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B66C 23/76 (2006.01)

(52) UK CL (Edition X):
B8B BGA

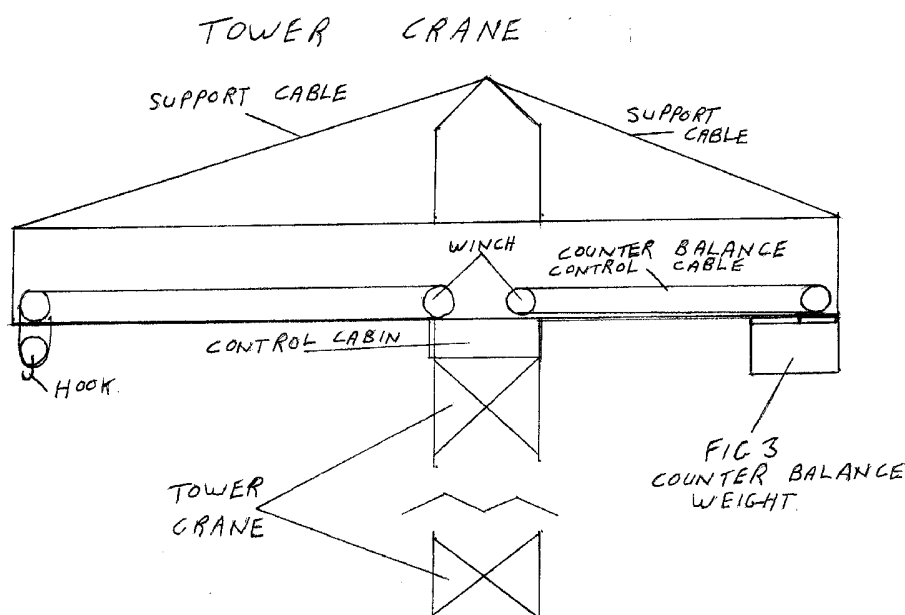
(56) Documents Cited:

GB 2026420 A	GB 1311767 A
GB 1282847 A	GB 0938463 A
GB 0935653 A	EP 0296383 A1
DE 019912758 A1	DE 004206630 A1
FR 002467169 A1	JP 070113333 A
SU 001076399 A1	SU 000551238 A1
US 6048012 A	

(58) Field of Search:
INT CL **B66C**
Other:

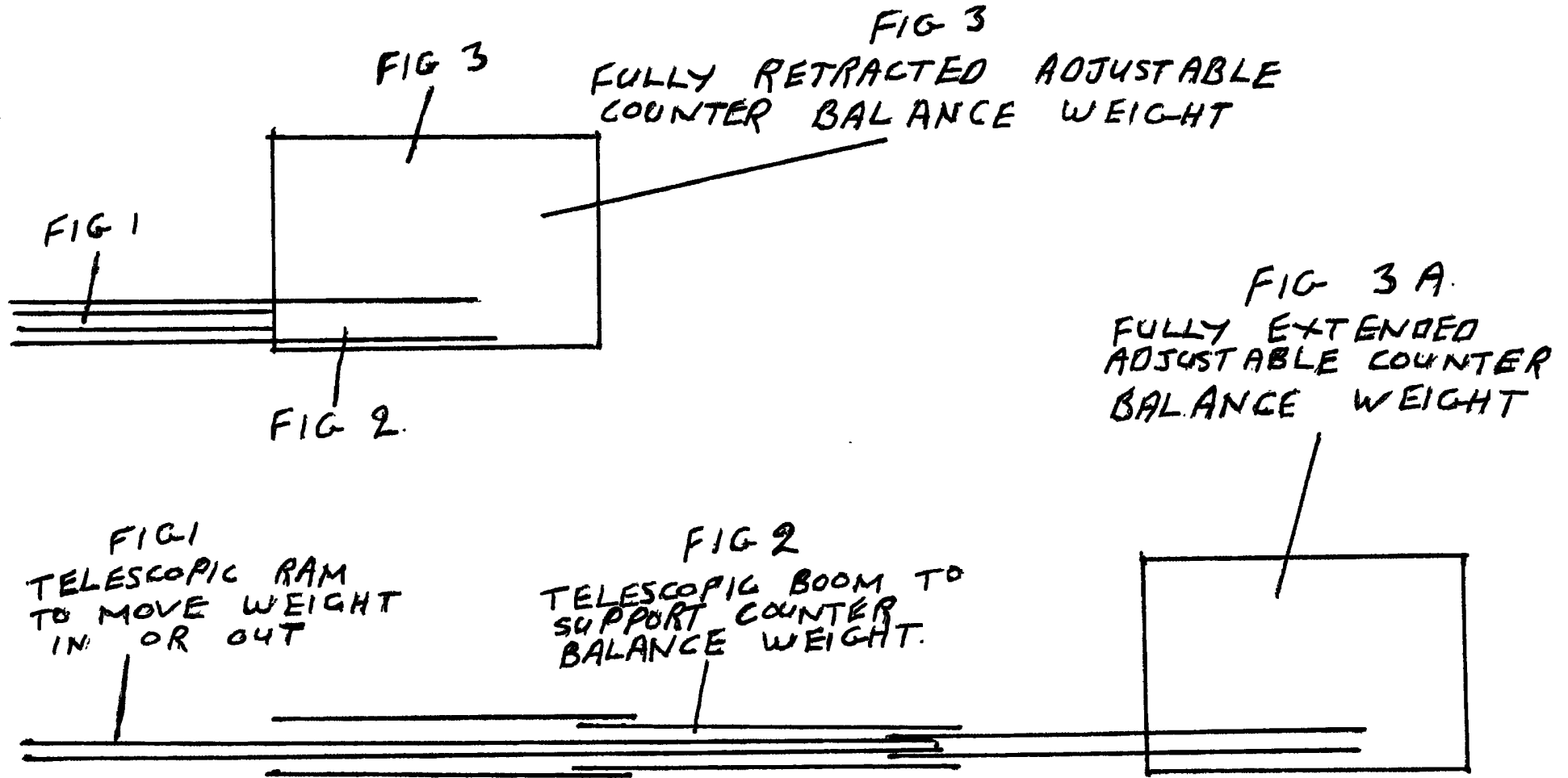
(54) Abstract Title: **Adjustable counterbalance system**

(57) A adjustable counterbalance system attached to a crane or tower crane, fire engine turntable ladder, platform hoist, loading shovel, 360° earth digger, earth mover or for lift truck. Using a telescopic boom (Fig 2) extended or retracted with a telescopic ram (Fig 1) used to control the extension supported on the telescopic booms or solid tracks or rails or a mixture of each as may be required depending on the weight of the counterbalance weight. The counterbalance weight (Fig 3) is to be moved or adjusted or extended automatically to compensate the load being moved to neutralise the loading effect and to distribute and equalise the ground weight of the machine and is to be connected to a load limit or weighing system which is already available and used on most cranes and some lifting equipment.

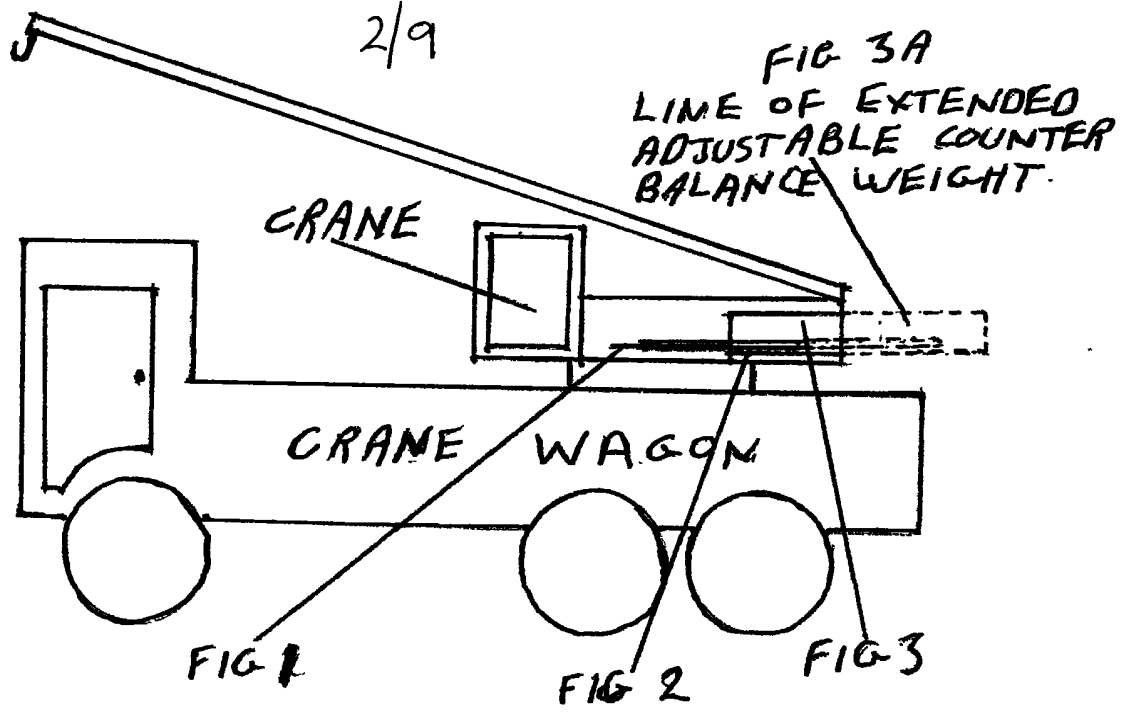


FULLY ADJUSTABLE AND EXTENDABLE COUNTER BALANCE WEIGHT.

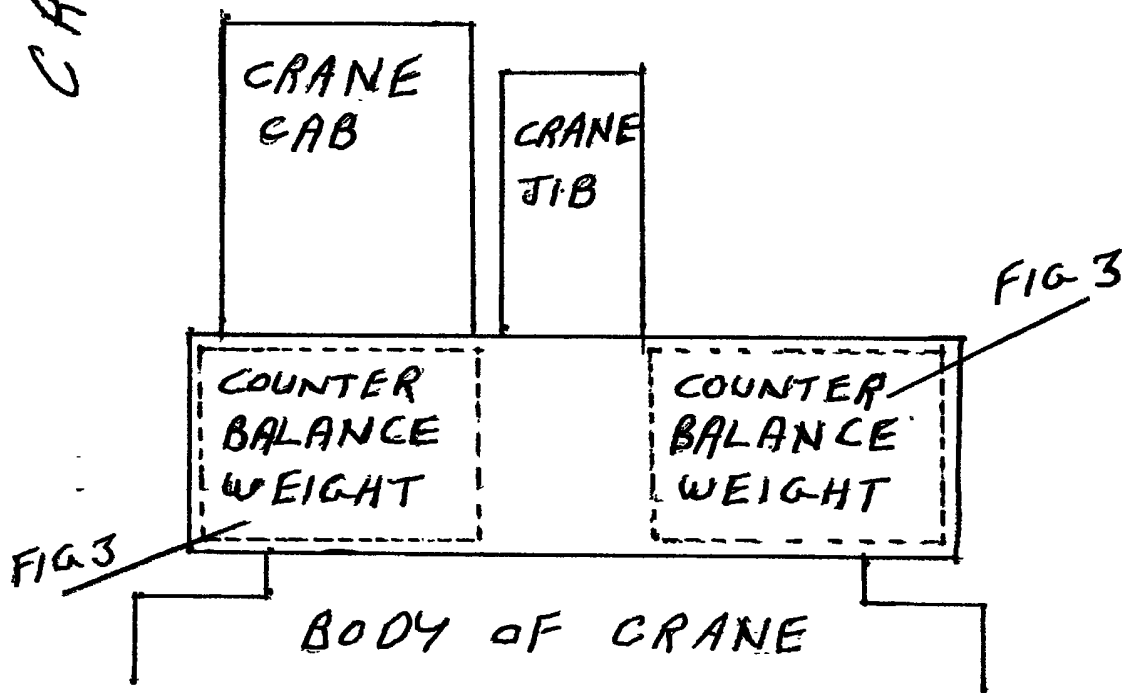
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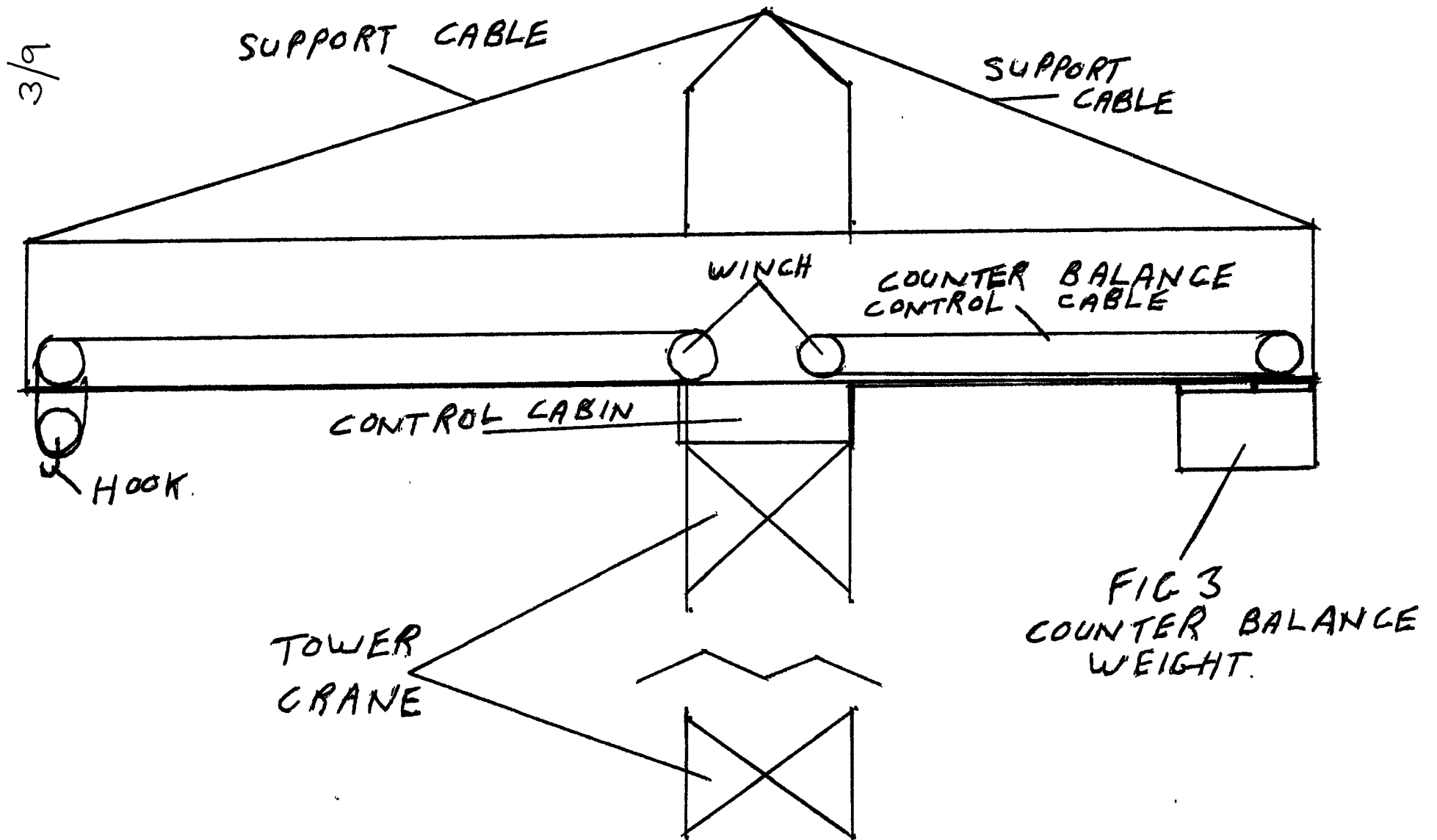
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CRANE

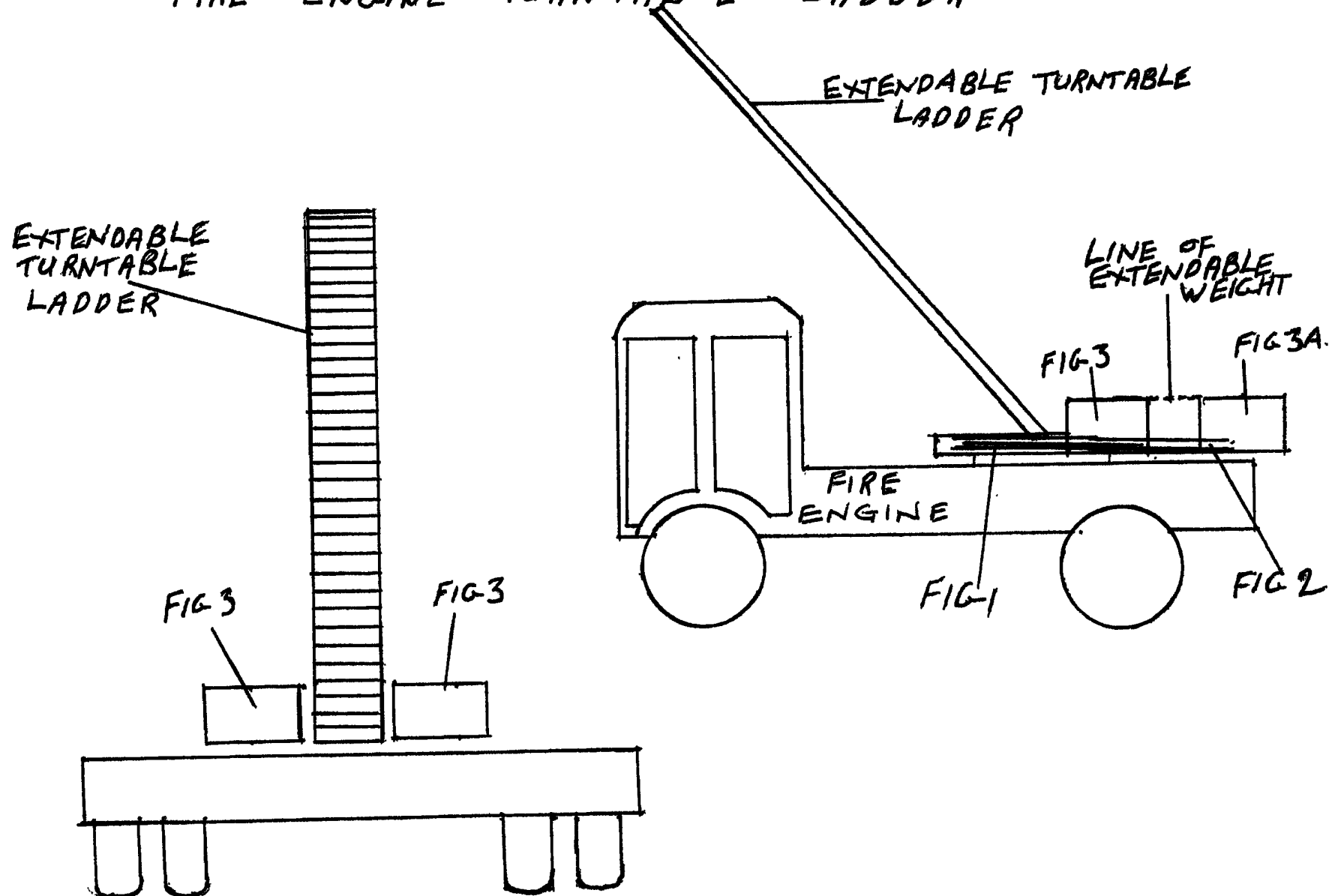


TOWER CRANE



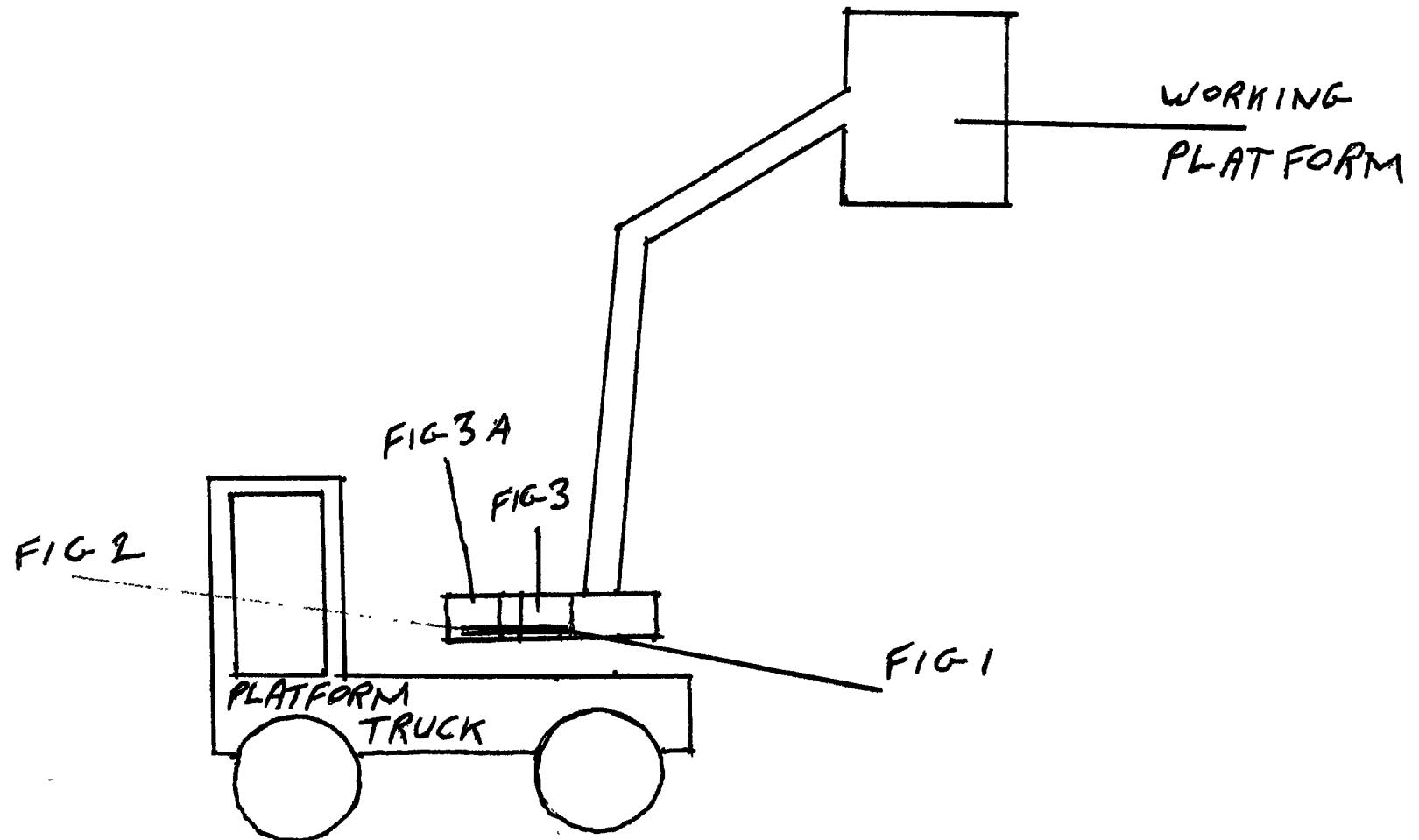
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FIRE ENGINE TURNTABLE LADDER



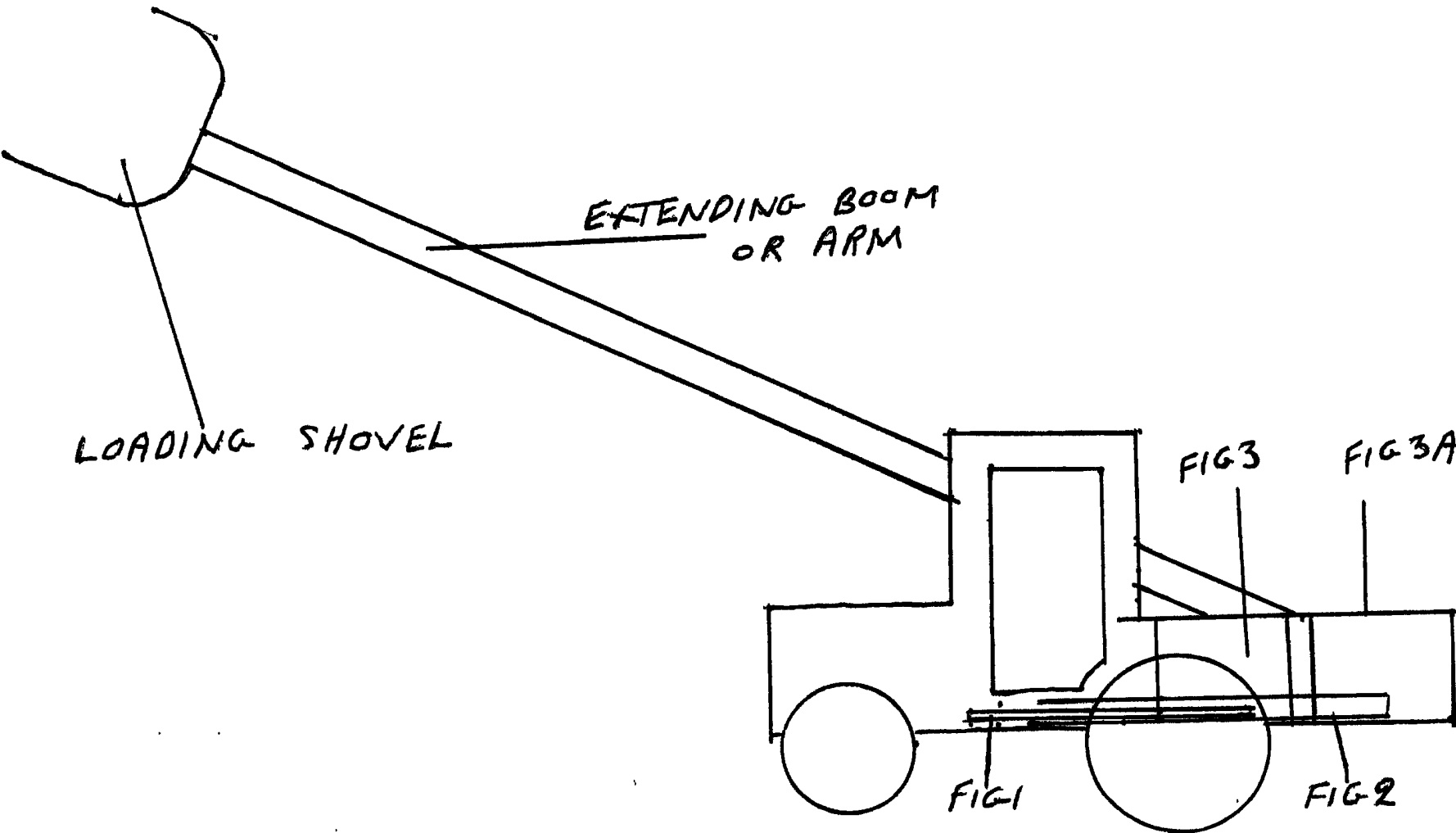
PLATFORM TRUCK / HOIST

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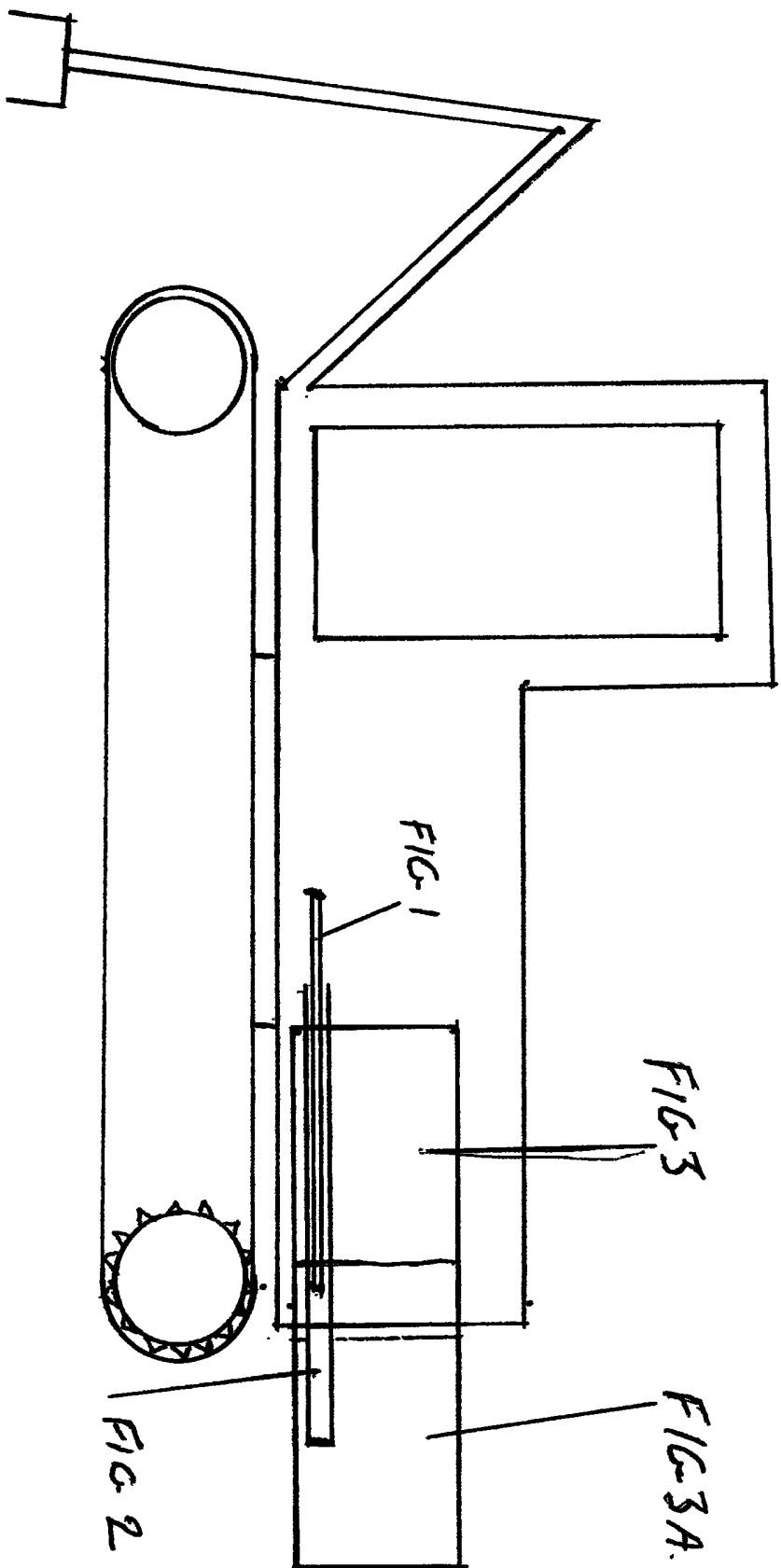


LOADING SHOVEL

b/q

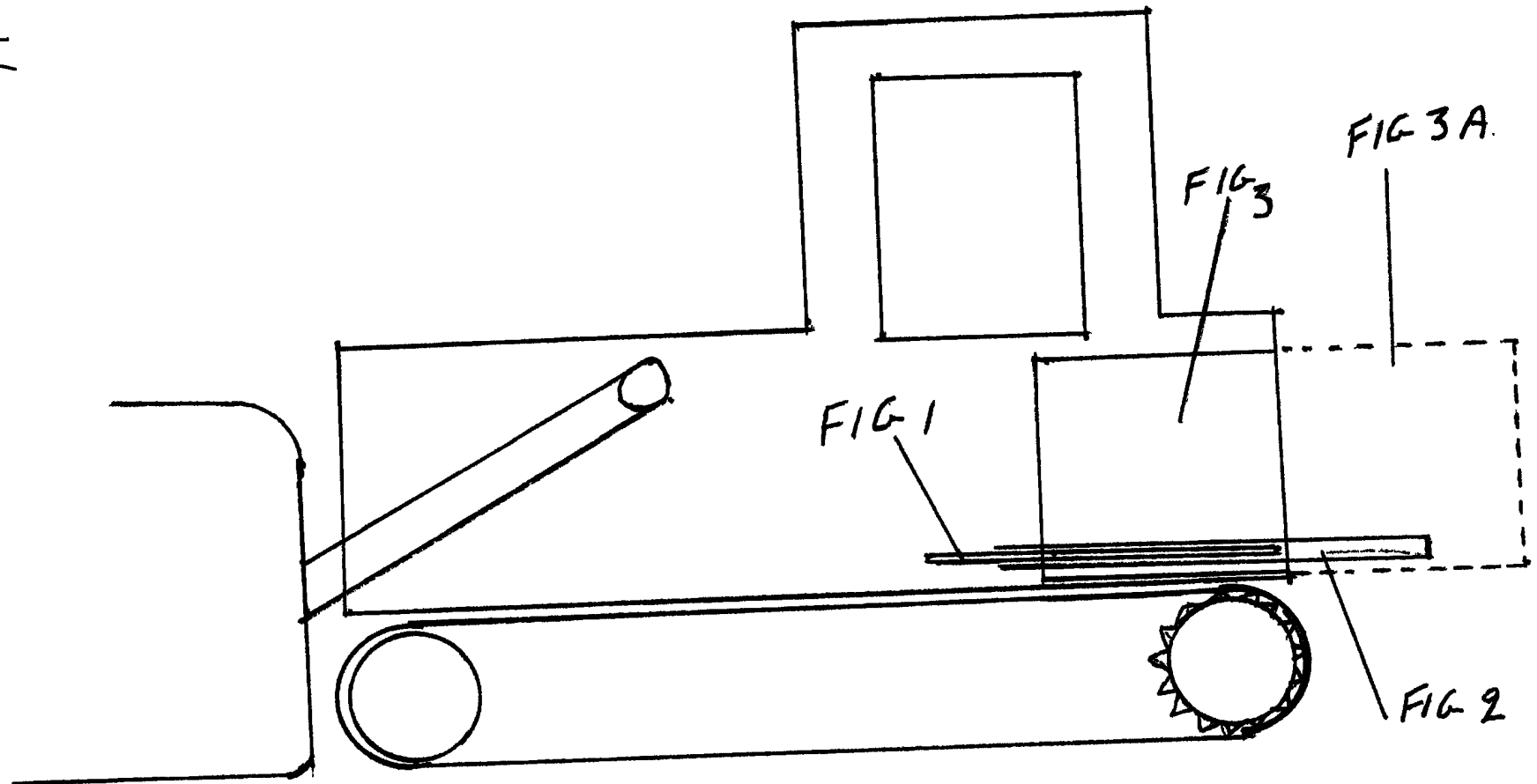


360° EARTH DIG



EARTH MOVER

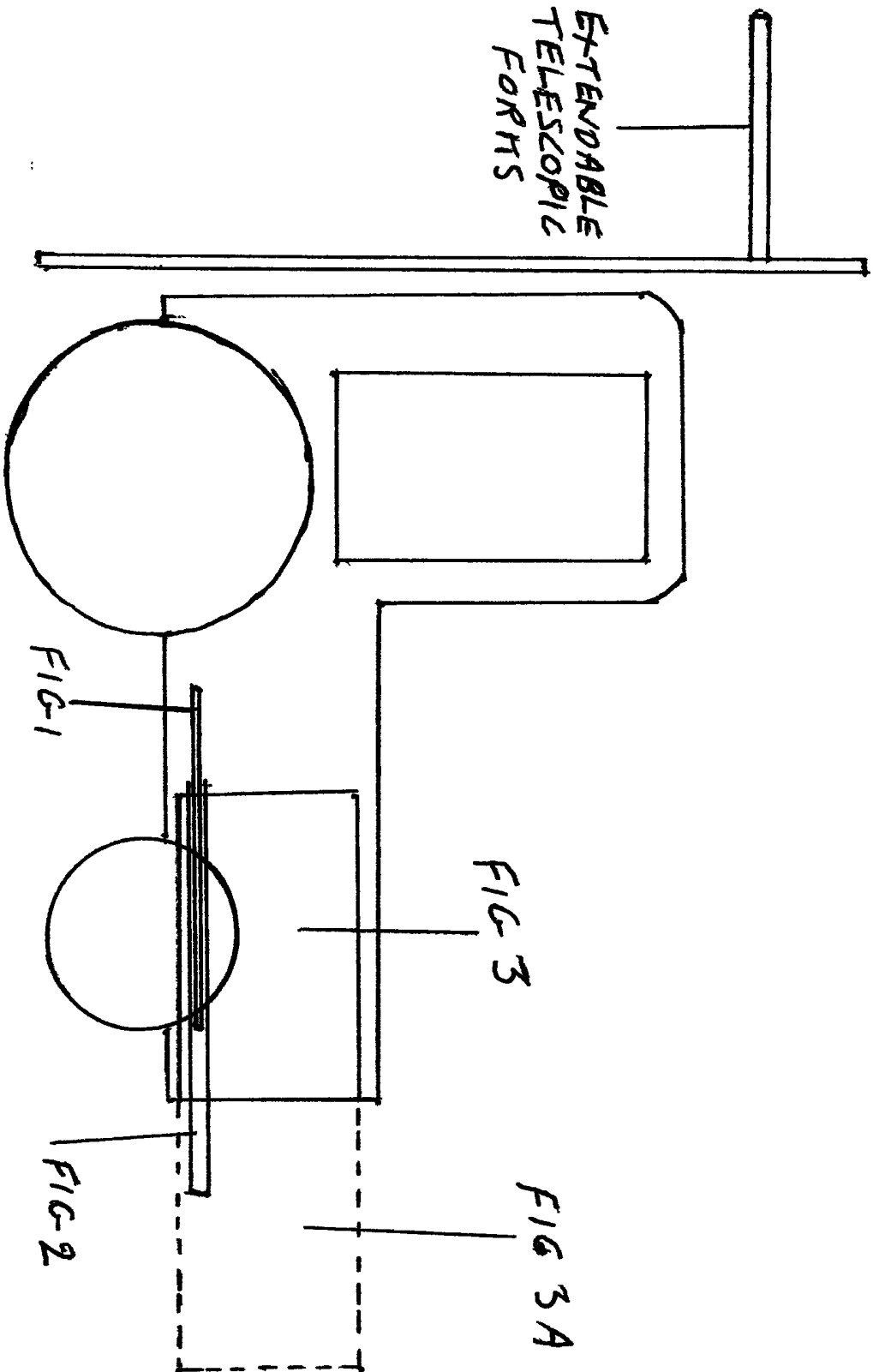
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FORK LIFT TRUCK

EXTENDABLE
TELESCOPIC
FORKS



Adjustable Counterbalance System

This invention is a device to enable lifting equipment and earth movers to be more effective and safer in their operation. The sketches to signify some of the applications are numbered 2, 3, 4, 5, 6, 7, 8 and 9 and are not to scale. Drawing number 1 shows detail of adjustable counterbalance weight or weights and is used in all of the drawings. The primary appliances to benefit with application of an adjustable counterbalance system are:-

2. Cranes
3. Tower cranes
4. Fire Engine turntable ladders
5. Platform hoists
6. Loading shovels
7. 360° earth digger
8. Earth mover
9. Fork lift trucks

At the opposite end of the machine from the load a adjustable weight is mounted or hung or built into the body of the appliance, making allowance for the counterbalance weight to be moved. The counterbalance weight is moved on supports and adjusted automatically to the load factor with one or more hydraulic rams set within a telescopic steel section or boom. A tower crane can use a winch to move the adjustable counterbalance weight set onto rails either suspended or supported as is necessary for safety. One end of the telescopic ram or winch cable is firmly attached to the body of the appliance so allowing the counterbalance weight to be moved to the optimum position for the weight to be lifted or moved by the appliance. Connecting the counterbalance weight to a load limiter or a system for calculating the weight being lifted which could be a simple tension or compression spring connected to the main lifting ramp or winch. This will allow that the adjustment of the counterbalance weight is moved automatically to the optimum position for the load to be lifted. A load limiter or weight assessment device is already being used in cranes and lifting equipment and could easily be used in conjunction with the counterbalance system. As the counterbalance system is automatically controlled as the load is moved, so to is the counterbalance weight, so that it is always in the most appropriate position for the weight being lifted.

Applying this system to a Fire Engine turntable ladder, greatly increasing height and reach without increasing the size of the Fire appliance. This has to be beneficial to people in general. The extra benefits of the appliance are well worth the extra weight to be carried and could be most helpful in today's multi-storey buildings, potentially to save lives. The machine can be made more compact and is able to work in a more restricted environment and will not necessarily need such expansive out riggers.

The counterbalance system whilst I believe should be automatically controlled it is quite possible to install the system which can be manual, semi-automatic or fully automatic. This may be determined best by circumstances but it is possible to incorporate a device that incorporates all three options.

Claims

Adjustable Counterbalance System

1. Greater safety, load, height and reach are available when using a adjustable counterbalance system.
2. A crane will be able to lift greater weights to greater reaches with increased safety.
3. A tower crane will be able to have greater extension capabilities with greater lift and safety and be more in balance with the load factor resulting in less uneven tension on the structure of the machine.
4. A Fire Engine turntable ladder will have greater height, reach and safety capacity without increasing size of machine.
5. A platform hoist will have greater increased safety with increased reach and lift capacity.
6. A loading shovel will have greater reach and height discharge possibilities with increased load and more even ground weight distribution especially when loaded.
7. A earth digger will have greater reach, greater load and greater dig depth capabilities.
8. A earth mover will have more capacity for heavy loads with greater reach and higher discharge with more evenly distributed ground weight especially when loaded.
9. A fork lift truck will have capabilities to lift more weight and to traverse the load to a greater distance from the machine also more evenly distributed ground weight.
10. The ground load of the machine will be more evenly distributed.
11. Using mobile cranes it can be more compact and not require such large out riggers.
12. Fire Engine turntable ladders and mobile cranes will be able to work in a more confined space.

All the above are designed with more safety and an increased load factor for either height or reach or both.

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Application No: GB0526601.0

Examiner: Dr Mark Shawcross

Claims searched: -

Date of search: 22 June 2006

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X	-	GB 938463 A (SGME) See page 1 lines 28-66 & figure 1 in particular
X	-	GB 1311767 A (RICHER-I) See page 1 lines 9-37 & 52-65 and figure 1
X	-	GB 1282847 A (RICHER-II) See page 1 lines 12-31 & 53-81 and figures 1, 2, 6 & 7
X	-	SU 1076399 A1 (ENERGOMONTAZHPROEKT) See English language abstract & figure 1
X	-	SU 551238 A1 (STROIMASH) See English language abstract & figure 1
X	-	FR 2467169 A1 (TRANCHAND) See English language abstracts & figure 1
X	-	JP 07113333 A (TAISEI) See English language abstracts & figures
X	-	EP 0296383 A1 (LIEBHERR) See English language abstracts and figures 5 & 6
X	-	DE 19912758 A1 (HEOPNER) See English language abstracts and figures 1 & 2
X	-	DE 4206630 A1 (LEDERGERBER) See English language abstracts & figures

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
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For Innovation

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Y Document indicating lack of inventive step if combined with one or more other documents of same category.

& Member of the same patent family

P Document published on or after the declared priority date but before the filing date of this invention.

E Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^x :

Worldwide search of patent documents classified in the following areas of the IPC

B66C

The following online and other databases have been used in the preparation of this search report

Online: EPODOC, WPI