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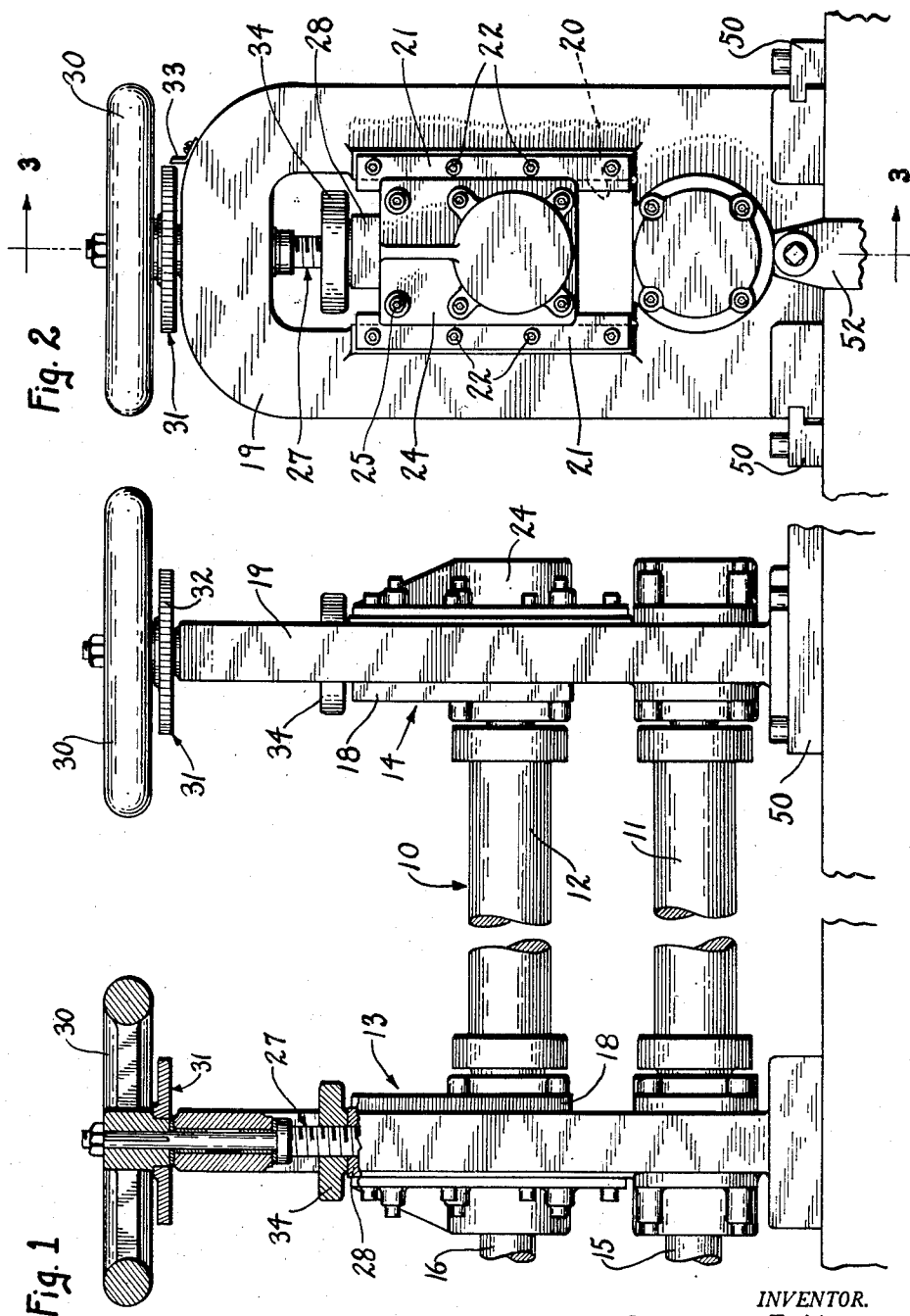
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SLITTER APPARATUS

Filed May 20, 1952

2 Sheets-Sheet 1



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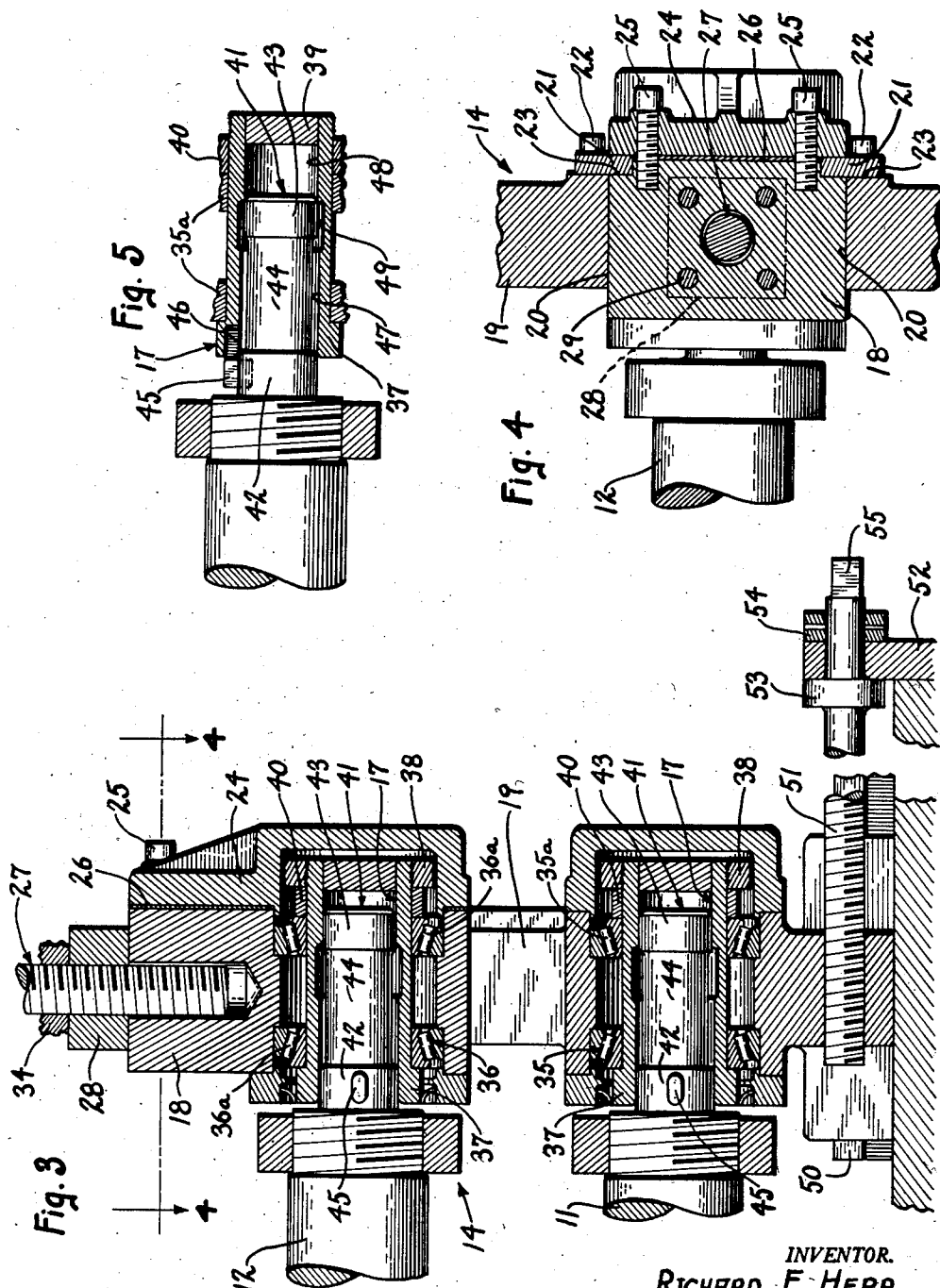
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2 Sheets-Sheet 2



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SLITTER APPARATUS

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6 Claims. (Cl. 308—59)

My invention relates to apparatus for supporting one or more rotatable shafts, more particularly to slitter apparatus wherein one shaft is supported for movement toward and away from the other and wherein one of the supports for the shafts is movable toward and away from shaft supporting position, and the principal object of my invention is to provide new and improved apparatus of the class described.

In the art of slitter construction, two troublesome problems have long existed. One of the problems is caused by the requirement that one of the shafts upon which the slitter knives are mounted must be movable toward and away from the other shaft. Heretofore, this has been accomplished by various constructions; however these past constructions have not been entirely satisfactory because they have been expensive to manufacture and because, for the most part, no provision was made to permit adjustment for normal wear.

The other problem presented is the requirement that one of the housings which supports the shafts must be easily movable toward and away from shaft supporting position so that the slitter knives may be replaced over the free ends of the shafts. This problem has been especially difficult because of the close fit required between each shaft and its bearing, the necessity of alignment between the parts of the key assembly which locks the respective parts against relative rotation, and the ever present requirement that manufacturing costs be kept as low as possible.

My invention provides a practical solution to the problems outlined above and to others as will later appear, and while these problems and my invention are disclosed specifically with respect to slitter apparatus, it will be apparent that the instant disclosure is illustrative only and that my invention has wide utility in apparatus apart from the one specifically mentioned.

In the drawings accompanying this specification and forming a part of this application there is shown, for purpose of illustration, an embodiment which my invention may assume, and in these drawings:

Figure 1 is a broken, fragmentary side elevational view partially in section illustrating a preferred embodiment of my invention,

Figure 2 is an end elevational view of the apparatus shown in Figure 1,

Figure 3 is an enlarged, fragmentary sectional view generally corresponding to the line 3—3 of Figure 2,

Figure 4 is an enlarged, fragmentary sectional view generally corresponding to the line 4—4 of Figure 3, and

Figure 5 is a fragmentary sectional view illustrating a stage in the assembly of certain parts of the apparatus illustrated in Figures 1 through 4.

As best shown in Figures 1 and 2, the apparatus chosen to illustrate my invention is a slitter construction indicated generally by the numeral 10. The construction comprises a pair of shafts 11 and 12 each supported for rotation in spaced-apart housings 13 and 14. Each shaft

11—12 projects through the housing 13 at 15 and 16 respectively, and each is adapted to be driven by a conventional drive which has been omitted from the drawings in the interest of clarity.

As herein disclosed, the shaft 11 is adapted to be supported for rotation in the housing 13 by means of a conventional bearing assembly which permits only rotative movement of the shaft. The housing 14 also supports the shaft 11 for rotation therein; however, a sleeve 17 is interposed between the shaft and its bearing for a purpose later to be shown. Suffice it is to state at this point that in addition to the rotative movement permitted between the shaft 11 and the housing 14, relative axial movement therebetween is also permitted.

Referring particularly to Figures 1, 3 and 4, it will be seen that the shaft 12 is rotatably carried by a chock 18 which is slideable in a housing frame 19 of the housing 14. While the housing 13 together with its chock and associated parts has not been shown in detail, it will be understood that such construction is similar to housing 14 and chock 18 except with respect to the bearing assemblies which will later be described.

Each housing frame 19 is provided with an opening 20 within which a respective chock 18 is slideable. Gibs 21 are secured to each frame 19 on opposite sides of the opening 20 as shown, cap screws 22 presently being employed to effect such securement. Each chock 18 is notched at 23 for engagement with a respective gib 21, and a cap 24 is secured to each chock 18 by means of screws 25 to hold each chock against respective gibs 21—21.

As will be clear, each chock 18 together with its cap 24 provide spaced-apart grooves each engageable with a respective gib 21 (see Figure 4). As shown in Figures 3 and 4, means are provided to permit adjustment of the width of the gib receiving grooves, and the means presently employed for this purpose comprise shims 26 interposed between each chock and its cap.

It will be apparent that the provision for adjustment of the width of the gib receiving grooves is a distinct step forward in the art since the initial setup of the machine is facilitated and because normal wear of the parts may be easily compensated for by the simple removal of the required number of shims.

The means employed to effect movement of each chock with respect to its housing frame 19 is herein shown to be of a conventional design and comprises a screw 27 rotatably carried by each frame 19 and a nut member 28 secured to each chock 18 by means of screws 29. A hand-wheel 30 is secured to each screw 27 so that the screw may be easily rotated, and an indicator disc 31, having indicia 32, is carried by each hand-wheel. A pointer 33 is secured to each frame 19 and each pointer is cooperable with the indicia carried by a respective disc 31 to indicate to the operator the proper setting of each end of the shaft 12. A collar 34 is threadably carried by each screw 27 as shown for locking respective screws in their adjusted positions.

As hereinbefore mentioned, the shaft 11 is supported in the housing 13 by a conventional bearing assembly which permits rotative but not axial movement of the shaft. The shaft 12 is supported in the housing 13 by the chock 18 which provides a similar conventional bearing assembly that also permits rotative but not axial movement of the shaft 12.

Referring particularly to Figure 3, it will be seen that a bearing assembly 35 is provided in the housing frame 19 of the housing 14 for the shaft 11, and a similar bearing assembly 36 is provided by the chock 18 of the housing 14 for the shaft 12. Each bearing assembly 35, 36 is similar and comprises bearings 35a, 36a respectively carried by the housing frame 19 of the housing 14 and

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the chock 18 of this housing. Sleeves 17, hereinbefore mentioned, are rotatable in bearings 35a, 36a, and each sleeve 17 is provided with a flange 37 as shown.

Each sleeve 17 is externally threaded on the end opposite the flange 37, a nut 38 being adapted to engage with the sleeve so that the sleeve may be securely locked to the bearings. A plug 39 may be welded or otherwise secured within each sleeve 17 as shown, and a spacer 40 is presently employed to space each nut 38 from its adjacent bearing.

Each shaft 11, 12 has a reduced end portion 41 which is adapted to slide into its respective sleeve 17. The reduced end portion 41 of each shaft is formed to provide spaced-apart seat portions 42, 43 connected by a reduced diameter portion 44. Seat portion 43 is slightly smaller in diameter than seat portion 42 for a purpose which will appear. A key 45 is secured to each shaft at seat portion 42, and the flange 37 of each sleeve 17 is provided with a keyway 46 as shown.

Each sleeve 17 has annular portions 47, 48 which are respectively engageable with seat portions 42, 43 of a respective shaft, and an annular groove 49 separates the portions 47, 48 to provide additional clearance over the seat portion 43.

As previously mentioned, the housing 14 is adapted to be shifted toward and away from shaft supporting position and for this purpose the housing 14 is slideable along guides 50 (see Figures 1, 2 and 3). A screw 51 is threadably engageable with the housing 14 and is supported for rotation in an upstanding bracket 52. Thrust collars 53, 54 engage respective sides of the bracket 52 and any desired means may be employed to assist rotation of the screw 51 (a squared portion 55 adapted to be engageable by a wrench or the like presently being employed for this purpose). It will be clear that rotation of the squared portion 55 of the screw 51 by means of a wrench or the like will cause the housing 14 to slide along its guides 50 toward and away from shaft supporting position.

Figure 5 illustrates engagement of a sleeve 17 with its respective shaft during movement of the housing 14 to shaft supporting position. It will be clear that the stepped diameter of the seat portions 42, 43 permit the sleeve 17 to be slipped over the shaft portion 41 and the keyway 46 aligned with the key 45 before a substantial amount of interengagement between the shaft and the sleeve occurs. Clearly, once substantial interengagement between the sleeve and the shaft occurs no correction may be made for alignment of the key with its keyway. Furthermore, the spaced-apart interengagement of the sleeve and the shaft provided by my construction insures the firm interfitting of parts that is required in heavy duty bearing constructions.

Since prior art constructions required that a substantial amount of interengagement between the parts take place before engagement of the key and keyway, it will be evident that the problem of establishing and maintaining alignment of the parts during assembly was a serious one. However, as hereinbefore disclosed, my invention completely solves this problem without sacrificing rigidity between the parts and without an appreciable increase in costs.

In view of the foregoing it will be apparent to those skilled in the art that I have accomplished at least the principal object of my invention and it will also be apparent to those skilled in the art that the embodiment herein described may be variously changed and modified, without departing from the spirit of the invention, and that the invention is capable of uses and has advantages not herein specifically described, hence it will be appreciated that the herein disclosed embodiment is illustrative only, and that my invention is not limited thereto.

I claim:

1. A splitter construction comprising a pair of rotatable shafts, one of the shafts being restricted against trans-

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verse movement and the other shaft being movable in a direction transverse to its longitudinal axis, each shaft being formed at one end to provide axially spaced seat portions of differing diameters and said seat portions terminating in respective leading ends, with the smallest diameter seat portion adjacent the extremity of such shaft end, a pair of spaced-apart housings having slide surfaces, said housings rotatably carrying said restricted shaft and one of said housings being shiftable toward and away from shaft supporting position, a chock for each of said housings, each chock being slideable along respective slide surfaces and each providing bearings for rotatably supporting said movable shaft, gib means carried by each of said housings, said gib means each comprising two elongated gib members disposed on opposite sides of each chock and extending longitudinally in a direction of movement thereof, cap means removably secured to each chock, each cap means and its respective chock together providing spaced grooves, each for receiving a respective gib member, shim means interposed between each cap means and its respective chock whereby the spacing between the opposed surfaces defining the sides of each of the grooves may be varied by varying the thickness of said shim means, a sleeve for each of said shafts, one sleeve being rotatable within bearings in said shiftable housing and the other sleeve being rotatable within bearings in the chock carried by said shiftable housing, each sleeve being shiftable with said shiftable housing over the ends of respective shafts and each having axially spaced portions interengageable with respective seat portion of a respective shaft and each sleeve portion terminating in respective leading ends, and a key extending transversely of the largest diameter seat portion of each shaft, each key interfitting with a respective keyway formed in a corresponding portion of each sleeve to effect unitary rotation of each shaft with its respective sleeve, each key being so related to its respective shaft and each keyway being so related to its respective sleeve and the spacing between the leading ends of said shaft seat portions and the spacing between said sleeve portions being substantially equal to effect substantially simultaneous engagement between the respective shaft seat portions and respective sleeve portions and between each key and its keyway upon movement of said shiftable housing to shaft-supporting position.

2. Means supporting a shaft for movement in a direction transverse to its longitudinal axis comprising, spaced-apart support means, a chock slideable with respect to each of said support means and each rotatably supporting spaced portions of said shaft, gib means carried by each of said support means, said gib means each comprising two elongated gib members disposed on opposite sides of said chock and extending longitudinally in the direction of movement thereof, cap means removably secured to each of said chocks, a respective cap means and its chock together providing spaced grooves each for receiving a respective gib member, opposed surfaces defining the sides of each of the grooves being respectively provided by portions of a respective cap means and its chock, and shim means interposed between each of said cap means and its respective chock whereby the spacing between the opposed surfaces defining the sides of each of the grooves may be varied by varying the thickness of said shim means.

3. A splitter construction comprising a pair of rotatable shafts, one of the shafts being restricted against transverse movement and the other shaft being movable in a direction transverse to its longitudinal axis, a pair of spaced-apart housings rotatably carrying said one shaft, said spaced-apart housings being formed to provide slide surfaces, a chock for each of said housings, each chock being slideable along respective slide surfaces and each providing bearings for rotatably supporting said movable shaft, gib means carried by each of said housings, said gib means each comprising two elongated gib mem-

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bers disposed on opposite sides of each chock and extending longitudinally in the direction of movement thereof, cap means removably secured to each chock, each cap means and its respective chock together providing spaced grooves each for receiving a respective gib member, opposed surfaces defining the sides of each of the grooves being respectively provided by portions of a respective cap means and its chock, and shim means interposed between each cap means and its respective chock whereby the spacing between the opposed surfaces defining the sides of each of the grooves may be varied by varying the thickness of said shim means.

4. Apparatus for supporting a shaft comprising, a first housing, a shaft rotatably carried by said first housing and extending laterally therefrom, the free end of said shaft having axially spaced seat portions of differing diameters with the smallest diameter seat portion adjacent the free end of said shaft and said seat portions terminating in respective leading ends, a second housing adapted to support the free end of said shaft and shiftable axially toward and away from shaft supporting position, a sleeve rotatable within bearings in said second housing, said sleeve being shiftable with said second housing over the free end of said shaft and having axially spaced portions each interengageable with a respective seat portion and each sleeve portion terminating in respective leading ends, and a key extending transversely of the largest diameter seat portion of said shaft, said key interfitting with a keyway formed in the portion of said sleeve interengageable with said largest diameter seat portion thereby to effect unitary rotation of said shaft and said sleeve, said key being so related to said shaft and said keyway being so related to said sleeve and the spacing between the leading ends of said shaft seat portions and the spacing between said sleeve portions being substantially equal to effect substantially simultaneous engagement between the shaft seat portions and respective sleeve portions and between said key and its keyway upon movement of said second housing to shaft supporting position.

5. In combination: a shaft having stepped diameter, longitudinally extending external seat portions terminating in axially spaced-apart, respective leading ends, and a sleeve having stepped diameter, longitudinally extend-

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ing internal seat portions terminating in axially spaced-apart, respective leading ends, one of said sleeve seat portions being proportioned for close fitting engagement with one of said shaft seat portions and another sleeve seat portion being proportioned for close fitting engagement with another shaft seat portion, the axial spacing between the leading ends of said shaft seat portions and the axial spacing between the leading ends of said sleeve seat portions being substantially equal to effect substantially simultaneous interengagement between respective internal and external seat portions during assembly of said sleeve upon said shaft.

6. In combination: a shaft having stepped diameter, longitudinally extending external seat portions terminating in axially spaced-apart, respective leading ends, a sleeve having stepped diameter, longitudinally extending internal seat portions terminating in axially spaced-apart respective leading ends, one of said sleeve seat portions being proportioned for close fitting engagement with one of said shaft seat portions and another sleeve seat portion being proportioned for close fitting engagement with another shaft seat portion, and key means having respective portions carried by said shaft and said sleeve and interengageable to lock said sleeve and said shaft against relative rotation, the respective portions of said key means being so related to respective seat portions, and the axial spacing between the leading ends of said shaft seat portions and the axial spacing between the leading ends of said sleeve seat portions being substantially equal to effect substantially simultaneous interengagement between respective internal and external seat portions and between respective key means portions during assembly of said sleeve upon said shaft.

References Cited in the file of this patent

UNITED STATES PATENTS

113,871	Gibbons	Apr. 18, 1871
376,900	Morell	Jan. 24, 1888
509,930	Moore	Dec. 5, 1893
1,184,514	Burgess	May 23, 1916
1,804,187	Terry	May 5, 1931
2,095,794	Corbin	Oct. 12, 1937