Feb. 28, 1939. H. W. KULP ET AL 2,148,627

BREAKER POINT GRINDER

Filed Dec. 14, 1937

Fig. 1.

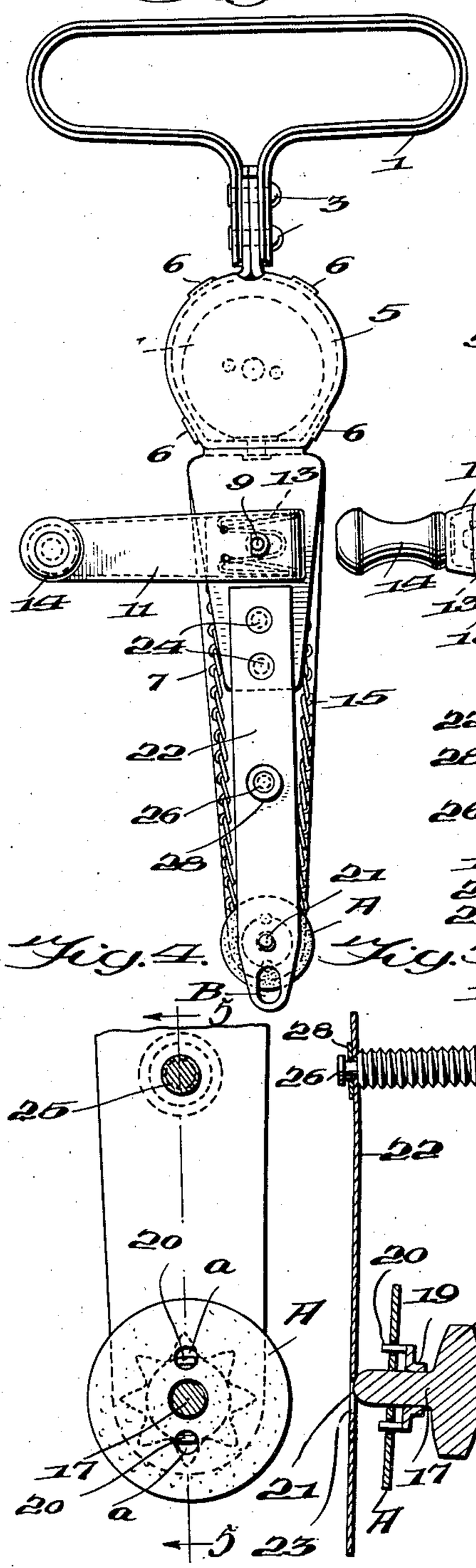

Fig. 2.

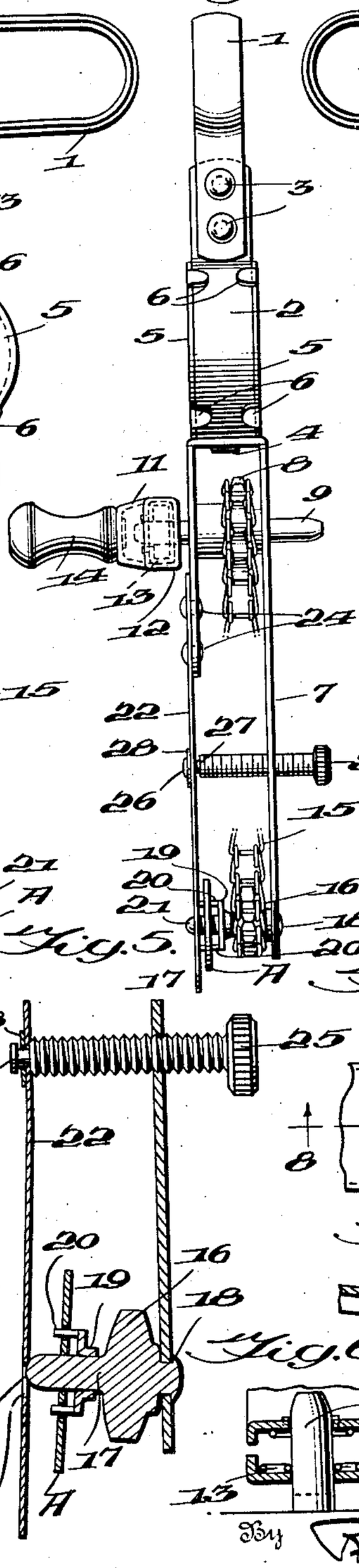

Fig. 3.

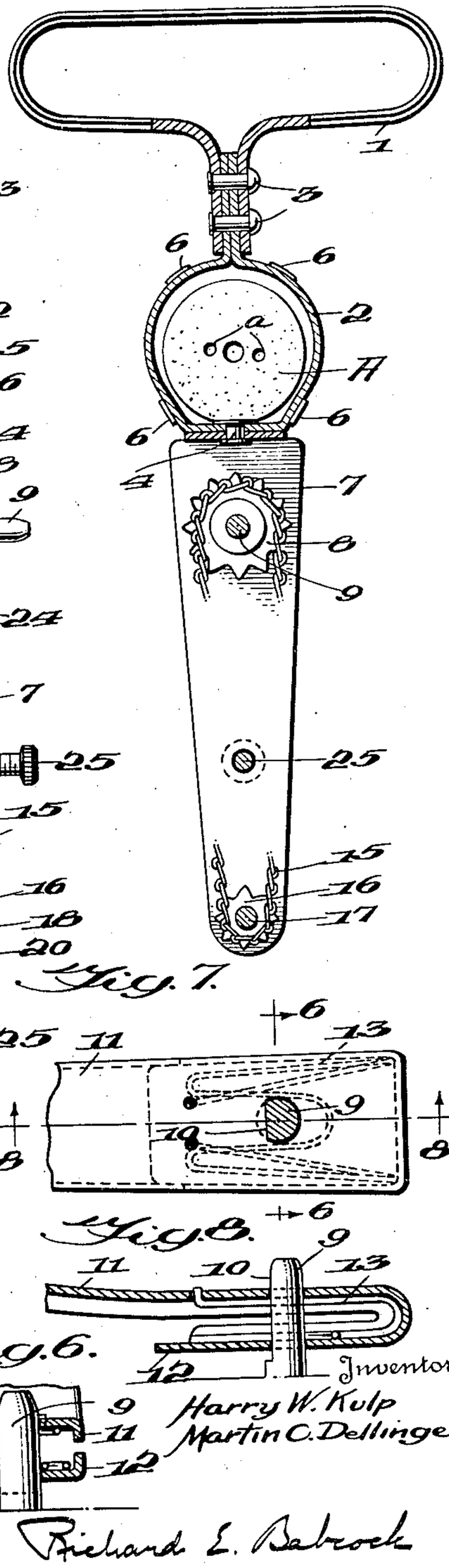

Fig. 4.

Fig. 5.

Fig. 7.

Fig. 8.

Fig. 6.

Inventors
Harry W. Kulp
Martin C. Dellinger

By Richard E. Babcock
Attorney

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BREAKER POINT GRINDER

Harry W. Kulp and Martin C. Dellinger, Lancaster, Pa., assignors to K-D. Manufacturing Company, Lancaster, Pa., a corporation of Pennsylvania

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9 Claims. (Cl. 51—170)

This invention relates to breaker point grinders, such for example as shown in the Patent Number 1,917,863, granted July 11, 1933, to Herbert H. Walters, although it is capable of use in other connections and other fields and by this application we seek to define and protect our invention for use in any field in which it is capable of functioning.

The primary objects of the present invention are, to provide a built up sheet metal frame having a hand grip portion, a magazine portion for extra grinding elements and a bifurcated portion for mounting the driving means and the driven grinder, all said portions being rigidly connected together and particularly lending themselves to very economical production on a large quantity basis by sheet metal stamping operations; to provide a drive shaft in association with a drive crank which by easy and quick shifting of the crank from one end portion of the shaft to the other may be selectively turned from the right hand or the left hand to facilitate operation of the tool in cramped quarters and on all makes of automobiles; and to provide in combination with the bifurcated member means preferably permanently associated therewith for positively at will moving the lower end portion of one of the furcations thereof both from and toward the other to permit the removal of a grinding element and its replacement by a new element and the holding of the new grinding element and of the operative parts in the proper operating relationship.

In this application we show and describe only the preferred embodiment of our invention simply by way of illustration of the practice thereof as by law required. However, we recognize that our invention is capable of other and different embodiments, and that the various details thereof may be modified in numerous ways, all without departing from our said invention and therefore, the drawing and descriptions herein are to be considered as merely illustrative and not as exclusive.

In the accompanying drawing:

Figure 1 represents a front elevation of a grinding tool embodying our invention;

Figure 2, a side elevation thereof;

Figure 3, a view similar to Figure 1 with the near side of the bifurcated portion and the drive crank omitted and the magazine in section together with the adjacent portion of the handle;

Figure 4, an enlarged fragmentary detail view of the lower portion of the rigid furcation, this view being taken in such a plane as to show the details of the mounting of the grinding wheel A on the shaft 17 and engaged by the drive forks 20;

Figure 5, a sectional view on the line 5—5 of Figure 4, looking in the direction of the arrows and assuming both furcations of the bifurcated fork to be present but spread, or the resilient furcation spread from the rigid furcation, the thrust screw and the drive forks being shown in side elevation;

Figure 6, a sectional view on the line 6—6 of Figure 7 looking in the direction of the arrows;

Figure 7, an enlarged detail side elevation view of the hub end portion of the drive crank as applied to one end of the drive shaft 9, the friction gripping spring 13 being shown in dotted lines; and

Figure 8, a sectional view on the line 8—8 of Figure 7, looking in the direction of the arrows.

Referring now in detail to the drawing, the frame of the tool comprises a loop form strap metal or stamp sheet metal handle portion 1; a loop form or generally round magazine body portion formed of a band or ribbon of sheet metal and having a flat lower side; and a bifurcated frame portion 7 having a flat web or bridge connecting the upper portions of its two furcations, according to the preferred embodiment illustrated.

Preferably the ends or end portions of the magazine body 2 will have their adjacent opposed faces brought into contact and disposed between the downwardly presented end portions of the loop 1 and secured therebetween by means of rivets 3 passing through said end portions of said loop 1 and said body 2, or by any other usual or suitable means serving to connect these two portions rigidly together Similarly the lower flat portion of the body 2 and the bridge of the bifurcated portion 7 are rigidly connected together against relative movement in any suitable known manner, as by a rivet 4 or any other usual or suitable means.

The open side faces of the band portion 2 or magazine portion may be closed in any desired suitable manner, as for instance by means of plates or covers 5 provided with inwardly presented spaced resilient lugs or fingers 6 engaging, in the embodiment illustrated, the outer face of said body 2 and serving to hold the respective plates or covers 5 against the adjacent side edges respectively of said portion 2.

The drive shaft 9 is rotatably mounted in the upper portion of the bifurcated portion 7 with its end portions extending appreciably beyond

the outer side faces of the respective furcations to selectively receive the drive crank handle 11 which is preferably provided with a handle or knob 14 as usual. The protruding end portions of the shaft 9 are preferably formed with a flattened face as at 10 to fit in registering correspondingly shaped and sized holes in the inner or hub end of the crank 11 and receives on its medial portion between the opposed faces of the furcations of said portions 7 the drive pinion 8 mounted in any suitable manner upon said shaft 9 to turn therewith, a drive chain 15 passing about said pinion 8 and about the pinion 16 preferably integral with the driven shaft 17 mounted in the lower portion of said bifurcated portion 7 serving to drive the shaft 17 from the shaft 9.

Preferably the drive end or hub portion of the crank 11 will be looped back upon itself as at 12, as well illustrated in Figure 8, and a suitable loop form 13 having one loop formation serving to hold it in place between the opposed faces of the hub portions of the crank 11 and a further loop portion lying flat against the upper face of portion 12 of the handle and slightly intersecting the side portions of the opening therein to frictionally engage the opposed peripheral face portions of the end portion of the shaft 9 to which the crank 11 may be applied is preferably provided and preferably of the construction in general as illustrated. Preferably this spring is anchored in position by having its end portions extend through perforations in the crank 11 as illustrated. However, the precise construction of this spring is not a vital factor and it may be of any structure such as will suffice to exert a resilient pressure against the shaft 9. Also, as stated, it is preferred, but it is not essential and it may be entirely omitted.

The lower or driven shaft 17 preferably has the driven pinion 16 formed integral therewith, the grinder collar 19 preferably being formed separately of a sheet metal stamping and being shrunk, or welded, or otherwise permanently mounted on the shaft 17 to rotate or turn therewith, and the drive forks 20 extend from the peripheral outer portions of the collar 19 parallel to the axis of the shaft 17 and away from the pinion 16 so as to fit into the cooperating holes *a* of a grinding or filing element A slipped over the end of the shaft 17, all as well shown in Figure 5.

Normally a shaft 17 has its end portions received in aligned openings or bearings in the lower portions of the bifurcated portion or fork 7, with the axis of the shaft 17 extending perpendicularly, or substantially perpendicularly, to said furcations, and with the grinding disc A as driven by the shaft 17 disposed in close adjacency to the opening B for one of the breaker points to the end that the grinder disc A will extend between the opposed faces of the breaker points during the rotation of the grinder A when actually applied to perform the work for which it is primarily intended and as referred to in more detail in the Walters patent above referred to.

In order to permit or facilitate the quick and easy removal of a grinder A and its replacement by another grinder wheel A, according to the size of grinder wheel desired and according to the condition of the particular grinder, it is desirable to provide some easy and simple means for separating the end of the shaft 17 adjacent the drive forks 20 from the adjacent furcation of the fork 7 or frame 7. Also, to avoid possible loss of parts during such separation and waste of time and annoyance instant to such loss of parts, it is desirable to provide some means for positively preventing the separation of the shaft 17 from the fork or frame 7 and to prevent the separation of the pinion 16 and the drive collar 19 with its forks 20 from the shaft 17. Preferably these objects are accomplished by permanently connecting the end of the shaft 17 to the rigid furcation of the fork 7 in such manner that while permanently connected therewith it shall be free to rotate therein and may slightly swing or wobble in relation thereto to accommodate itself to the pull of the drive chain when the other end of the shaft 17 is left free by the removal therefrom of the resilient furcation 22 of the frame 7. The shaft 17 may be permanently rotatively connected with said rigid furcation of the chain or fork 7 by passing the end of the shaft 7 through a suitable hole or bearing in the said rigid furcation and thereafter upsetting or riveting over the end of the shaft as shown at 18 of Figure 5, care being taken however not to upset or rivet over the end to such a degree as to bind the shaft 17 in its mounting in said rigid furcation against rotation therein.

In order to provide for the proper supporting and positioning of the free end of the shaft 17 while the same is being rotated during the operation of the tool upon the breaker points or other elements one leg of the rigid portion of the fork or bifurcation 7 will be made very much shorter than the other and to this shortened leg or furcation will be preferably secured a resilient spring steel portion or leaf spring 22 preferably by means of two spaced rivets 24 to rigidly secure the upper end of said leaf spring 22 to the lower portion of said shortened furcation of the fork 7. This leaf spring 22 will extend down below the end of the rigid furcation and will be formed with the opening B to receive one of the breaker points as above referred to and above said opening B it will be formed with a perforation or bearing opening 23 to receive and constitute a bearing for the free end of the shaft 17, when said shaft extends perpendicularly, or substantially perpendicularly to both of the sides of the bifurcation, in other words to the rigid arm or leg of the bifurcation and to the leaf spring 22 when the parts are in the position shown in Figure 2.

In order to positively spread the spring 22 or force it away from the rigid leg or arm of the bifurcation 7 to permit the insertion or removal of a grinder wheel A and to positively pull the leaf spring 22 back into proper grinding relation after the new grinding wheel A has been applied, some positive pushing and pulling means is provided, and to accomplish the foregoing movement and results a pushing and pulling screw 25 is preferably employed, being threaded through the rigid arm or leg of the frame or bifurcation 7 and having a reduced end portion passing through a corresponding opening in the leaf spring 22, preferably a washer 28 being applied against the outer face of the leaf spring 22 about the reduced portion of the screw 25 and the extreme end portion of said reduced portion being thereafter riveted over or upset to permanently secure the washer to the screw 25. As thus assembled the screw 25 on being screwed into or through the rigid arm of the bifurcation 7, bearing with its shoulder 27 against the inner face of the leaf spring 22 and forces or spreads the same away from said rigid arm and thus removes

the lower portion of said spring 22 from the end of the shaft 17, continued inward turning of the screw 25 resulting in spreading the leaf spring 22 sufficiently from the tip 21 of the shaft 17 as to leave a clearance therebetween of such distance or size as may be desired by the operator, providing ample room for the removal and insertion or application of a grinding element A. When this has been accomplished the screw 25 is screwed outward or in the reverse direction to let the spring 22 straighten out or spring back toward its former position. When the spring 22 has moved back to such point that the edge of the upper portion of its hole or bearing 23 strikes against the rounded tip 21 of the shaft 17 it may come to rest at such point until continued outward turning of the screw causes the washer 28 to bear against the outer face of the leaf spring 22 and thereafter continued outward turning of the screw 25 will result in positively pulling the spring 22 toward the rigid arm of the bifurcation 7 and this added tension on the spring 22 will cause the same to bear against the rounded end 21 of the shaft 17, which rounded end will ride downward until the shaft 17 centers itself in said hole or bearing 23, the outward turning of the screw 25 preferably being continued until the leaf spring 22 assumes the position illustrated in Figure 2 with the tips of the forks or fingers 20 touching the opposed inner face of leaf spring 22 or substantially touching the same or infinitesimally spaced therefrom.

It is thought that the operation and construction of the preferred embodiment illustrated are clear from the foregoing description.

It is not essential to the mounting of the lower or driven shaft 17 and to the association therewith for relative movement of the leaf spring 22 that any magazine such as shown should be provided or that the construction and association of the loop and the magazine should be provided as illustrated or that a loop form of handle should be provided nor is it essential to the construction and operation of the magazine that the loop should be provided or that the special details of the driven shaft or of the association therewith of the leaf spring 22 should be provided or any other means serving the same function should be provided. Similarly, it is not essential to the operation and cooperation of the crank 11 with the drive shaft 9 that any of the other features in detail as mentioned should be provided or that the magazine should be provided or that the combination between the leaf spring 22 and the lower shaft 17 should be provided.

So far as the combination of the driven shaft 17 with the relatively movable lower end portion of the spring 22 is concerned it is only essential that said lower portion shall be movable relative to the shaft 7 and in the direction of the axis thereof and it is not essential that said shaft shall be mounted in the rigid leg or arm of the furcation 7 with a wobbling or swinging capacity, nor is it essential that an operating screw such as 25 be employed. It would suffice if the lower end of 22 were swingable relative to the shaft 17, whether said element 22 were a spring or were a hinged member and any means for accomplishing this swinging action and for holding it in normal operative position during the grinding operation of the tool would suffice. It is not absolutely essential that the shaft 17 be permanently mounted in either arm or leg of the frame or bifurcation 7, though this is preferred.

We claim:

1. A tool of the character described comprising a frame consisting of a strap metal loop form hand grip having substantially parallel end portions, an intermediate magazine formed with a band form sheet metal body portion having a flattened portion and substantially parallel end portions, a fork having substantially parallel furcations connected at their upper ends by a bridge disposed substantially parallel to and engaging said flattened portion of the magazine body, means for rigidly securing said flattened portion and said bridge together, and means for rigidly securing the ends of said magazine body between the ends of said hand grip, in combination with a drive shaft mounted in said fork adjacent the bridge thereof, a driven shaft mounted for rotation in the lower portions of said furcations, means on said driven shaft for engaging and driving a friction element, and drive connections for driving said driven shaft from said drive shaft.

2. A tool of the character described comprising a frame consisting of a strap metal loop form hand grip having substantially parallel end portions, an intermediate magazine formed with a band form sheet metal body portion having a flattened portion and substantially parallel end portions, a fork having substantially parallel furcations connected at their upper ends by a bridge disposed substantially parallel to and engaging said flattened portion of the magazine body, means for rigidly securing said flattened portion and said bridge together and means for rigidly securing the ends of said magazine body between the ends of said hand grip.

3. A tool of the character described comprising a bifurcated frame formed with a long furcation and a short furcation connected at their upper ends by a rigid bridge and being of relatively rigid sheet metal, a drive shaft mounted for rotation in said furcations adjacent said bridge, a pinion mounted on said shaft between said furcations to turn therewith, a driven shaft permanently mounted by one end portion for rotation in the lower end portion of said long furcation, a pinion provided on said driven shaft to turn therewith, an endless band flexible drive means for driving said driven pinion from said drive pinion, a thin substantially sheet form rotary working element, and means provided on said driven shaft for engaging and rotating said element, said driven shaft having a rounded self-centering free end, in combination with a leaf spring rigidly connected at its upper end portion to said short furcation and extending down beyond the axis of the driven shaft in its normal driven position and being formed with a hole in transverse registry with the point of mounting of said driven shaft in said long furcation, said hole normally receiving and affording a bearing for the free end of said driven shaft, and a screw threaded through said long furcation and having a reduced neck loosely extending through said leaf spring with a shoulder to engage the inner face of said leaf spring to force the latter axially off of the end of said driven shaft to permit the removal and replacement of a friction element, and means carried by said screw to engage the outer face of said leaf spring to positively pull the same back over the free end of said driven shaft.

4. A tool of the character described comprising a bifurcated frame formed with a long furcation and short furcation connected at their upper

ends by an integral bridge and being of relatively rigid sheet metal, a drive shaft mounted for rotation in said furcations adjacent said bridge, and having a portion extending beyond the outer face of each furcation to selectively be engaged by an operating element, a driven shaft permanently mounted by one end portion for rotation in the lower end portion of said long furcation, means for driving said pinion from said drive pinion, said driven shaft having a rounded self-centering free end, in combination with a leaf spring rigidly connected at its upper end portion to said short furcation and extending down beyond the axis of the driven shaft in its normal driven position and being formed with a hole in transverse registry with the point of mounting of said driven shaft in said long furcation, said hole normally receiving and affording a bearing for the free end of said driven shaft, and means for positively pushing the lower portion of said leaf spring away from and pulling it toward said rigid furcation to permit the removal and replacement of a friction element.

5. A tool of the character described comprising a bifurcated frame, a drive mounted for rotation in the upper part of said frame, a driven shaft mounted in the lower portion of said frame, means for driving said driven shaft from said drive shaft, in combination with means permanently connected with each of the furcations of said frame for positively pushing and pulling to cause relative movement between said furcations in one direction to permit free unobstructed access to one end of the driven shaft to remove or replace a driven element therefrom or thereon and in the reverse direction to cause the said end of said driven shaft to be received in a supporting bearing.

6. A tool of the character described comprising a bifurcated frame, a drive mounted for rotation in the upper part of said frame, a driven shaft mounted in the lower portion of said frame, means for driving said driven shaft from said drive shaft, in combination with means permanently connected with one of the furcations of said frame for positively pushing and pulling to cause relative movement between said furcations in one direction to permit free unobstructed access to one end of the driven shaft to remove or replace a driven element therefrom or thereon and in the reverse direction to cause the said end of said driven shaft to be received in a supporting bearing.

7. A tool comprising a frame member, a shaft mounted for rotation in said member and having end portions extending beyond both outer faces of said member, said extending end portions being irregular in cross-section and having their extreme end portions tapered, in combination with an operating crank handle having its hub end bent to lap back together with the main portion to provide two substantially parallel metal webs, and being formed with registering irregular form hub openings in said webs corresponding in shape to the cross-sectional shape of each said end portion of the shaft and being of such size as to selectively make a snug sliding fit thereon, and a loop form spring received in the pocket formed between the webs of the hub end of said crank handle and having portions normally intersecting the opening in one of said webs to be engaged and spread by the extreme tapered end portion of one end of said shaft as the crank handle is applied thereto and, to yieldingly frictionally grip the shaft to prevent the crank handle from dropping by gravity therefrom.

8. A tool comprising a frame member, a shaft mounted for rotation in said member and having an end portion extending beyond an outer face of said member, said extending end portion being irregular in cross-section and having its extreme end portion tapered, in combination with an operating crank handle formed with an irregular form hub opening corresponding in shape to the cross-sectional shape of said end portion of the shaft and being of such size as to make a snug sliding fit thereon, and a spring having a portion normally intersecting said opening in one of said webs to be engaged and sprung by the extreme tapered end portion of said shaft as the crank handle is applied thereto and, to yieldingly frictionally grip the shaft to prevent the crank handle from dropping by gravity therefrom.

9. A tool of the character described comprising a bifurcated frame formed with a long furcation and short furcation connected at their upper ends by an integral bridge and being of relatively rigid sheet metal, a drive shaft mounted for rotation in said furcations adjacent said bridge, and having a portion extending beyond the outer face of each furcation to selectively be engaged by an operating element, a pinion mounted on said shaft between said furcations to turn therewith, a driven shaft permanently mounted by one end portion for rotation in the lower end portion of said long furcation, a pinion provided on said driven shaft to turn therewith, an endless band flexible driving means for driving said driven pinion from said drive pinion and means provided on said driven shaft for engaging and rotating a grinding element, said driven shaft having a rounded self-centering free end, in combination with a leaf spring rigidly connected at its upper end portion to said short furcation and extending down beyond the axis of the driven shaft in its normal driven position and being formed with a hole in transverse registry with the point of mounting of said driven shaft in said long furcation, said hole normally receiving and affording a bearing for the free end of said driven shaft, and a screw threaded through said long furcation and having a reduced neck loosely extending through said leaf spring with a shoulder to engage the inner face of said leaf spring to force the latter axially off of the end of said driven shaft to permit the removal and replacement of a friction element, and means carried by said screw to engage the outer face of said leaf spring to positively pull the same back over the free end of said driven shaft.

HARRY W. KULP.
MARTIN C. DELLINGER.