6. TECHNICAL DESCRIPTION:

Power Driven Palm Climbing Cycle

Climbing palm tree is a strenous and skilled work done by professional climbers who are trained from their childhood. ~~The~~ Climbing by this traditional method is very risky.

The power driven palm climbing cyeele, which is designed and developed by me, is invisaged to mechanise the climbing operation with safety provisions for the operator. Any unskilled person can use this machine for reaching the top of the palm with comfort and safety.

The technical details of the machine is described below:

The Power driven cycle mainly comprises of (1) Prime mover-Engine (2) Power transmission machanism (3) Frame (4) Rope winding system (5) Brake-system (6) Rope lock Assembly (7) Wheels for transporting in the road.

(Please See Figure)

1. Prime mover: The Prime mover in this machine is Rallis RT 35 Petrol engine. The horse power of the engine is 1.7 at 6000 RPM and the engine weighs about 7 kg. The engine is fitted suitably in the frame. The clutch lever and the accelerator assembly of the engine are fitted on the left and right side handles of the frame.

2. Frame: The frame of the machine is made of 3/4" steel pipe (Fig.1). Bicycle frame is used for a part of this frame and bicycle seat and hand bar are fitted to the frame as operator's seat and front handle bar. The engine is mounted between the 'V' shape of the frame. The clutch lever is fitted on the left handle with extended cable. Accelerator and engine cut off switch are fixed on right handle. Petrol tank of the engine is mounted on the cross bar of the V frame as in Fig. (1) and (2). On the top part of the frame, the pulleys for guiding wire rope are fitted and at the bottom of the frame, the ground wheels are fitted. To the front side of the frame the top and bottom palm guide assemblies are attached.

3. Power Transmission:

The power transmission system of this machine consists of clutch assembly and speed reduction sprocket and chain assembly. There are two sets of sprocket and chains for reducing the speed by 32:1 ratio. Motorcycle chains and sprockets are used in this.

Tension sprockets are also provided to adjust the tightness of the chain. The final drive sprocket is on right side of the frame and the winding drum wheel is fitted on final drive sprocket axle. The theoretical maximum rpm of the final drive sprocket will be 187.

Rope Winding System:

The rope winding system consists of steel wire rope, wire rope guide pulleys, winding assembly and Rope locking assembly. 1/4" thick steel wire rope is hung from a 2 feet long clamp which is fixed on top of the tree. The other end of the rope is free, touching the ground. To this wire rope end the steel wire rope from the machine is connected through a key. The wire is guided thr ugh the balancing pulley at the centre of the top frame and through guide pulleys on the backside of frame of the engine and connected to the wire rope from the winding drum. The balancing pulley can be adjusted on the top frame for aligning and balancing. The pulleys are fixed on cycle wheel axiles and ball bearings.

Winding drum: The winding drum is assembled on the same axle of final drive sprocket wheel. On the left side of the winding drum, the rope lock assembly is fitted. The hub of the winding drum is 3" diameter and 2" in length and ordinary bicycle wheel axle is used as axle.

Diameter of the winding drum is 1½ feet. The wire rope and is connected to the hub of of the drum with a key. When the drum rotates in clockwise direction by the power of the engine, the wire rope is wound on the drum, thereby moving the machine upwards.

Rope lock assembly: Rope lock wheel is assembled to the left side of the winding drum. The function of this system is to prevent the reverse movement of the winding drum while climbing up so that the machine does not come down due to its own weight when it is in the locking position. (please see Fig. 3). This is an important system in the machine.

It consists of a lock wheel with holes, cycle pre-wheel sprocket, pressure plates, left foot pedal and steel rope, with return spring and lock pin. The steel rope from the footpedal is connected to the lock pin at its end and when the pedal is not pressed, the lock pin is locked inside the lock wheel which allows the pre-wheel sprocket to rotate in one direction only and hence the winding drum is locked to rotate in forward direction only. This is a very important part since the winding drum may start rotating backwards due to the weight of the machine unwinding the rope, in the absence of a locking arrangement. In case the engine suddenly fails while climbing, the rope lock assembly prevents the reverse direction rotation of the winding drum. The machine can be stopped at any height without any problem because of the rope lock assembly. The mechanism is assembled in a H bracket on the rear side. When the foot pedal is pressed, the lock pin is released from lock wheel which enables the pre-wheel to rotate in the reverse direction also. Hence for getting down from the top of the tree, the rope lock pedal is pressed, and engine is put off and by clutching, the machine is brought down slowly.

6. Brake Assembly

The function of the brake system is to stop the machine at any instand on the tree without falling down, in the event of an accident by breaking of wire rope line or by defect in any of the systems. This is also a very important safety provision in this machine.

The mechanism comprises of top palm guide, bottom palm guide, brake rope winding drums, Brake rope winding shaft, brake rope wheels and chain, brake rope and spring loaded brake pedal. The brake pedal is on the right side of the machine (Please see Fig.1 and 3).

The top palm guide assembly comprises of a set of rollers which slide on the trunk. The top palm guide assembly is connected to the brake rope winding drums through brake chain. The brake rope winding drumsare assembled on the brake shaft which is fitted on the front side above the handle bar of the frame. The brake rope is wound on this shaft and the other end of the rope is connected to the brake controlling wheel (large) on the right side bottom of the 'V' frame through a pulley. To the brake controlling wheel, a small wheel is attached which in turn is connected to the spring loaded foot pedal. The spring helps in the return of the foot pedal to original position when released. The size of the brake controlling wheels and the brake rope winding drums are so made that the mechanical advantage obtained is 18:1. When the brake pedal is pressed, the large wheel is rotated by the small wheel and the brake rope is pulled and unwound from the brake rope shaft. This rotates the brake rope shaft which in turn rotates the brake rope winding drums. Hence the brake chain is wound on the drums and because of this, the top palm guide assembly to which the brake chain is linked, is pulled to tighten with the trunk. This will stop the machine by the grip of the top palm guide assembly with the tree trunk.

Bottom Palm Guide Assembly: The bottom palm guide assembly with rollers fitted on the bottom front frame serves the function of guiding the palm cycle along the trunk while climbing up and coming down.

7. Ground wheels:

Two wheels at the rear and one wheel at the front of the frame serve as ground wheels for transporting from one tree to another. By these wheels, the palm climbing cycle can be moved as a tri-cycle on the road.

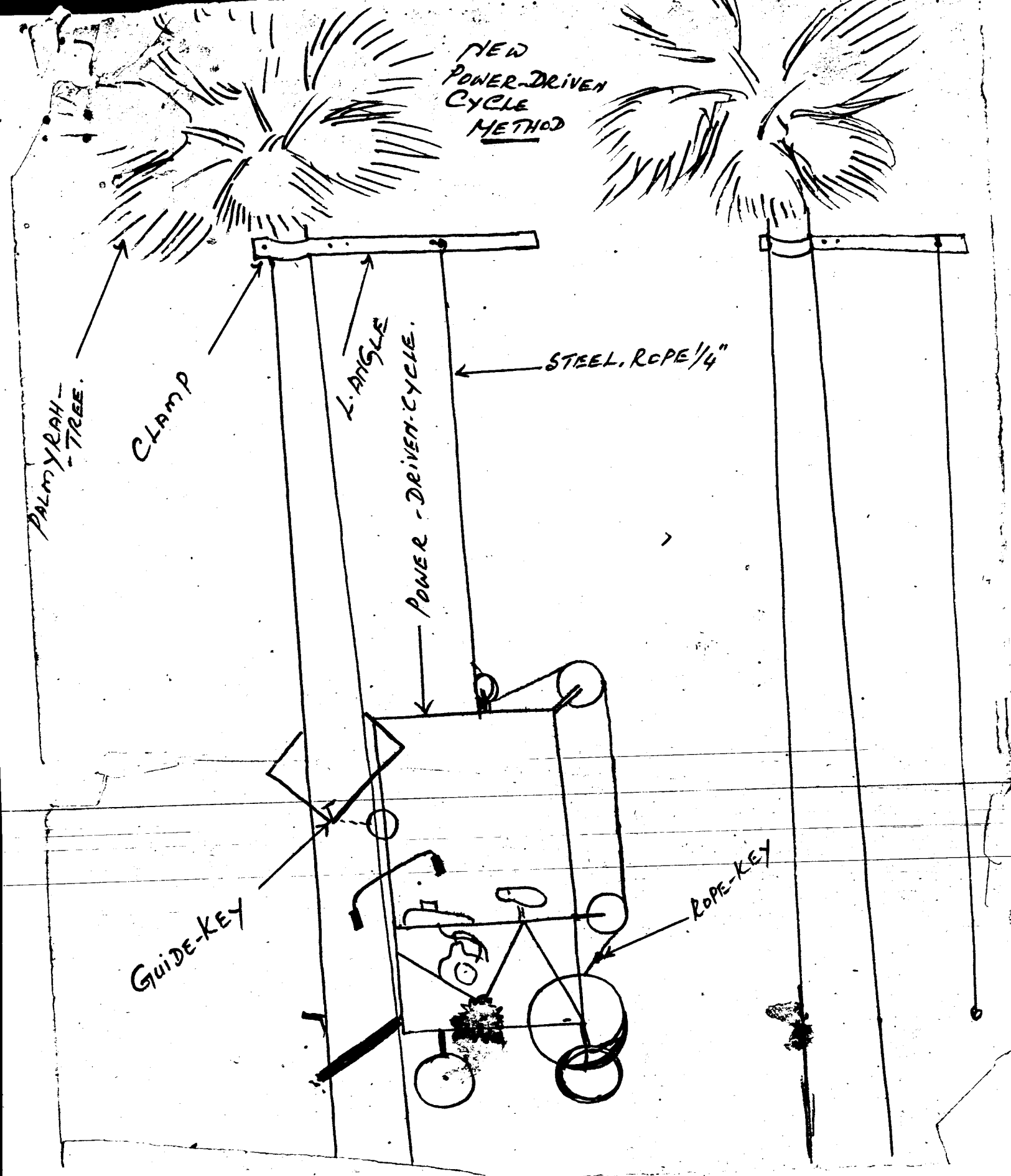
Operation of the Power driven cycle

The steel wire rope of the tree is hooked to the wire rope of the rope winding drum through the pulleys. The balancing pulley is adjusted for proper alignment and tightened on the top frame. The top palm guide assembly is opened and fixed into the trunk and locked. Now the machine is ready to use.

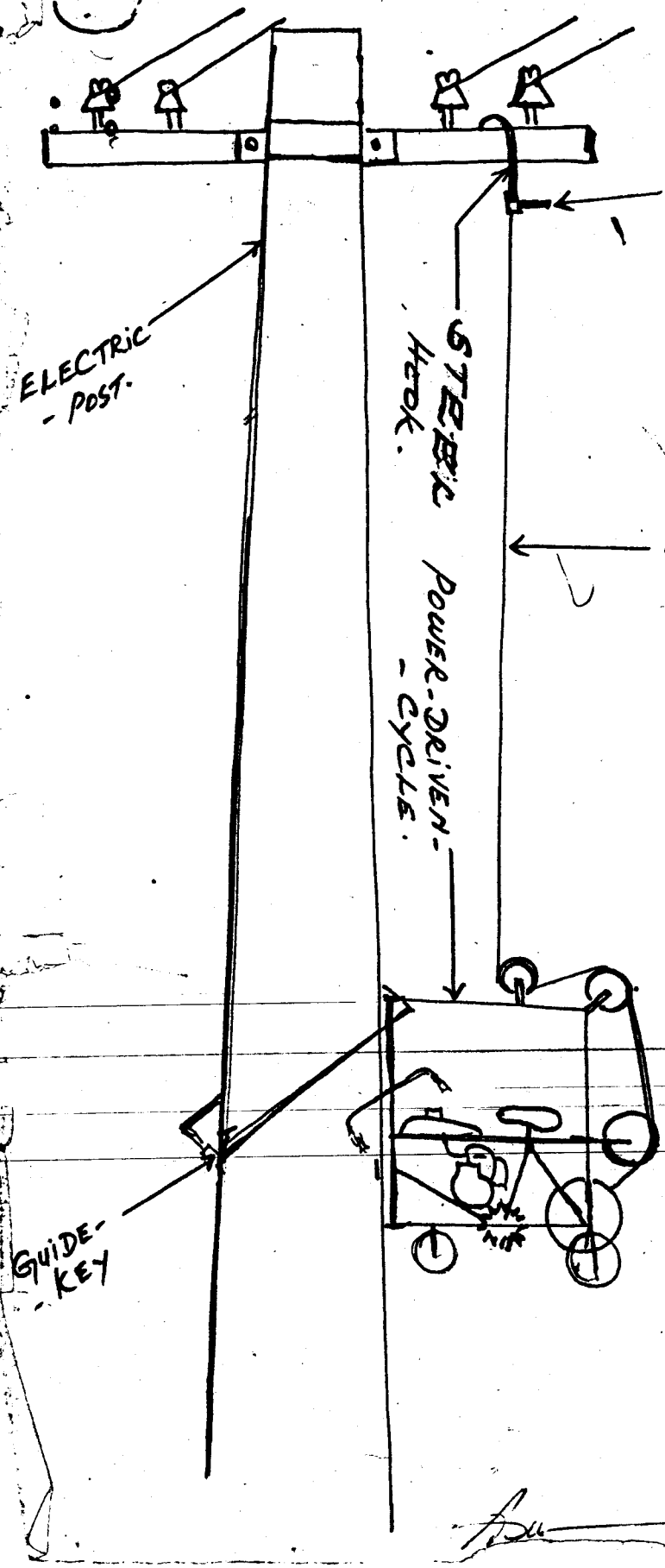
The clutch lever is pressed and the engine is started by pulling the re cil rope starter. The the operator sits on the seat and holds the handle bar. The legs of the operator are to rest on the foot rests (and not on the pedals). The accellerator is slowly raised and the clutch is slowly released. The engine transmits power to rope winding the steel wire rope. The machine is lifted up and the top palm guide assembly and bottom palm guide assembly guide the cycle along the trunk. After reaching the top, the engine is put off and the operator has to leave the cycle to go the crown for doing the harvesting job. The rope lock assembly prevents the machine from coming down. While coming down, the operator need not start the engine. The clutch lever is pressed slowly and the left side pedal is pressed to release the lock pin. The machine comes down by its weight and the wire rope is unwound slowly. The clutch lever helps in bringing down the machine slowly.

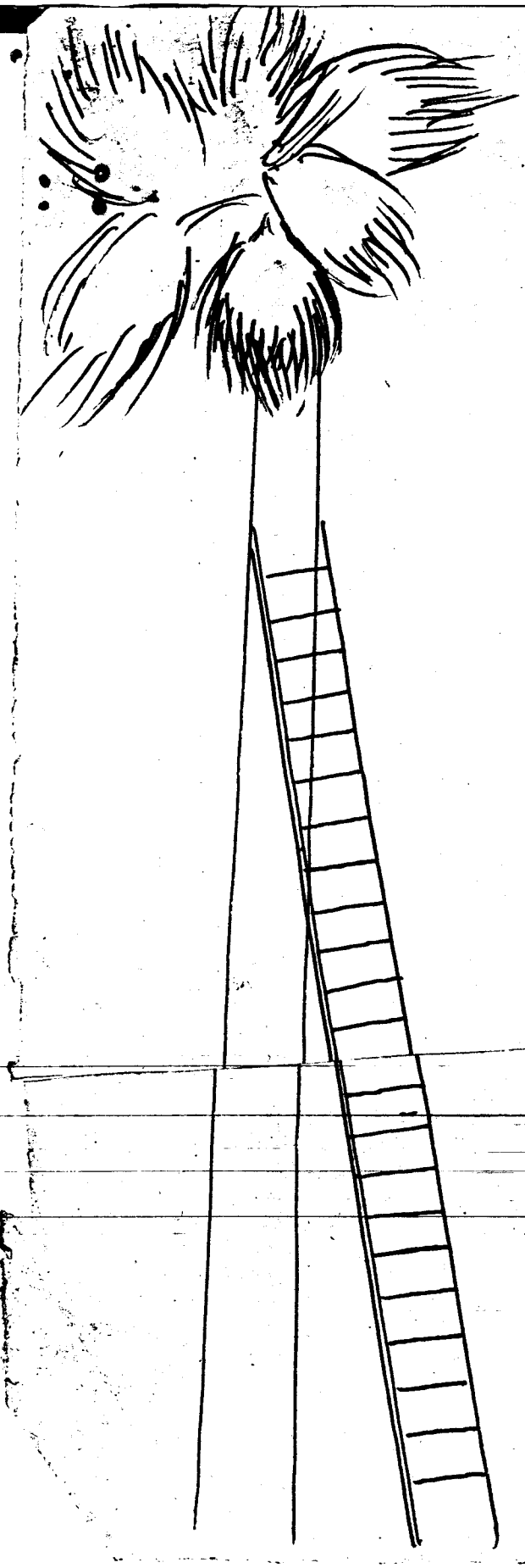
The theoretical speed calcutated for the machine is about 140 feet per minute. The approximate cost of the machine is Rs. 850/- and the cost will be loss when large scale production is taken up. With one litre of petrol, 100-200 palms can be climbed in this machine.

NEW POWER-DRIVEN CYCLE METHOD



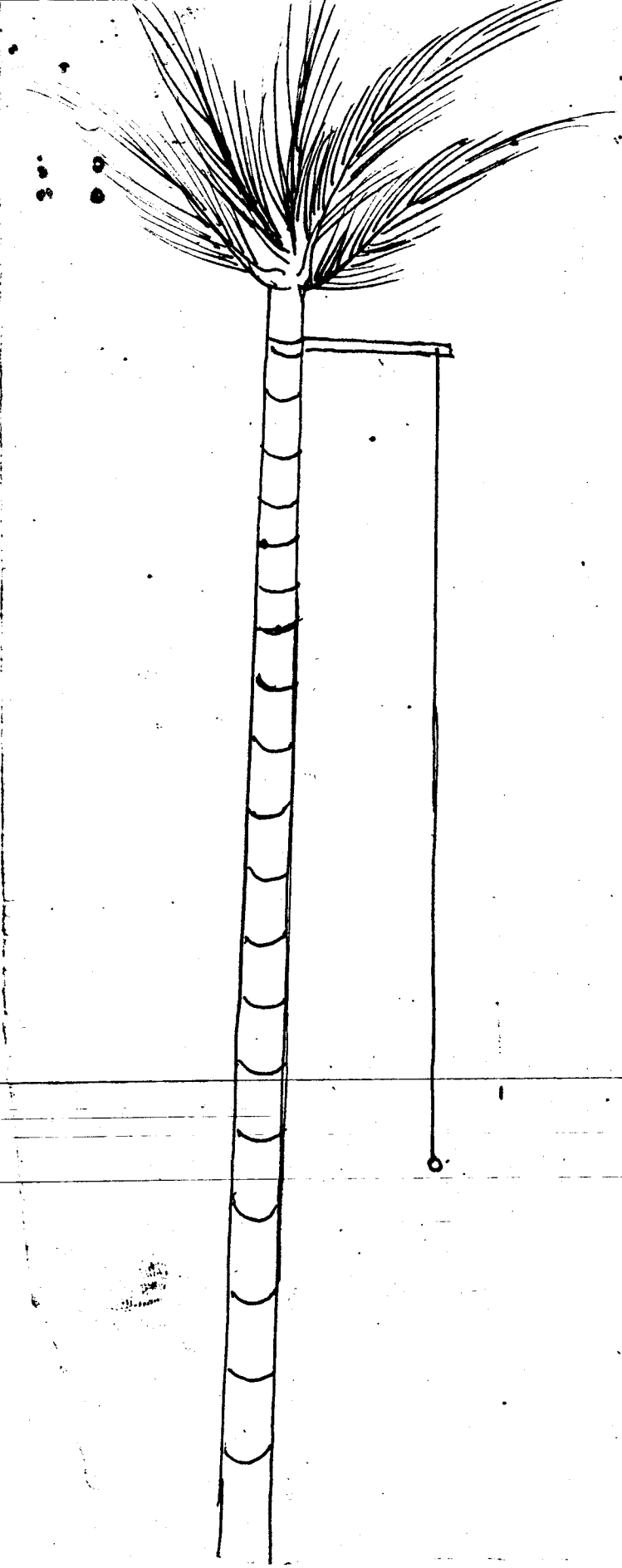
NEW-POWER-DRIVEN CYCLE-METHOD





OLD-METHOD

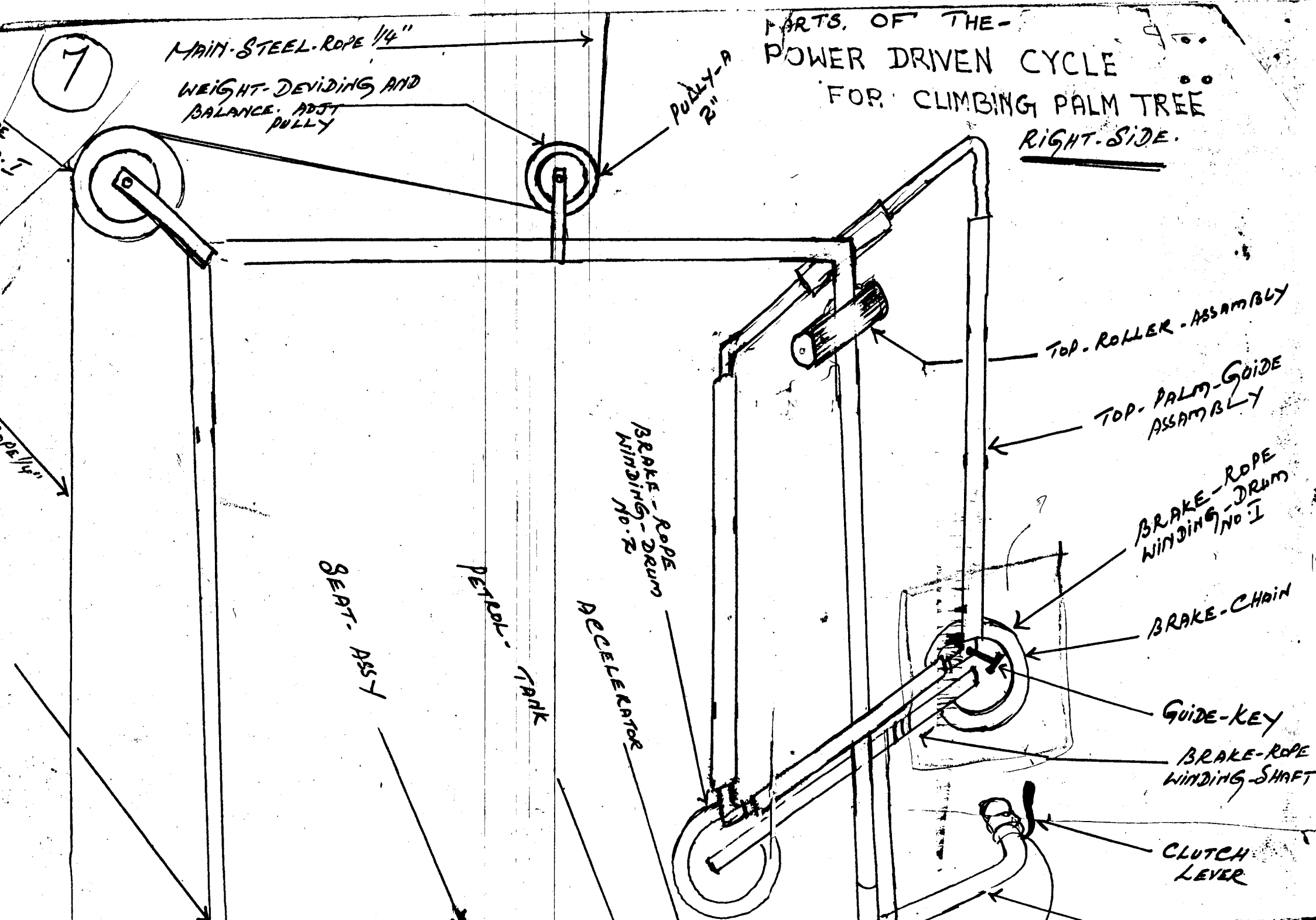
NEW-POWER-DRIVE
METHOD

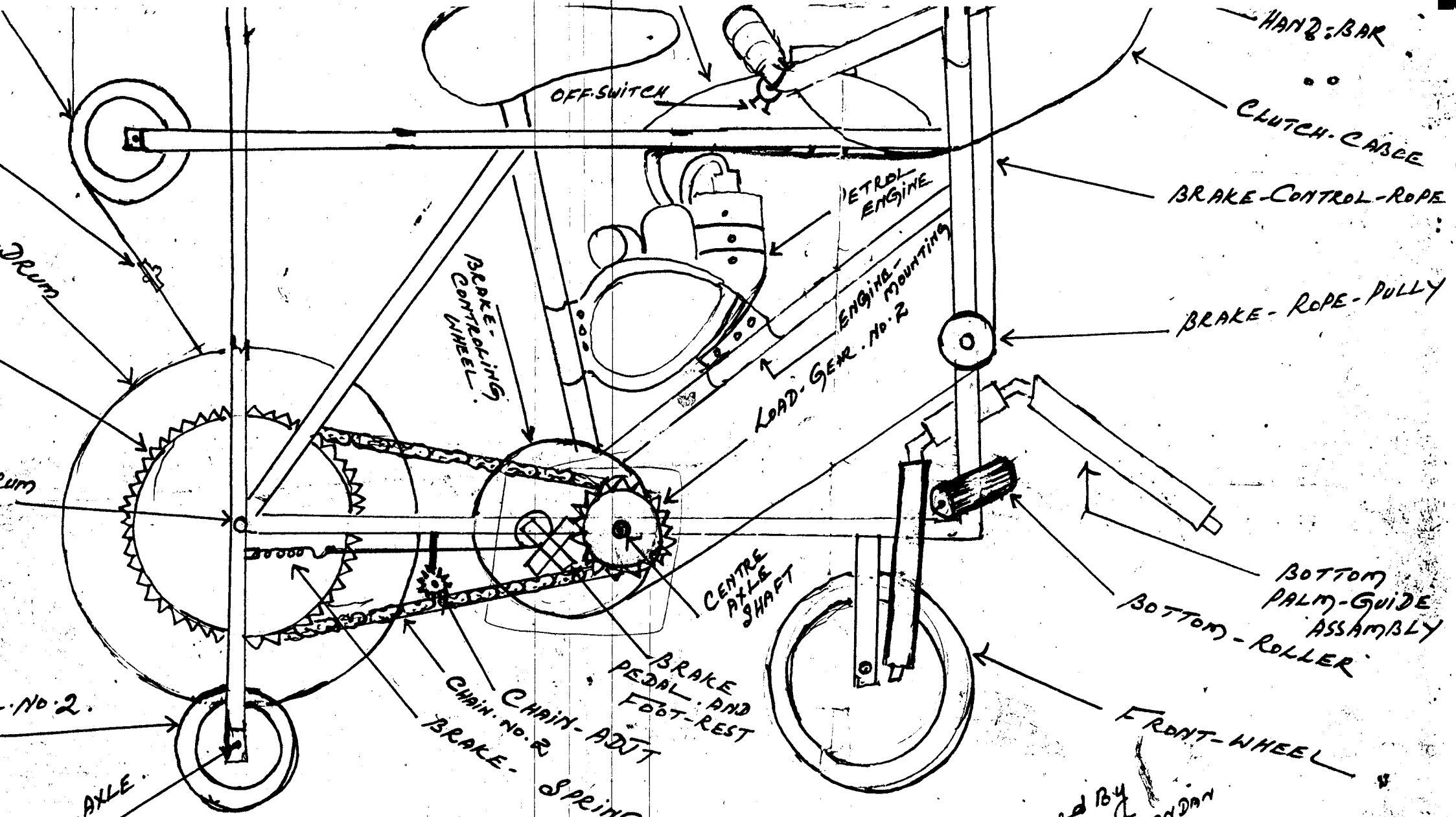


7

PARTS OF THE POWER DRIVEN CYCLE FOR CLIMBING PALM TREE

RIGHT SIDE.

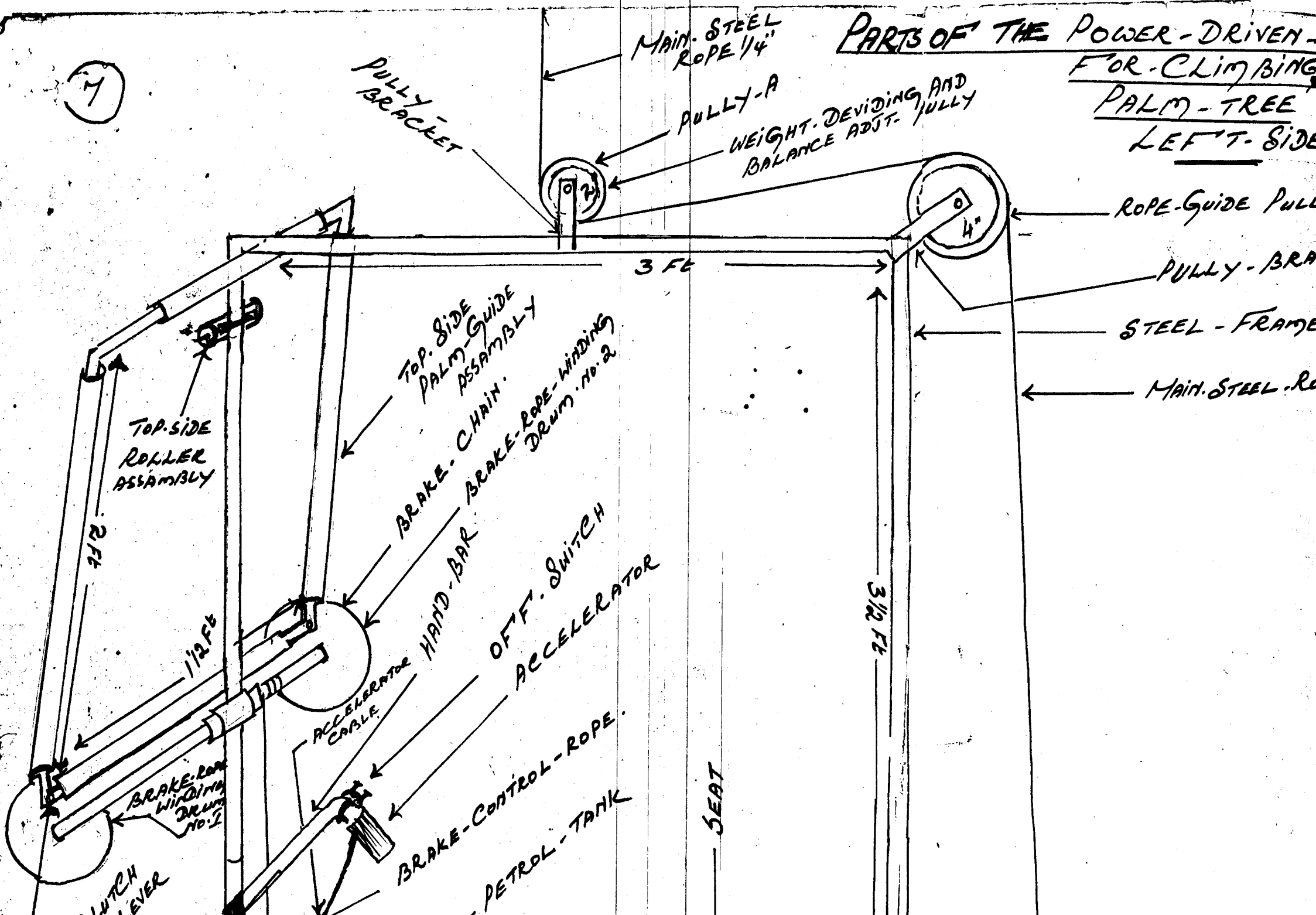


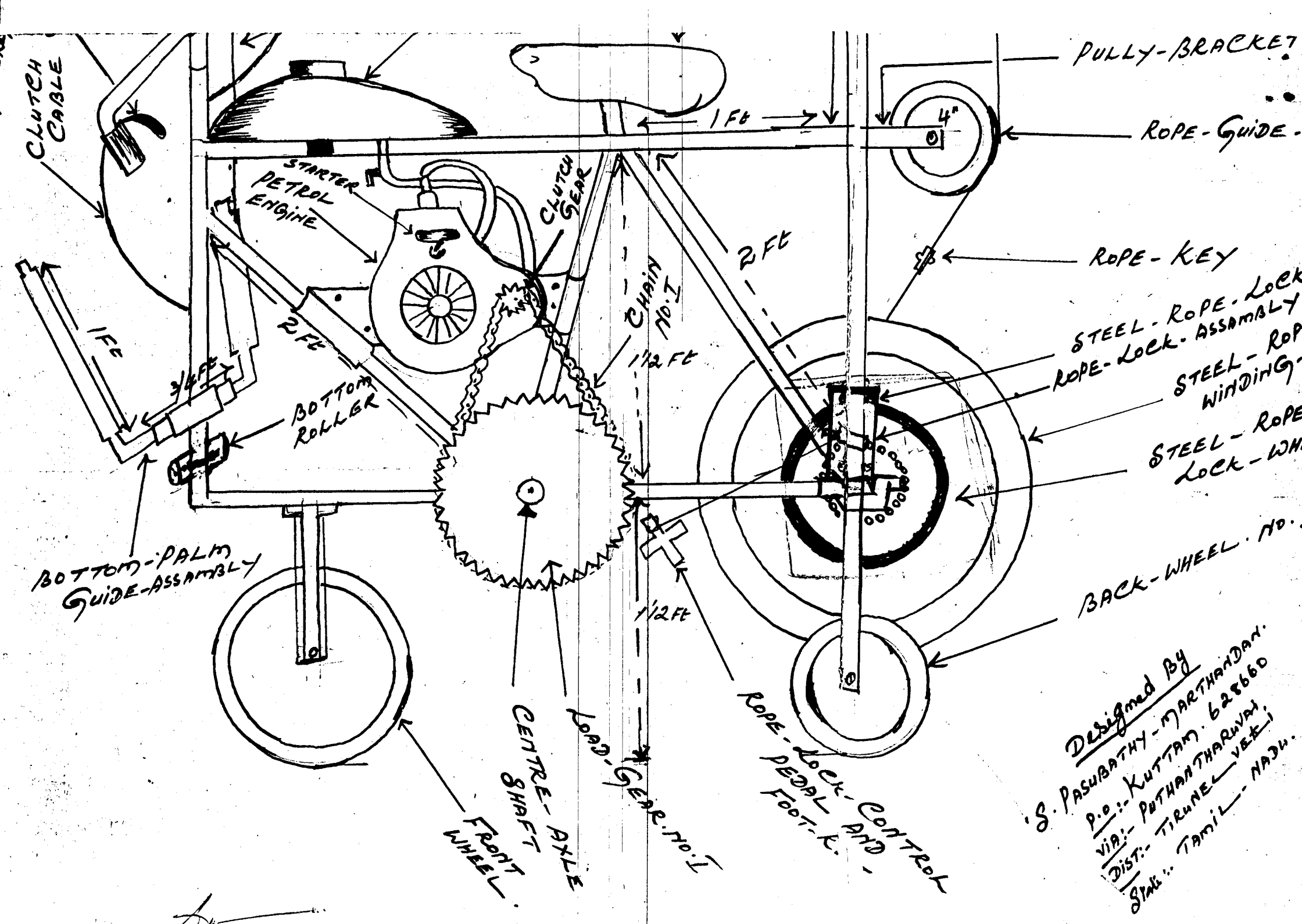


Designed By
S. PASUBATHY-MARTHANDAN
P.O:- KUTTAM. 628660
VIA:- PUTHAN-THARUVAI
DIST:- TIRUNELVELI
STATE:- TAMIL-NADU

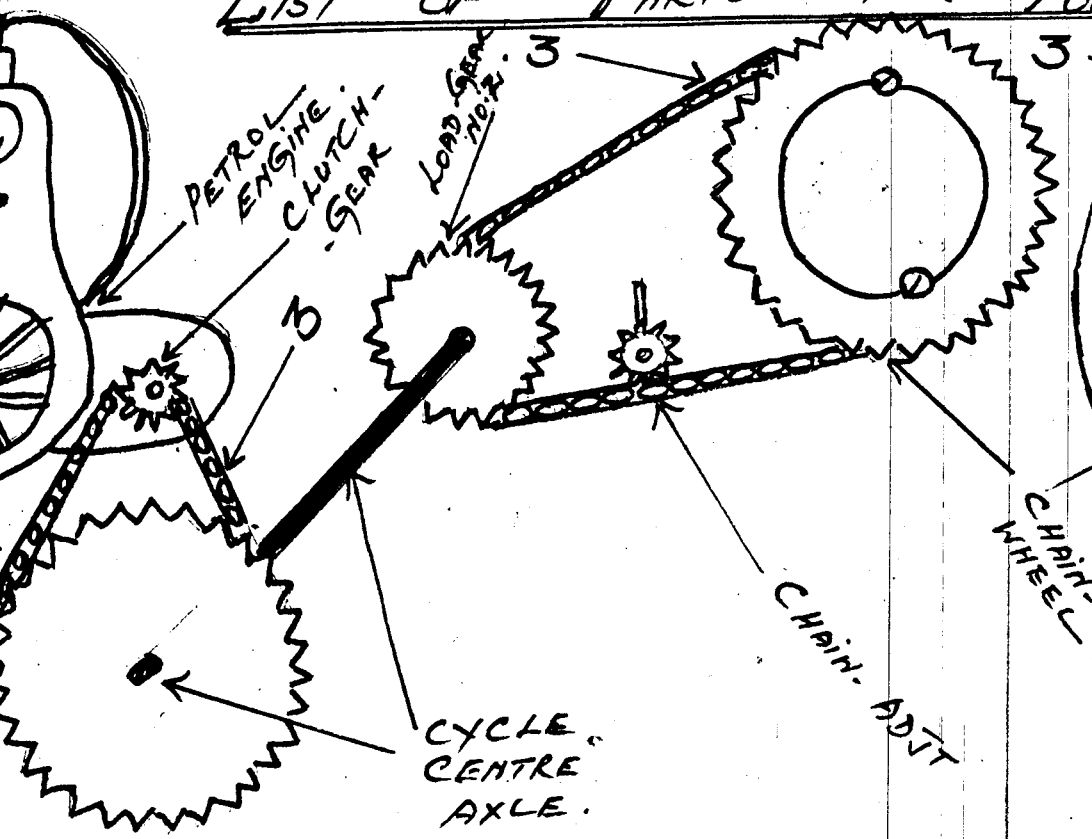
7

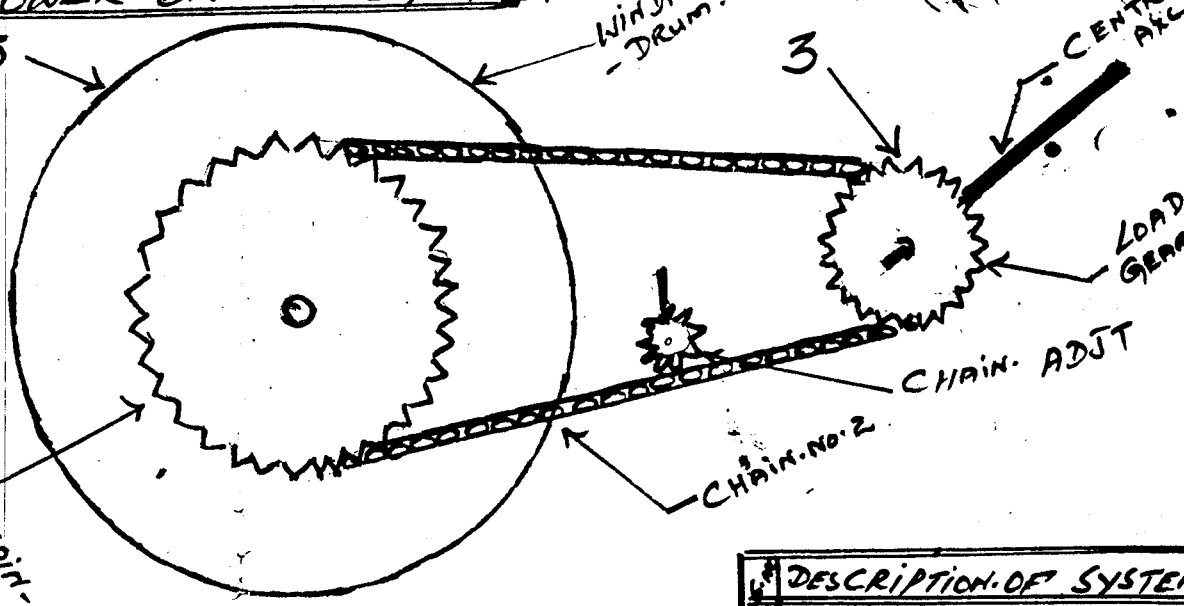
PARTS OF THE POWER-DRIVEN-
FOR-CLIMBING
PALM-TREE
LEFT-SIDE

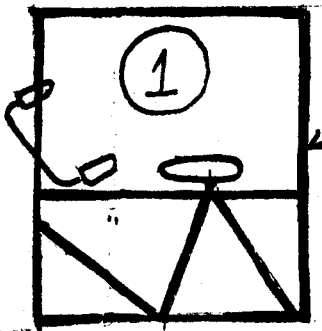



CLUTCH CABLE
STARTER PETROL ENGINE
CLUTCH GEAR
1 Ft
4"
PULLY-BRACKET
ROPE-GUIDE-
2 Ft
ROPE-KEY
CHAIN NO.1
1 Ft
2 Ft
3/4 Ft
1 1/2 Ft
BOTTOM ROLLER
STEEL-ROPE-LOCK
ROPE-LOCK-ASSAMBLY
STEEL-ROP
WINDING
STEEL-ROPE
LOCK-WH
BOTTOM-PALM GUIDE-ASSAMBLY
BACK-WHEEL. NO.
1 1/2 Ft
FRONT WHEEL.
CENTRE-AXLE SHAFT
LOAD-GEAR.NO.1
ROPE-LOCK-CONTROL PEDAL AND FOOT-K.
Designed By
S. PASUPATHY-MARTHANDAM.
P.O:- KUTTAM. 628660
VIA:- PUTHANTHARUVAI
DIST:- TIRUNELVELI
STATE:- TAMIL-NADU.

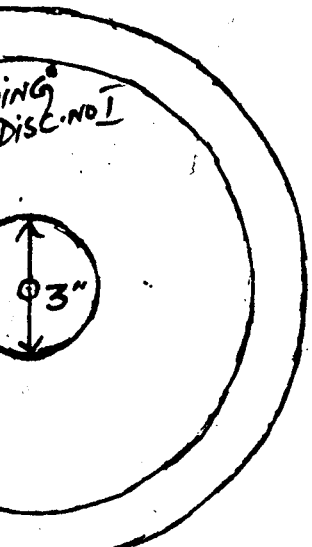
LIST OF PARTS FOR POWER-UNIT-CYCLE

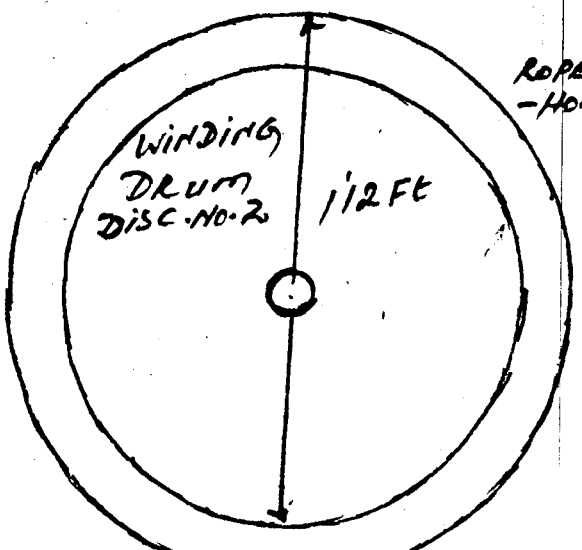


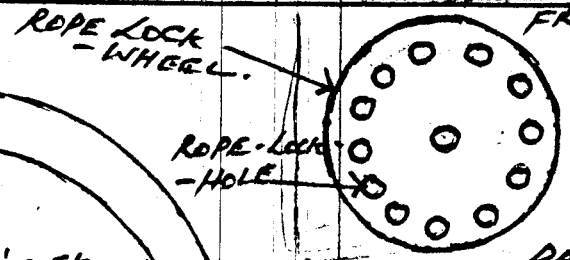


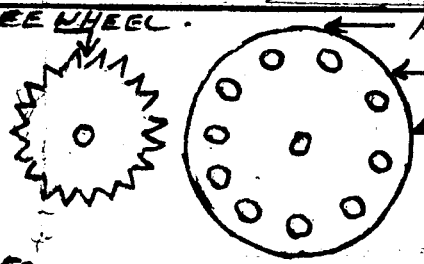


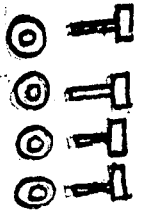
S.No	DESCRIPTION OF SYSTEM
1	FRAME.
2	ENGINE.
3	TRANSE-MECHINE-SYS
4	ROPE WINDING-SYSTE
5	BRAKE-SYSTEM
6	ROAD-WHEEL AND ROLLER ASSEMBLY

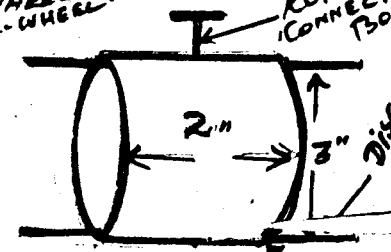


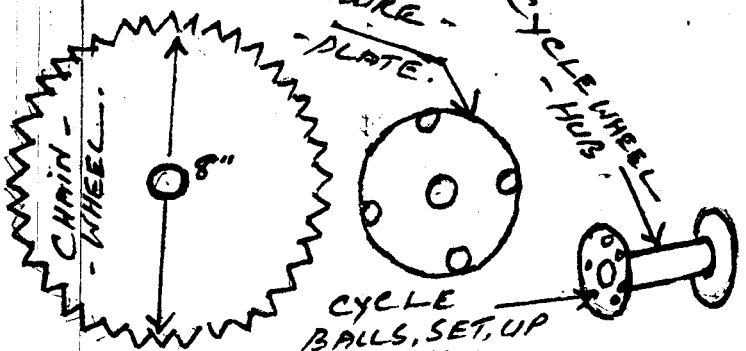


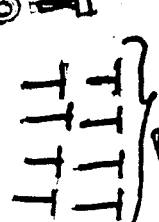


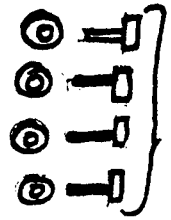


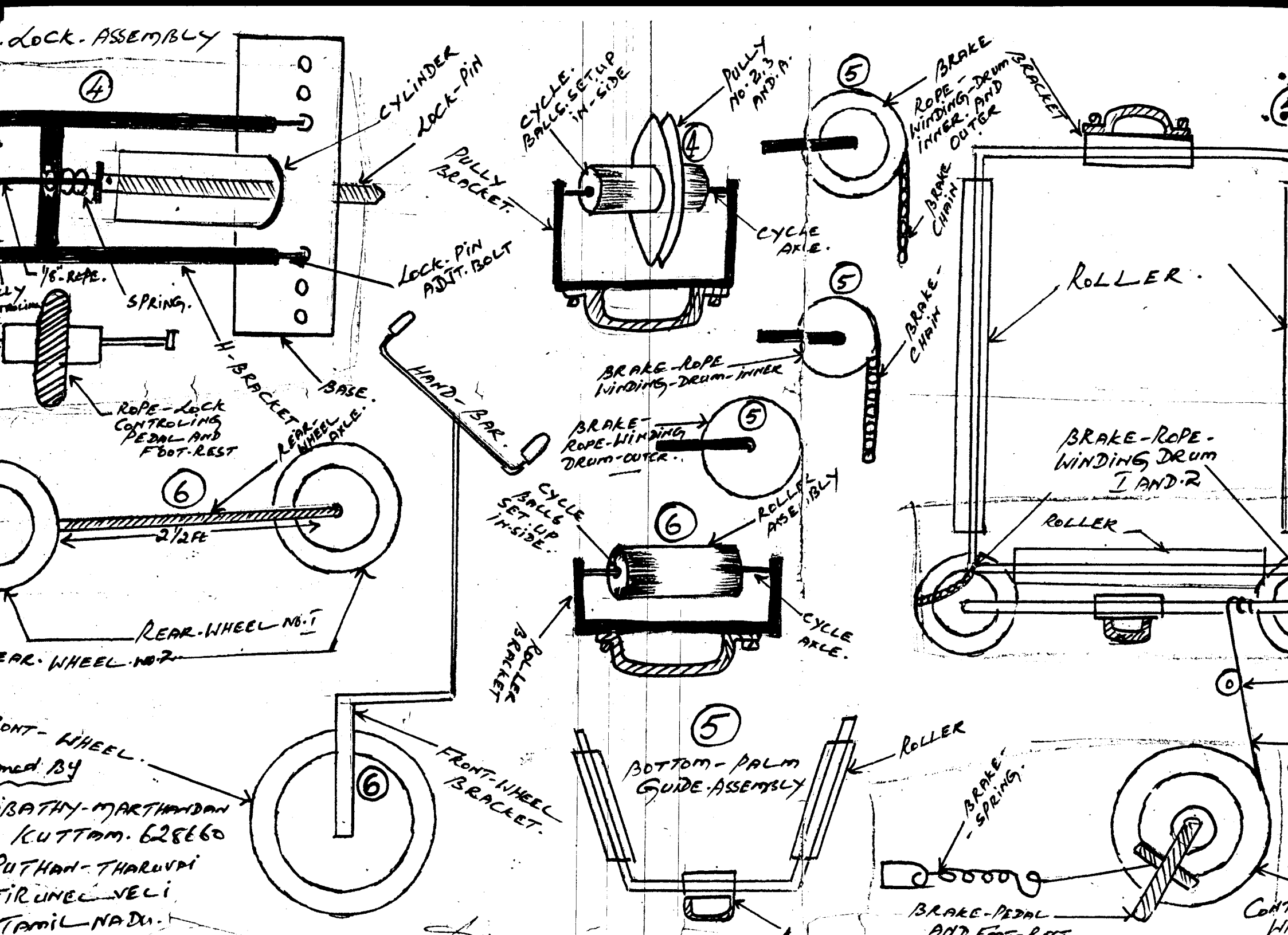




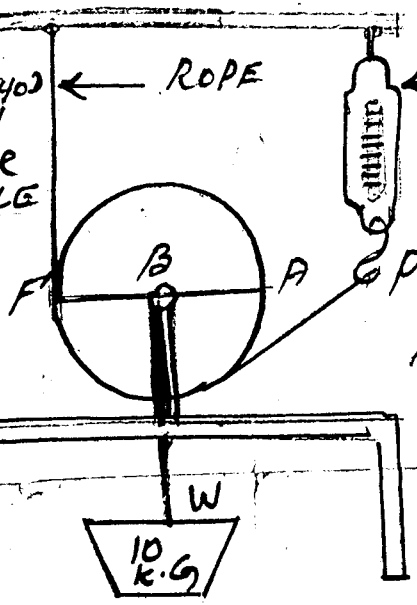


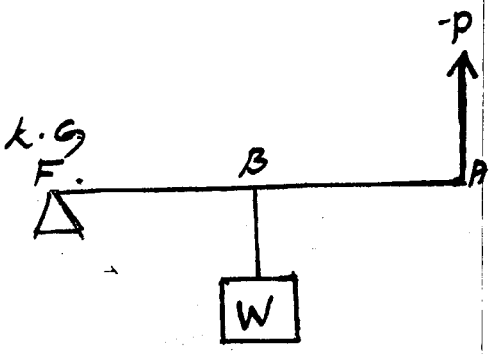





LOCK-ASSEMBLY
4
CYLINDER
LOCK-PIN
1/8" ROPE.
SPRING.
H-BRACKET
LOCK-PIN ADJT. BOLT
BASE.
ROPE-LOCK CONTROLING PEDAL AND FOOT-REST
REAR-WHEEL AXLE.
6
2 1/2 Ft
REAR-WHEEL NO.1
EAR-WHEEL-NO.2
HAND-BAR.
ONT-WHEEL.
nod BY
BATHY-MARTHANDAN
KUTTAM. 628660
UTHAN-THARUVAI
IRUNEL VELI
TAMIL NADU.
FRONT-WHEEL BRACKET.
CYCLE BALLS SET UP IN-SIDE
PULLY NO. 2,3 AND 4.
PULLY BRACKET.
CYCLE AXLE.
BRAKE-ROPE WINDING-DRUM-INNER
BRAKE-ROPE-WINDING DRUM-OUTER.
CYCLE BALLS SET UP IN-SIDE.
ROLLER ASSEMBLY
ROLLER BRACKET
CYCLE AXLE.
5
BOTTOM-PALM GUIDE-ASSEMBLY
BRAKE ROPE-WINDING-DRUM INNER AND OUTER
BRAKE CHAIN
BRACKET
ROLLER.
BRAKE-ROPE-WINDING DRUM I AND 2
ROLLER
ROLLER
BRAKE-SPRING.
BRAKE-PEDAL

THE UNDER MENTIONED METHODS ARE USED IN THE POWER DRIVEN CY





MECHANICAL ADVANTAGE $= \frac{AF}{BF}$

AF = CIRCLE DIAMETER

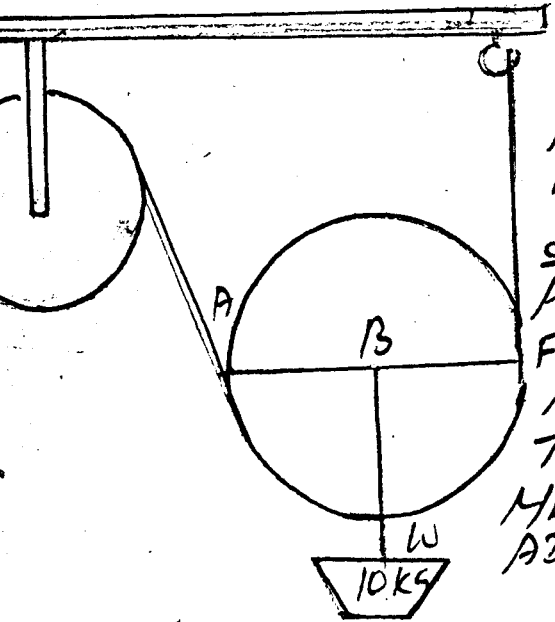
BF = CIRCLE RADIUS

AF = 4"

BF = 2"

$= \frac{4}{2} = 2$

MECHANICAL ADVANTAGE OF PULLY A IS 2



P = POWER

F = FULCRUM

W = WEIGHT

Suppose

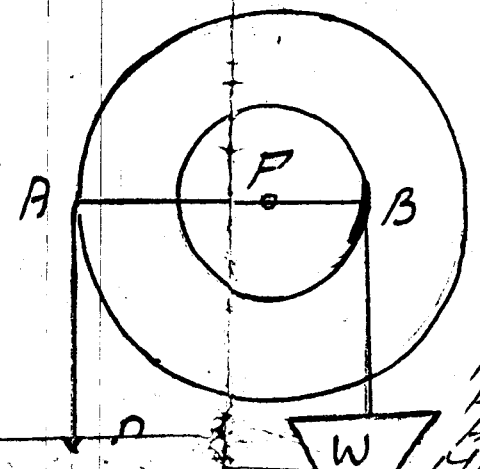
POWER DRIVEN F WEIGHT } 50 k·G

RIDER-WEIGHT } 50·k·G

TOTAL WEIGHT 100k·G

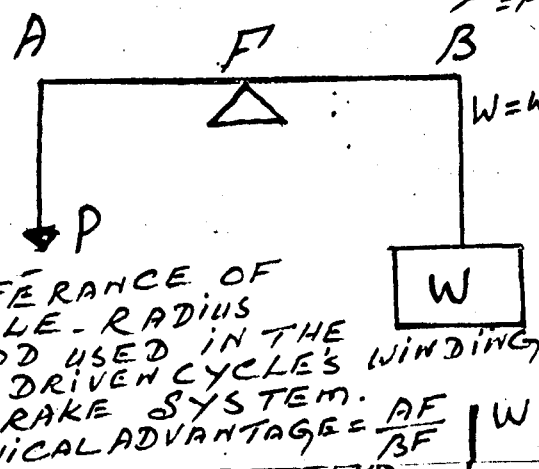
MECHANICAL ADVANTAGE FROM PULLY A } $\frac{100k}{2}$

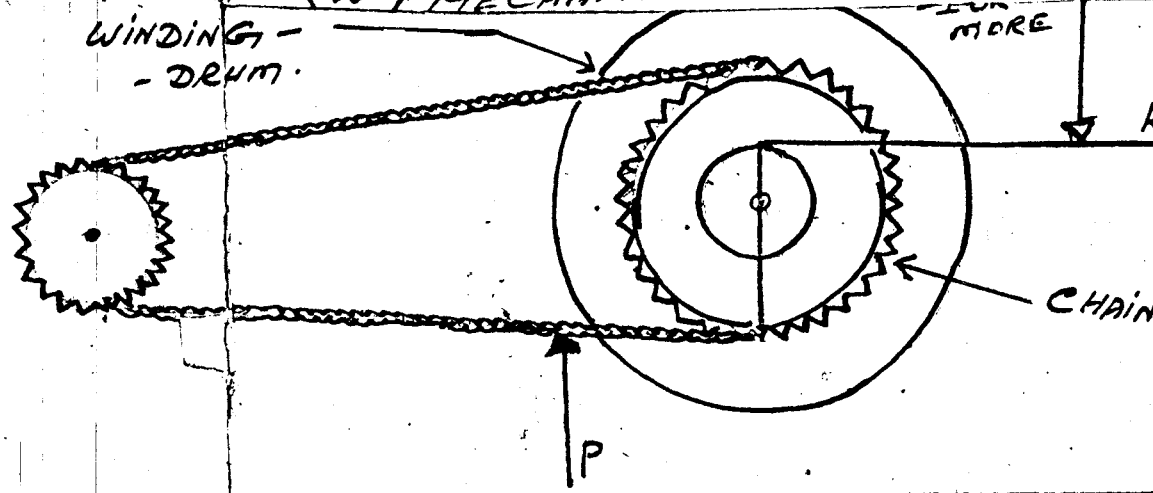
ENGINE LOAD = 50k·G

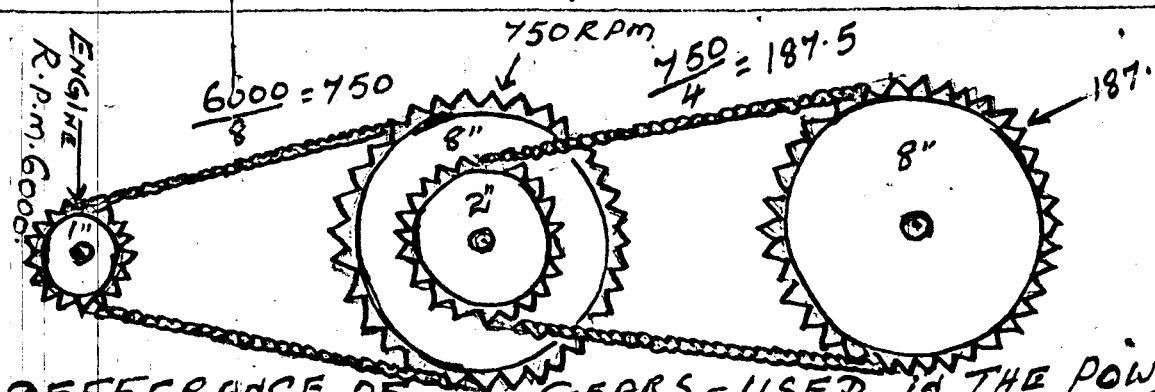


DEFFERANCE OF CIRCLE-RADIUS METHOD USED IN THE POWER DRIVEN CYCLE'S BRAKE SYSTEM.

AND MECHANICAL ADVANTAGE $= \frac{AF}{BF}$





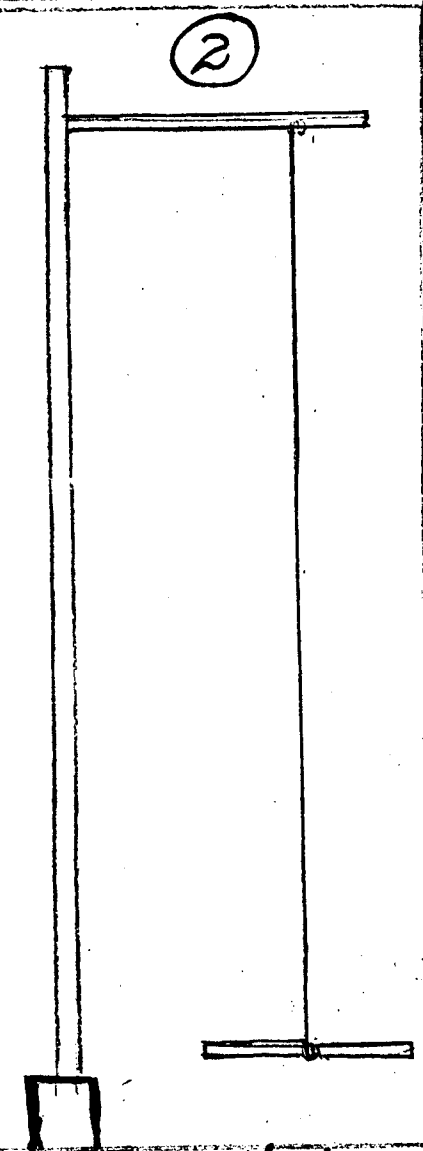


DEFFERANCE OF GEARS-USED IN THE POW

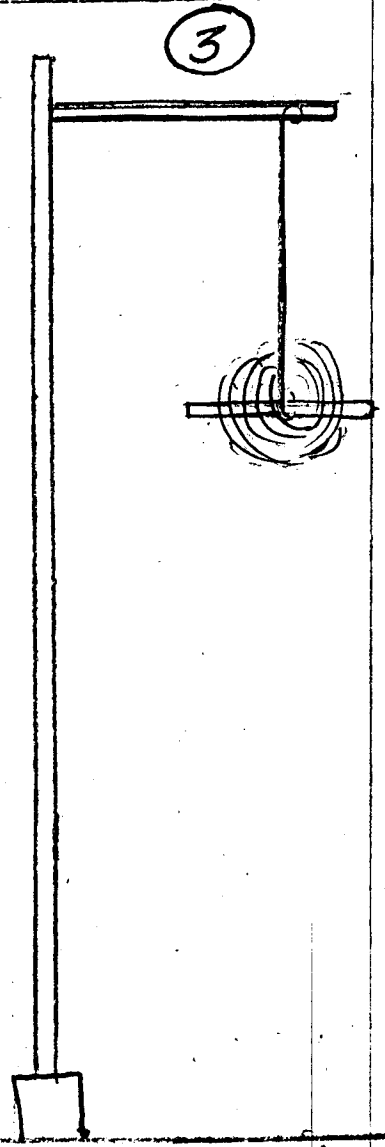
DRIVEN CYCLE'S TRANSE-MECHINE SYSTEM

THE UNDER MENTIONED IDEAS ARE USED BY THE POWER DRIVEN CYCLE.

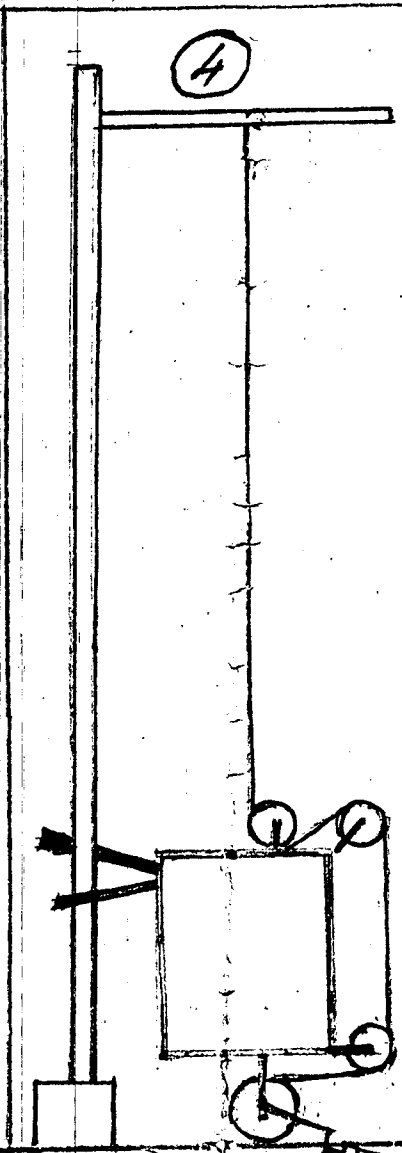
e is Hunging
top of the
d Stand.
of the Rope
n the Bar
ther End is
Freely
re No. I



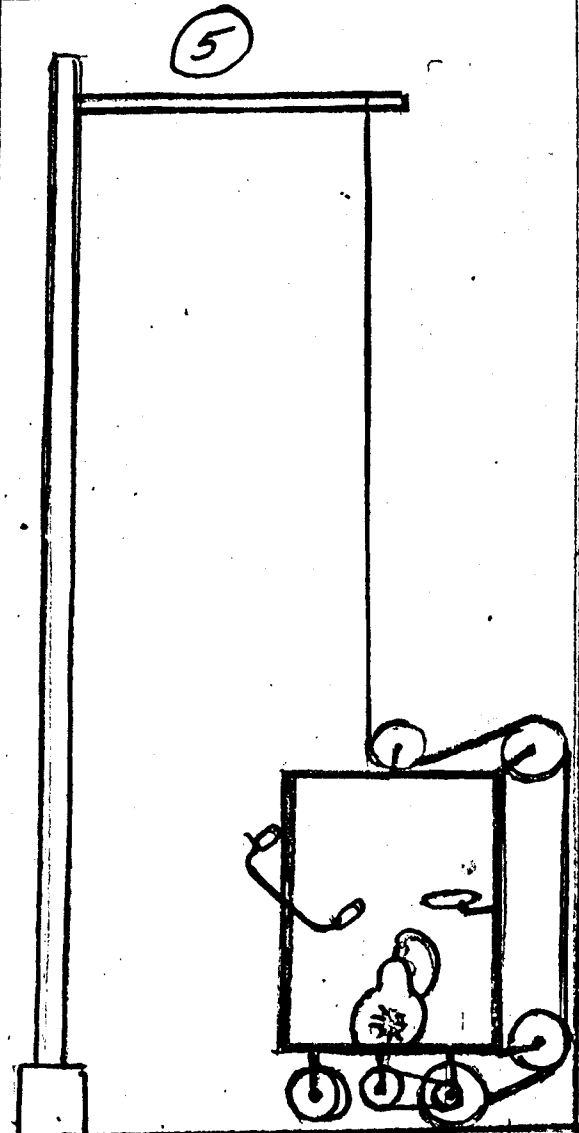
One Pencil is tied By the Down End of the Hunged Rope
As Per picture No 2



The Rope Wind on the Pencil. The Pencil And Rope Lift up
AS Per Picture No. 3



Model Power Driven Cycle Connect With the Hunged Rope The Handle of the Model Cranked by the Hand. The Rope Wind in the Winding-Drum. The Model Lift up AS Per Picture No. 4



Engine Model Power Driven Cycle Connect with Rope
As Per Picture No. 5