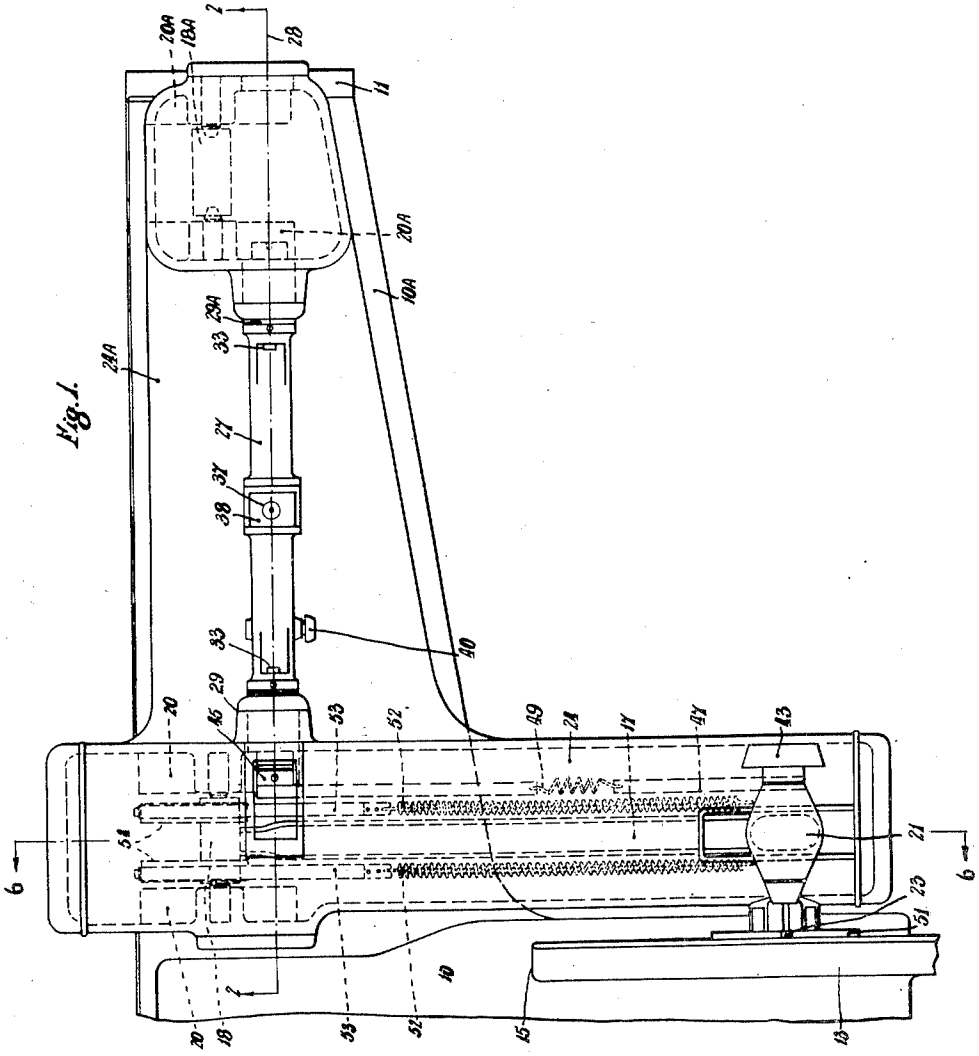
April 5, 1955 C. B. A. PORTER 2,705,487

FORMING MEANS FOR PROFILE GRINDING WHEELS

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Fig. 1.



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FORMING MEANS FOR PROFILE GRINDING WHEELS

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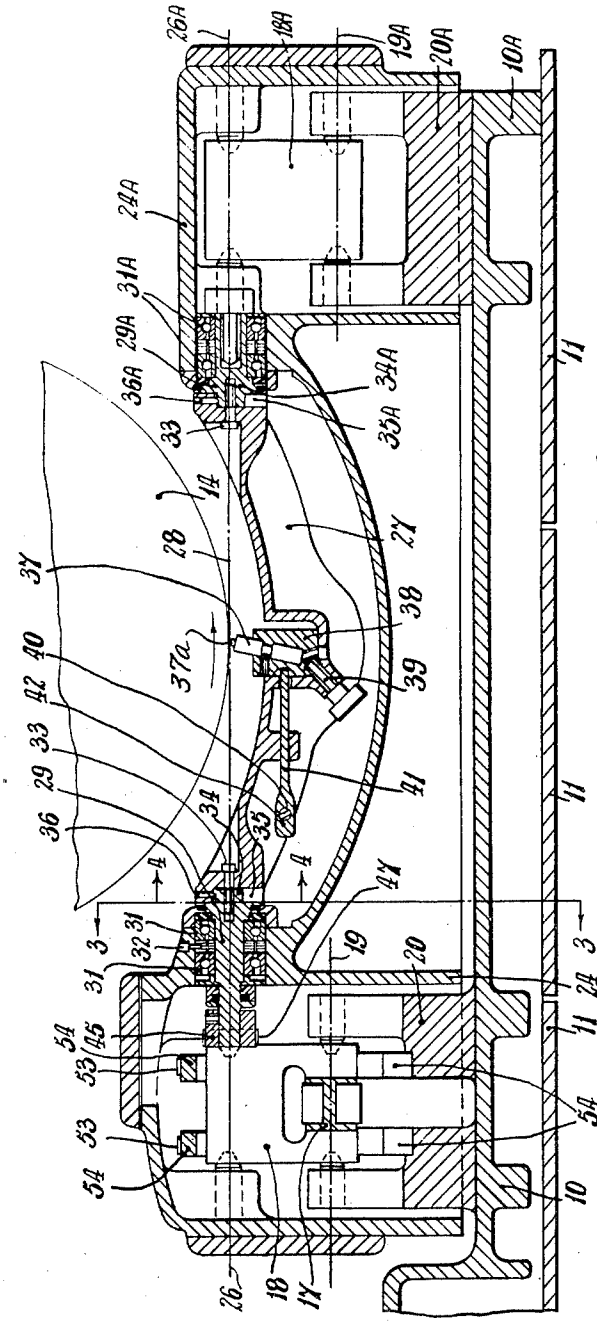


Fig. 2.

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FORMING MEANS FOR PROFILE GRINDING WHEELS

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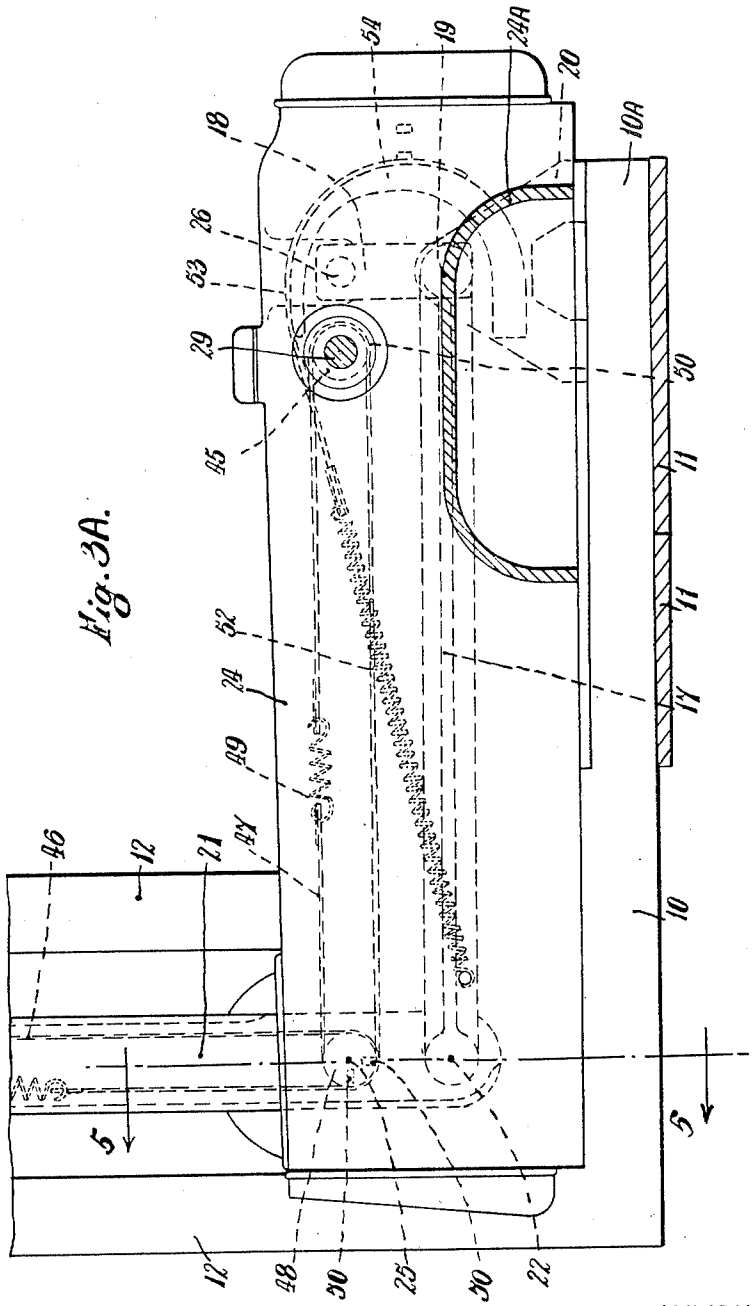


Fig. 3A.

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FORMING MEANS FOR PROFILE GRINDING WHEELS

Filed Sept. 7, 1951

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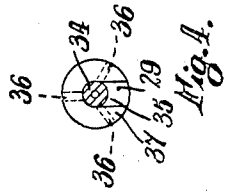


Fig. 4.

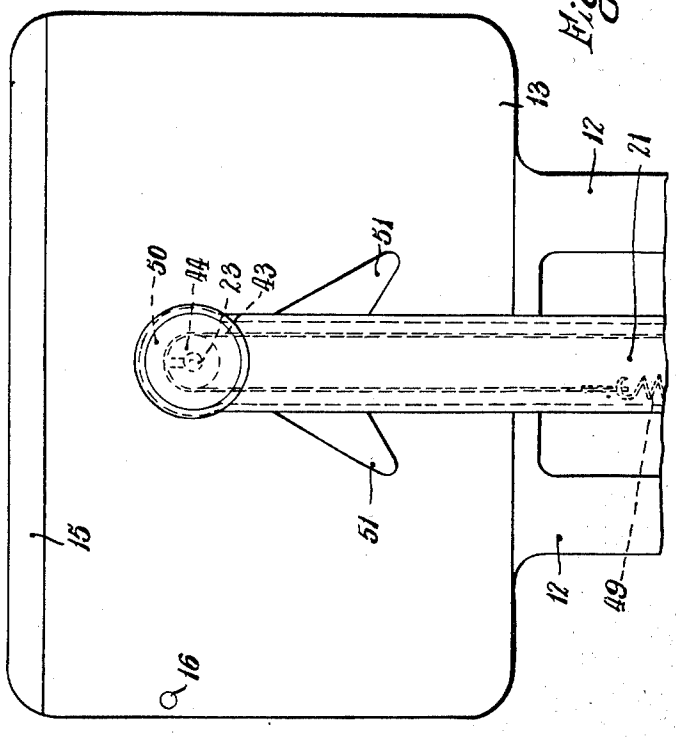


Fig. 3B.

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FORMING MEANS FOR PROFILE GRINDING WHEELS

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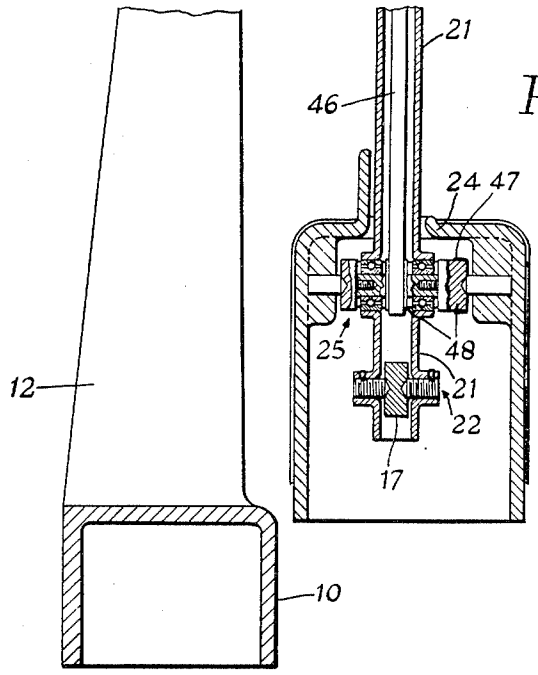


Fig. 5.

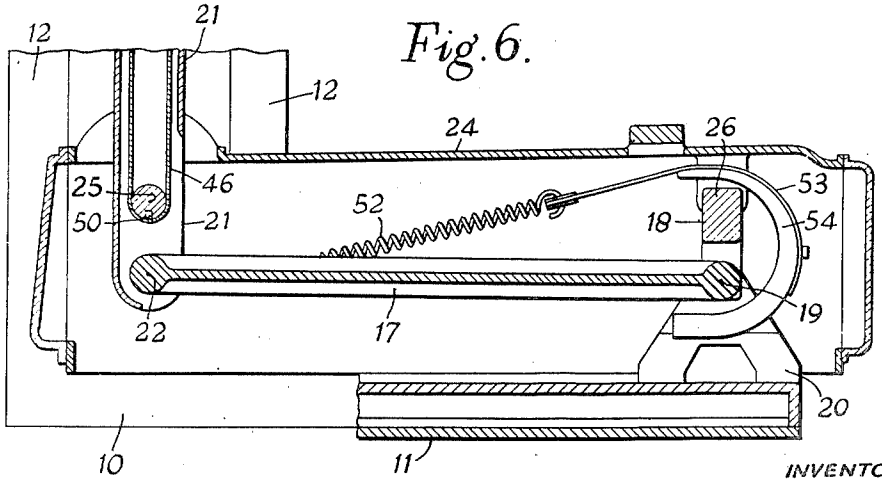


Fig. 6.

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United States Patent Office 2,705,487 Patented Apr. 5, 1955

2,705,487

FORMING MEANS FOR PROFILE GRINDING WHEELS

Charles Benjamin Albert Porter, Yeovil, Somerset, England, assignor to Harold Stuart Hallewell, Hillingdon Heath, England

Application September 7, 1951, Serial No. 245,462

Claims priority, application Great Britain September 8, 1950

4 Claims. (Cl. 125—11)

This invention relates to a pantographic wheel-dressing device adapted to be attached to a grinding machine and employed for forming on the grinding wheel thereof a profile reproduced from a template.

Such a device comprises a link parallelogram pantograph, a template-follower member mounted in a bearing in one of the pantograph arms and rockable about the axis of the bearing, a dressing-tool holder mounted as a cantilever in another bearing in one of the pantograph arms and rockable about the axis of the said other bearing, and a connection supplementary to the pantograph for constraining the template follower member and the dressing-tool holder to rock in unison.

The device is intended to be used with the periphery of the grinding wheel set tangentially with respect to the rocking axis of the dressing-tool holder, the direction of rotation of the grinding wheel relatively to the cantilever dressing-tool holder being such as to tend to move the dressing-tool away from the grinding wheel periphery. However, with some recent types of grinding machines, for example, that in which the grinding wheel is mounted for both vertical movement and horizontal traversing movement, it is impossible to mount a known wheel-dressing device in the required position on the machine table, since the grinding wheel mounting is bulky and the device cannot be moved sufficiently close to the grinding wheel without the vertically-extending portions of the device fouling the grinding wheel mounting.

An object of this invention is to provide a wheel-dressing device which will avoid this difficulty.

Another object is to provide a wheel-dressing device in which the dressing-tool holder is supported between spaced bearings in a rigid unitary member.

A device embodying the invention will now be described, by way of example, with reference to the accompanying diagrammatic drawings wherein:

Figure 1 is a plan view on a reduced scale of the device, part of the base not being shown.

Figure 2 is a section taken on the line 2—2 in Figure 1 and drawn to a larger scale.

Figures 3A and 3B are on the larger scale and together constitute a view partly in elevation and partly in section, the section being taken on the line 3—3 in Figure 2.

Figure 4 shows on the larger scale a detail and is taken on the line 4—4 in Figure 2.

Figure 5 is a section taken on the line 5—5 in Figure 3B and drawn to the larger scale, and

Figure 6 corresponds to Figure 3B, but is a section taken on the line 6—6 in Figure 1 and drawn to the smaller scale.

The device includes a baseplate **10** to which are fixed plates **11** adapted to be engaged by the magnetic chuck of a grinding machine (not shown). A tubular bracket **12** (Figures 3A and 3B) rigid with the base carries a support **13** to which a template (not shown) can be fixed. When in position the template lies in a vertical plane parallel to the axis of the grinding wheel **14** (Figure 2); the template is located on the support by a horizontal straight edge **15** and an end stop **16**.

The first long arm of the link parallelogram is constituted by a more or less horizontal H-section link **17** pivoted to a more or less vertical short link **18** about a horizontal axis **19** which is fixed relatively to the base plate **10** and is perpendicular to the plane of the template. The short link **18** constitutes one part of the second arm

of the link parallelogram and is pivoted about the axis **19** of a mounting **20** on the base plate. A tubular lever **21** parallel to the short link **18** is pivoted to the free end of the long link **17** at **22** and carries a template-follower pin **23** at its upper end. A light alloy casting **24** and **24A** constitutes the third, long arm of the parallelogram, this third arm being forked. The portion **24** of the casting extends parallel to the long link **17** and constitutes one prong of the fork and the portion **24A** extends transversely of the link and constitutes the other prong. The prong **24**, which is of inverted channel section with boxed-in ends, also serves to protect the bearings of the link parallelogram from dust, etc. The prong **24** is pivoted to the lever **21** at **25** and to the short link **18** about an axis **26**. The portion of the lever **21** between the pivots **22** and **25** constitutes the fourth, short arm of the parallelogram.

The base **10** is also forked, the portion **10A** carrying at its free end a mounting **20A**, similar to the mounting **20**. A short link **18A** is pivoted to the mounting **20A** about an axis **19A** coaxial with the axis **19** and to the prong **24A** about an axis **26A** coaxial with the axis **26**. The short link **18A** is the other part of the said second arm, the two links **18** and **18A** together constituting this arm.

A dressing-tool holder **27** is mounted on the third arm near to the end which is pivoted to the short links **18** and **18A** and for rotation about an axis **28**, which is perpendicular to the plane of the template. One end of the holder **27** is secured to a shaft **29** mounted in the prong **24** and the other end is secured to a shaft **29A** mounted in the prong **24A**. Each of the shafts **29** and **29A** is mounted in a pair of ball bearings **31** and **31A** respectively, the pair **31** being held against axial movement by a pin **32**. The pair **31A** are capable of axial movement in their housing and, thus, small changes due to temperature variations can be accommodated in the length of the holder **27**. The holder **27** is readily removable from the device by withdrawing retaining screws **33** and moving the holder radially of the axis **28**, bosses **34** (see Figure 4) and **34A** on the shafts **29** and **29A** respectively being slidable in radial slots **35** and **35A** respectively in the holder. When the holder is in position on the device it is located accurately radially of the axis **28** by means of two sets of three grub screws **36** and **36A**, each set forming a three point mounting for its respective boss **34** or **34A**.

The dressing tool is a diamond-pointed cylindrical holder **37** of conventional type carried in a bore in a mounting-block **38**, the diamond **37A** itself having a radiused chisel-shaped tip. The position of the block **38** can be adjusted in a vertical plane by means of a screw **39** and in a horizontal plane by means of a screw **40** and a co-operating pivoted lever **41**, the end **42** of which is threaded and works as a nut on the screw **40**. In use the position of the block is made such that the axis about which the radiused tip of the diamond is formed lies on the axis **28**. The radius of the template-follower pin **23** is equal to the radius of the diamond tip multiplied by the mechanical advantage of the pantograph, which conveniently is 10 to 1.

The template-follower pin **23** is mounted for rotation about an axis perpendicular to the plane of the template, the pin and the holder **27** being connected for rocking in unison under control of a hand-wheel **43** on the pin **23**. The necessary connection consists of pulleys **44** (Figures 3A and 3B) and **45** fast on their respective shafts, and steel driving tapes **46** and **47** connecting their respective pulleys to a pulley **48**. The tapes are provided with tensioning springs **49**; relative movement between the tapes and the pulleys over which they pass is prevented by grub screws **50** (Figures 3A and 3B).

Sector blades **51** prevent the template-follower from being accidentally manipulated in such a way that the shoulder of the dressing tool is cut by a part of the grinding wheel **14**. In order to relieve the operator of most of the weight of the pantograph mechanism two tension springs **52** each have one end fixed to the prong **24** and the other end to a strap **53** which is pinned to a support **54** rigid with the support **20**. Preferably the springs are so set that the template-follower pin **23** will still fall away

from the template; if the spring were to overbalance the weight of the pantograph mechanism there would be a risk of the dressing tool accidentally plunging too deeply into the grinding wheel.

The improved device provides extreme rigidity of support for the dressing tool, whilst permitting it to be disposed sufficiently far from the vertically-extending portions of the device for the said portions not to foul the grinding machine while the device is in position for dressing the grinding wheel. This extreme rigidity is provided with a minimum of complication.

I claim:

1. A pantographic wheel-dressing device for attachment to a grinding machine and for forming on the grinding wheel thereof a profile reproduced from a template, the device comprising a base for mounting on the grinding machine, a template holder fixed to the said base and for carrying a template, a link parallelogram constituted by parallel first and third arms and parallel second and fourth arms, the first arm being pivoted at one end to the base for movement about the axis of the pivot, the third arm being forked to form two prongs, the second being constituted by two independent spaced links, both individually pivoted at one of their ends to the base for movement about the said pivot axis and each being individually pivoted at its opposite end to a different one of the two prongs of the third arm and the fourth arm being pivoted to the other ends of the first and third arms and having an extension beyond one of its pivots with the first and third arms, a bearing mounted in the said extension of the fourth arm, a template follower member mounted in said bearing for rocking movement about the axis thereof, two coaxial bearings each mounted in a different one of the two prongs of the forked third arm, a dressing-tool holder extending between the two coaxial bearings and mounted therein for rocking movement about the axis thereof, and a connection supplementary to the pantograph linkage coupled to the template-follower member and the dressing-tool holder and for constraining the template-follower member and the dressing-tool holder to rock in unison.

2. A pantographic wheel-dressing device for attachment to a grinding machine and for forming on the grinding wheel thereof a profile reproduced from a template, the device comprising a base for mounting on the grinding machine, a template holder fixed to the said base and for carrying a template, a link parallelogram constituted by parallel first and third arms and parallel second and fourth arms, the first arm being pivoted at one end to the base for movement about the axis of the pivot, the third arm being forked to form two prongs, one of which extends parallel with the first arm and the other of which extends laterally of the first arm, the second arm being constituted by two spaced independent links, both individually pivoted at one of their ends to the base for movement about said pivot axis, one of said spaced links being pivoted at its other end to the said parallel-extending prong and the other of said links being pivoted at its other end to the said laterally-extending prong, and the fourth arm being pivoted to the other ends of the first and third arms and having an extension beyond one of its pivots with the first and third arms, a bearing mounted in the said extension of the fourth arm, a template follower member mounted in said bearing for rocking movement about the axis thereof, two coaxial bearings each mounted in a different one of the two prongs of the forked third arm, a dressing-tool holder extending between the two coaxial bearings and mounted therein for rocking movement about the axis thereof, and a connection supplementary to the pantograph linkage coupled to the template-follower member and the dressing-tool holder and for constraining the template-follower member and the dressing-tool holder to rock in unison.

3. A pantographic wheel dressing device as claimed in claim 1, wherein the said third arm comprises a hollow member which encloses the first arm, the two links comprising the second arm, at least the portion of the fourth arm between its pivots with the first and third arms, and the said pivots between the fourth arm and the first and third arms.

4. A pantographic wheel dressing device as claimed in claim 2, wherein the said third arm comprises a hollow unitary member which encloses the first arm, the two links comprising the second arm, at least the portion of the fourth arm between its pivots with the first and third arms and the said pivots between the fourth arm and the first and third arms.

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