Nov. 16, 1965 L. P. CONOVER 3,217,556

ATTACHMENT FOR DRILL PRESS

Filed Oct. 15, 1963

Fig. 1.

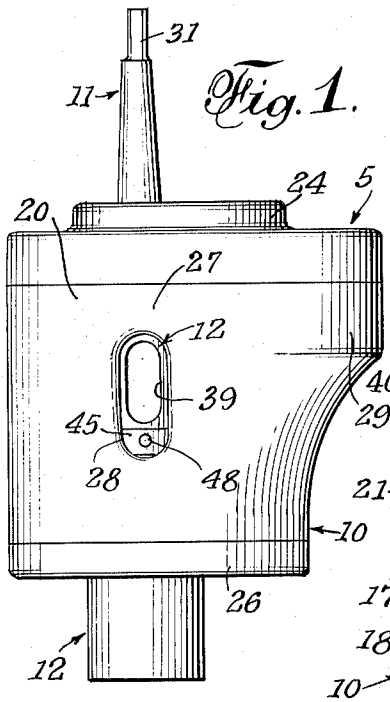


Fig. 2.

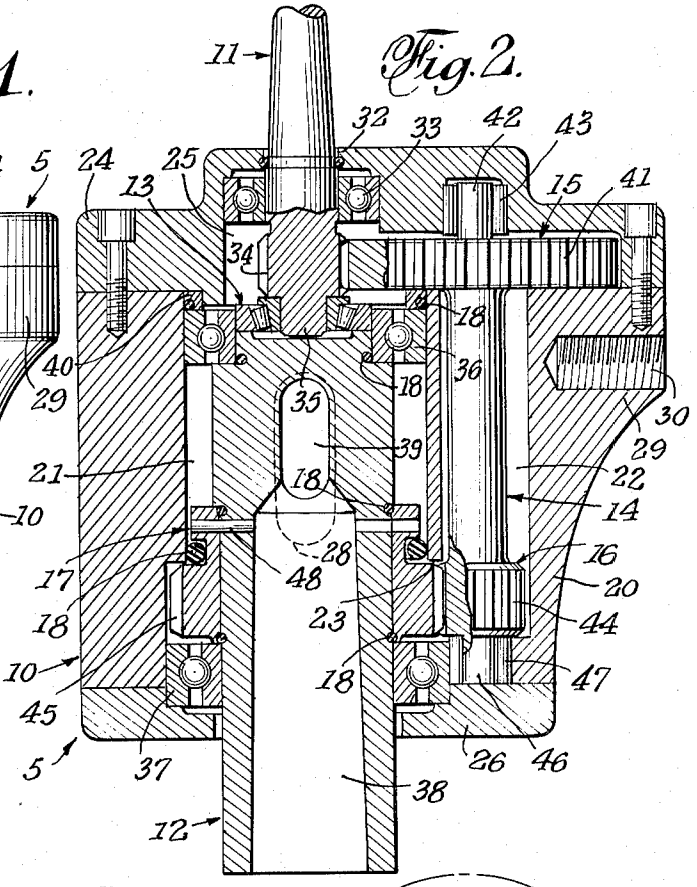
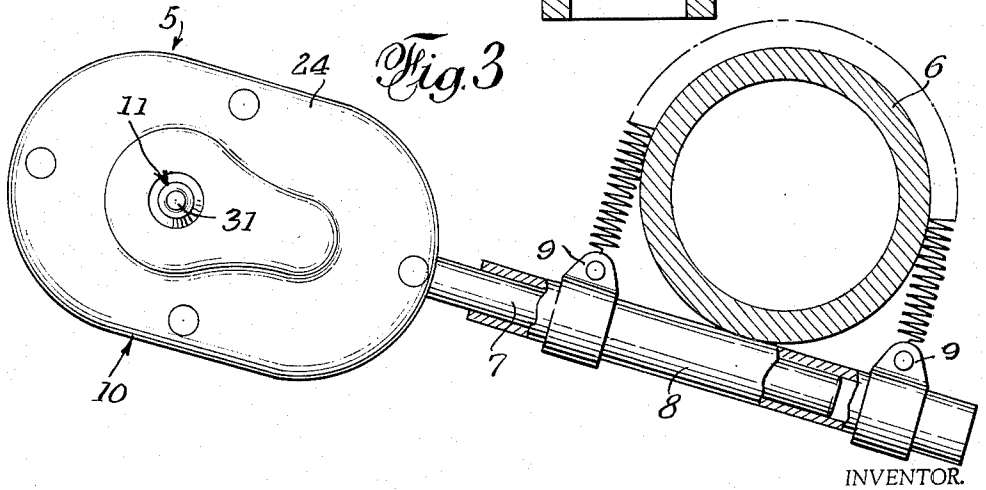


Fig. 3



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ATTACHMENT FOR DRILL PRESS

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This invention relates to an attachment that converts a drill press of one maximum size to one for drilling holes of a larger size than the capacity of the original press. This invention is an improvement of the improvements disclosed in my Patent No. 2,784,614, issued May 12, 1957.

An object of the present invention is to provide a simplified and less costly structure that effects an efficient transfer of power from the input to the torque-applying spindle by means of a simplified and powerful speed reducer.

Another object of the invention is to provide an attachment as characterized that has a trimmer, less bulky shape, giving improved visibility of the work and, therefore, more efficient operation.

A further object of the invention is to provide a drill press attachment that incorporates features of safety to insure against unduly stressing the reducing gears of the attachment.

A still further object of the invention is to provide an attachment as above that is sealed against leakage of lubricant housed in the body of the same.

This invention also has for its objects to provide such means that are positive in operation, convenient in use, easily installed in a working position and easily disconnected therefrom, economical of manufacture, relatively simple, and of general superiority and serviceability.

The invention also comprises novel details of construction and novel combinations and arrangements of parts, which will more fully appear in the course of the following description and which is based on the accompanying drawing. However, said drawing merely shows, and the following description merely describes, one embodiment of the present invention, which is given by way of illustration or example only.

In the drawing, like reference characters designate similar parts in the several views.

FIG. 1 is a side elevational view of an attachment according to the present invention.

FIG. 2 is an enlarged vertical sectional view thereof.

FIG. 3 is a plan view, to a scale between that of FIG. 1 and FIG. 2, showing the present attachment in operative position relative to the column of a drill press.

The present attachment **5** is shown in operative relation to a drill press column **6** and is held non-rotationally by an arm **7** that extends from the attachment, a length-adjustable sleeve **8** on said arm and a coil spring around the column **6** and connected by its ends **9** to said sleeve. It is understood that the attachment is mounted on the axis of the drill press drive shaft or arbor, and that the above-described means holds steady the attachment **5** during drive thereof by the press arbor.

The attachment **5** comprises, generally, a housing **10**, an input shaft or shank **11** extending into the housing from above, the same being adapted for separable connection to the mentioned press arbor to be rotated thereby, an output shaft **12** axially aligned with the shank **11**, a single taper roller bearing **13** interengaging the adjacent ends of said shank **11** and shaft **12**, a countershaft **14** in the housing parallel to the shaft **12**, a first stage reducing gearing **15** between the shank **11** and said countershaft, a second stage reducing gearing **16** between said countershaft and the shaft **12**, shear means **17** connecting the shaft **12** and said reducing gearing **16** to shear in the

event of excessive torque resistance on the shaft **12**, and leakage sealing means **18**.

The housing **10** comprises a body **20** that has a through bore **21**, and a parallel, smaller bore **22**, said bores being in communication at **23** at the lower portion of the body. A cap plate **24** closes the top of the body and has a bore **25** that is an axial extension of bore **21** and a communicating bore coaxial with the bore **22** of the body. A bottom plate **26** closes the bottom of the body. In this form of the invention, the body **20** has flattened sides, as seen in FIG. 3, the bore **21** forming side walls **27**. Vertically elongated openings **28** are formed in said walls, as best seen in FIG. 1. The body is formed with a laterally extending portion **29** in which is shown a tapped seat **30** for an end of the arm **7**.

The input shank **11** is provided with an upper end **31** that is adapted for separable connection to a press arbor to be rotationally driven thereby. Said shank extends through an opening **32** in the cap plate and through a radial bearing **33** in the bore **25** of said cap plate. Integrally formed on the shank **11** is a spur pinion **34** in the bore **25** beneath the bearing **33**, an integral pilot extension **35** of the shank **11** being engaged in the inner race of the mentioned taper roller bearing **13**. Said pinion **34** is the fast gear of the first stage reducing gearing **15**.

The output shaft **12**, at its upper end, is fitted into the inner race of a radial bearing **36** mounted in the bore **21** of the body **20**. The outer race of the taper roller bearing **13** is also fitted into said inner race. Thus, the pilot extension **35** of the shank **11** and the upper end of the shaft **12** are retained in alignment by the radial properties of bearing **13** and the same are in anti-friction end thrust engagement due to the thrust-taking properties of said bearing **13**. A radial bearing **37**, partly in the bore **21** of the body **20** and partly in an aligned bore in the bottom plate **26**, is mounted so as to journal the shaft **12** in cooperation with the bearing **36**. Said shaft is provided, in its lower portion with a tapered socket **38** that is adapted to receive the similarly tapered shank of a drilling or similar tool of conventional design. Shaft **12** is shown with a knock-out slot **39** that extends from the upper end of socket **38** and in approximate register with the openings **28** in the housing body, as best seen in FIG. 1.

By means of the above arrangement, the shank of a tool, carried by the shaft **12**, extends partly into the body, providing for a close-coupled arrangement of tool and attachment that minimizes flexure of the tool during a drilling or boring operation. It will be clear the openings **28** afford access to the slot **39** for a tool-dislodging member.

As can be seen in FIG. 2 a ring or washer **40** is held by the cap plate **24** in a hold-down relation to the upper radial bearing **36**. In this construction it is preferred that the bearings **33**, **36** and **37** be sealed bearings, i.e., those that will not pass lubricant therethrough and which retain pre-packed lubricant.

The first stage reducing gear **15** comprises the mentioned pinion **34** on the shank **11** and a mating gear **41** on the countershaft **14**. A pilot extension **42** on the countershaft **12** is held by a needle bearing **43** journalled in the cap plate **24**. The ratio of the gears **34** and **41** is shown, in this case, at about one to three and one-half.

The second stage reducing gearing **16** comprises a pinion gear **44** integral on the lower end of the countershaft **14**, and a ring gear **45** mating therewith and carried by the shaft **12**. The ratio of these gears may be in the nature of one to three or three and one-half, thereby providing an overall reducing ratio of one to ten or twelve, as desired, with a commensurate increase in power; a

pilot extension **46** on the lower end of the countershaft **14** is held by a needle bearing **47** journalled in the lower portion of the body **20**.

The shear means **17** is shown as shear pins **48** connecting the shaft **12** and the ring gear **45**. The same will shear under excessive resistance to the torque on the shaft by the tool carried by said shaft, thereby saving wear or breakage of the gear teeth of the several gears. Such pins are easily replaced, since they may be knocked out and replaced without disassembling the tool, because of access thereto through either of the slots **28**.

Since the bore **21** is open due to the slots **28**, the various O-rings **18**, as shown, are provided to prevent leakage of lubricant that may spill from said slots **28**.

Since drill presses are but examples of the type of machine on which the present attachment may be used, the same should be considered as generic.

While the foregoing has illustrated and described what is now contemplated to be the best mode of carrying out the invention, the construction is, of course, subject to modification without departing from the spirit and scope of the invention. Therefore, it is not desired to restrict the invention to the particular form of construction illustrated and described, but to cover all modifications that may fall within the scope of the appended claims.

Having thus described this invention, what is claimed and desired to be secured by Letters Patent is:

1. A drill press attachment comprising:

(a) a housing adapted to be mounted on the arbor of said press and having lateral knock-out openings,

(b) means to hold the housing non-rotational,

(c) axially aligned input and output shafts extending in opposite directions from said housing with a major portion of the output shaft disposed within the housing,

(d) a thrust-receiving bearing carried by one of said shafts and in thrust-taking engagement with the other,

(e) reducing gearing in the housing inter-connecting the shafts to drive one shaft slower than the other, and

(f) the slower shaft having a tool-receiving socket and a knock-out slot longitudinally aligned with the mentioned openings in the housing to provide access for a member to dislodge a tool fitted into said socket.

2. A drill press attachment according to claim **1** in which an element of said reducing gear is mounted on the slower shaft, and shear means connects said element and slower shaft to shear under excessive resistance to torque of the latter shaft.

3. A drill press attachment according to claim **1** in which seals between the housing and the slower shaft are provided above and below the openings in the housing to obviate lubricant leakage through said openings.

4. A drill press attachment according to claim **1** in which the reducing gearing comprises first and second reducing stages, and a shear connection between the slower shaft and the second reducing stage to shear under excessive resistance to torque of said latter shaft.

5. A drill press attachment according to claim **1** in which the housing holding means comprises:

(a) a rigid lateral arm on the housing,

(b) a length-adjustable sleeve on said arm, and

(c) means to connect said sleeve to the column of said press.

6. A drill press attachment comprising:

(a) a housing adapted to be mounted on the arbor of said press and having lateral knock-out openings,

(b) means to hold the housing non-rotational,

(c) axially aligned input and output shafts extending in opposite directions from said housing with a major portion of the output shaft disposed within the housing,

(d) a thrust-receiving bearing carried by one of said shafts and in thrust-taking engagement with the other,

(e) reducing gearing in the housing inter-connecting the shafts to drive one shaft slower than the other,

(f) a radial bearing for the faster shaft,

(g) two longitudinally spaced radial bearings for the slower shaft, and

(h) the slower shaft having a tool-receiving socket and a knock-out slot longitudinally aligned with the mentioned openings in the housing to provide access for a member to dislodge a tool fitted into said socket.

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