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B8H HCF HDVX H302 H326 H403 H430 H431 H551
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(56) Documents Cited
GB 2149357 A **GB 2126982 A** **GB 2122553 A**
GB 2040260 A **GB 1277957 A** **GB 1276537 A**

(58) Field of Search
UK CL (Edition Q) **B7A ATD , B8H HCF HCL HCN HCR HCV HDVX**
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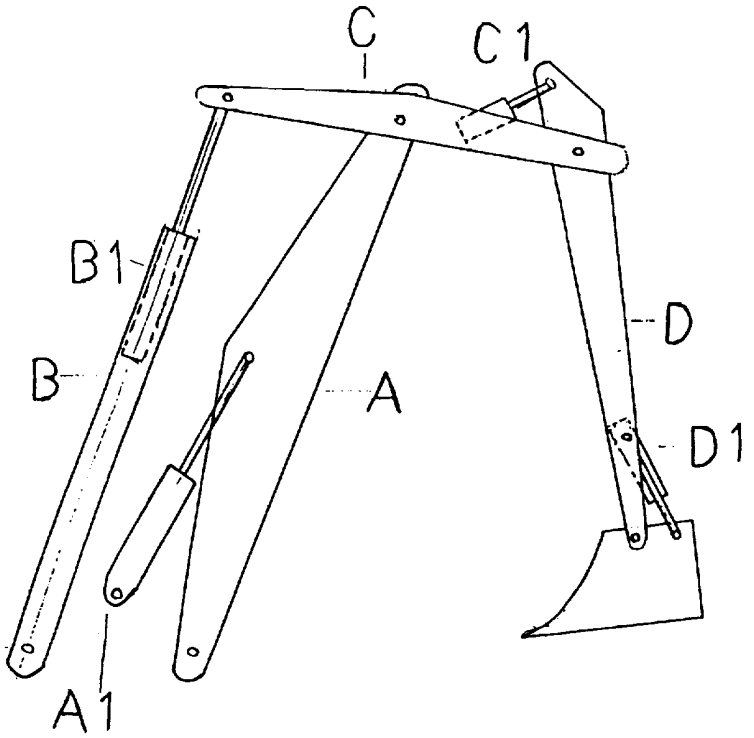
ONLINE : WPI, EPODOC, JAPIO

(54) Abstract Title
Parallel arm arrangement for back-hoe type diggers

(57) A back-hoe type digger has a parallel arrangement comprising arm A operated by ram A1 and link B having a ram B1 pivoted to a machine body and moving bucket arm D by ram C1 and pivoted link arm C. The digger can be full size or designed for use in allotments or provided on an armoured bomb disposal vehicle. The bomb disposal vehicle can have CCTV, monitors in a turret, claw for tearing the ground up and bomb sensing and exploding equipment.



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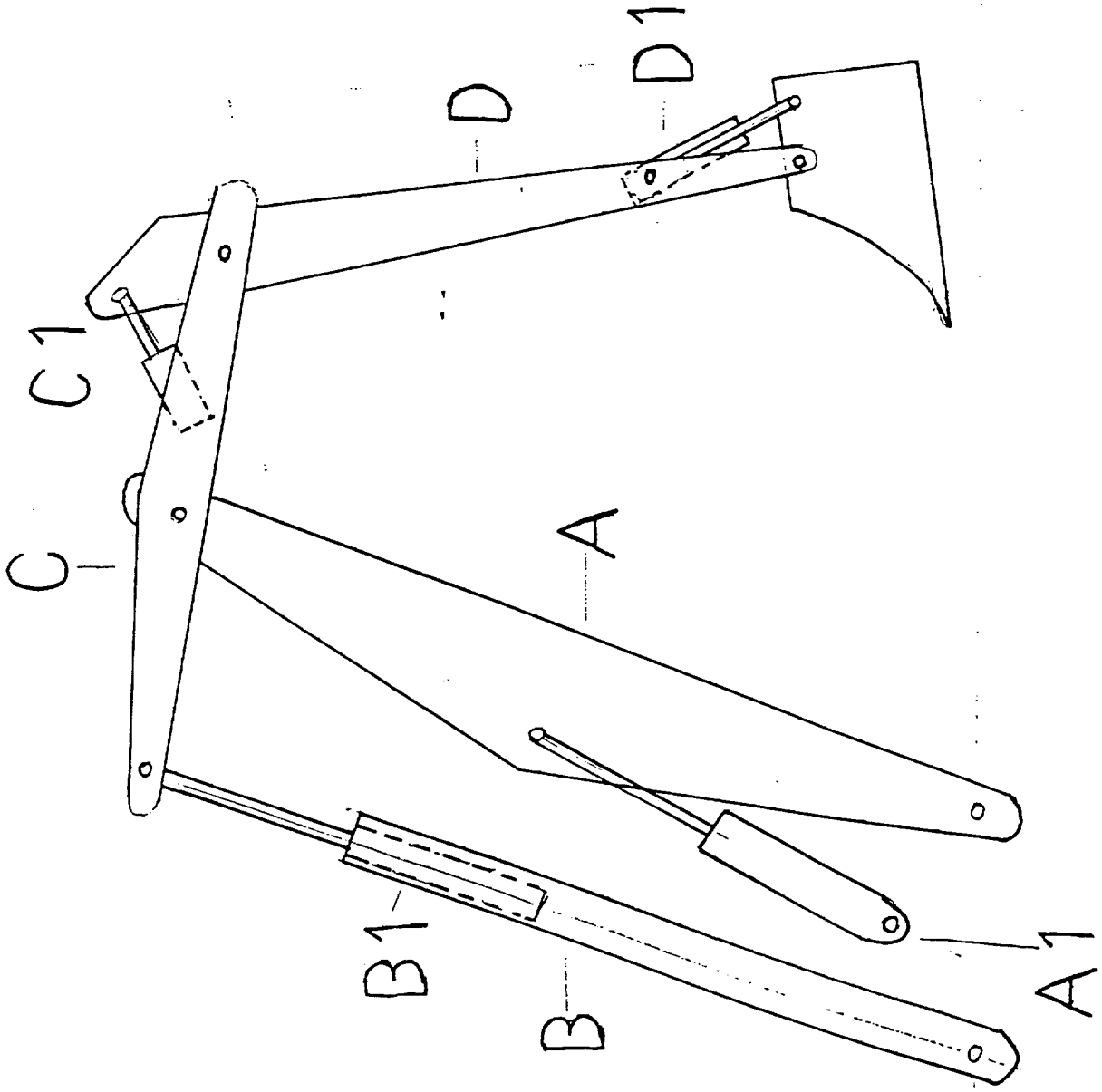
D
D1
C1
C
A
B1
B
A1

PANTOGRAPHIC ACTION FOR BACK ACTORS AND MECHANICAL DIGGERS

Back actors and mechanical diggers work mostly with two jibs which both produce semi circular movement. These contradictory movements have to be combined via the skill of the operator to try and get something akin to linear action.

As the machine is well nigh impossible to control properly, the training of skilled operators is difficult and expensive.
The very good operators are few and far between.

My proposal is to simplify the machine by giving it natural linear action to control the bucket.

This would make skilled operators easier to instruct, increasing the number and quality of the top operators available to the contractors.

A specific embodiment of the invention will now be described by way of example with reference to the accompanying drawing.

Referring to the drawing, the pantographic action is produced by mounting two parallel arms from the base A and B working in tandem to control the top arm C which can then be moved forwards and backwards in any pre selected plane (pantographic).
From C, arm D descends to base level, with the bucket attached.

These arms are controlled by the hydraulic rams A1, B1, C1, and D1. by moving ram A1 this moves A and B together giving us pantographic action at the bucket.
To get level or gradient cuts all the operator has to do is combine two complimentary movements on ram A1 and B1 to get a very even linear movement.

The jibs can be set for level cutting of foundations, elevated to any pre arranged angle to allow grading from the bottom of an embankment, or the system can be set on a downward angle to grade an embankment from the top.

This system could have gradient meters mounted on the bucket arm D so that the operator could work to very precise instructions.

A pantographic action which when applied to back actors and mechanical diggers produces a natural linear action to control the bucket and make excavation work easier and more accurate.

I envisage that this machine could be produced in three very distinct sizes.

There could be a small version for working in gardens and allotments, allowing all the soil cultivation etc. to be done from the paths, eliminating at a stroke the problems of surface compaction and damage to the drainage systems.

There could be a normal sized machine for building site work.

Finally, there could be a very large machine with extensive jibs for mine clearing work in the aftermath of war.
For this very dangerous work, it would have to be mounted on a large armour plated military type vehicle and fitted with C.C.T.V. so that the operator could work in safety from within a control turret equipped with monitors. The end of this very long jib would have a large claw to tear up the terrain and in addition would have equipement for sensing and exploding these very dangerous ordinance which while designed to maim and kill professional soldiers .
After the war, it is left on the battlefield, where it can injure and slaughter innocent adults and children, who work the land to ward off starvation.

CLAIMS

1. A pantographic action which enables back actors and mechanical diggers to produce a natural linear action.

2. Jibs which can be set for level cutting, such as foundations

3. Jibs which can be set for a pre arranged angle to allow grading such as from the bottom of an embankment or the top.

Application No: GB 9913279.7 **Examiner:** Dave McMunn
Claims searched: 1-3 **Date of search:** 20 September 1999

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

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Int Cl (Ed.6): E02F 3/30, 3/32.

Other: ONLINE : WPI, EPODOC, JAPIO.

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
Y	GB 2,149,357 A	(KRUPP). See Figs	1-3
X	GB 2,126,982 A	(O & K). Note parallel linkage 2, 8	1-3
Y	GB 2,122,553 A	(SIVAN DEV.). See Figs	1-3
X	GB 2,040,260 A	(GENERAL INC). Note parallel linkage 68,96	1-3
X,Y	GB 1,277,957	(FUCHS & THIERER). See Fig 2 & lines 92, page 1 to line 1 page 2	X:1-3 Y:1-3
X	GB 1,276,537	(POCLAIN). See parallel linkage 2,3	1-3

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.