movable into and out of engagement with the respective lugs by the rotation of said tubular device, at least one of said lugs being provided with a yieldable detent to engage the corresponding stud and hold said tubular device against rotation.

7. In a die set or the like comprising a base, a guide pin carried by said base and a member movable toward and from said base and provided with a guideway to receive said guide pin, a tubular device carried by said movable member in line with said guide pin and of such length that it will bridge the space between said guideway and said pin when said movable member is in its retracted position, headed screws mounted in said movable member, slotted lugs carried by said tubular device and movable into and out of engagement with said screws, said screws having their heads flattened on one side and arranged close to said tubular device to prevent the rotation of said screws while said lugs are in engagement therewith.

8. In a die set or the like comprising a base, a guide pin carried by said base and a member movable toward and from said base and provided with a guideway to receive said guide pin, a tubular device carried by said movable member in line with said guide pin and of such length that it will bridge the space between said guideway and said pin when said movable member is in its retracted position, headed studs carried by said movable member, and slotted lugs carried by said tubular device and movable into and out of engagement with the respective lugs by the rotation of said tubular device, said lugs having apertures spaced apart distances corresponding to the spacing of said studs to facilitate the locating of said studs on said movable member when said tubular device is to be installed.

9. In a die set or the like comprising a base, a guide pin carried by said base, a member movable toward and from said base, and a tubular element carried by and projecting beyond the surface of said movable member in line with said pin, a second tubular element mounted about the first mentioned tubular element and bridging the space between the latter and said pin, and yieldable attaching devices carried by one of said tubular elements, the other tubular element having a part to be engaged by said attaching devices.

10. In a die set or the like comprising a base, a guide pin carried by said base, a member movable toward and from said base, and a tubular element carried by and projecting beyond the surface of said movable member in line with said pin, a second tubular element mounted about the first mentioned tubular element and bridging the space between the latter and said pin, said first mentioned tubular element having a circumferential groove, and yieldable detents carried by said second tubular element and arranged to enter said groove.

11. In a die set or the like comprising a base, a guide pin carried by said base and a member movable toward and from said base and provided with a guideway to receive said guide pin, a tubular device carried by said movable member and embracing said pin, said device including a plurality of telescoping sections slidably connected one to the other and of such length that

the lowermost section will remain close to said base when said movable member is fully retracted.

5 12. In a die set or the like comprising a base, a leader pin carried by said base, and a member movable toward and from said base and provided with a guideway to receive said leader pin, a collapsible cover for said leader pin comprising a tubular device having parts movable lengthwise thereof into nested relation, and quick detachable means connecting one end of said device with said movable member, said device being of such a length that it will substantially bridge the space between said base and said movable member in all positions of the latter.

15 13. In a die set or the like comprising a base, a guide pin carried by said base and a member movable toward and from said base and provided with a guideway to receive said guide pin, a tubular cover arranged about said guide pin and comprising a plurality of sections slidably mounted one within the other, and means for connecting the outermost section with said movable member, each upper section having its lower

end portion slightly tapered to form a stop and each lower section having its upper end portion slightly flared to form a stop to cooperate with the stop at the lower end of the next higher section.

5 14. In a die set or the like comprising a base, a guide pin carried by said base, a member movable toward and from said base, and a tubular element carried by and projecting beyond the surface of said movable member in line with said pin, a second tubular element mounted about the first mentioned tubular element and bridging the space between the latter and said pin, and an attaching device carried by said second tubular element and cooperating with the first mentioned tubular element to detachably connect said elements one to the other.

10 15. A cover for a leader pin of a die set or the like comprising a section of tubing having spaced parts at the upper end thereof cut away and having the remaining parts of said upper end bent outwardly to form attaching lugs.

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