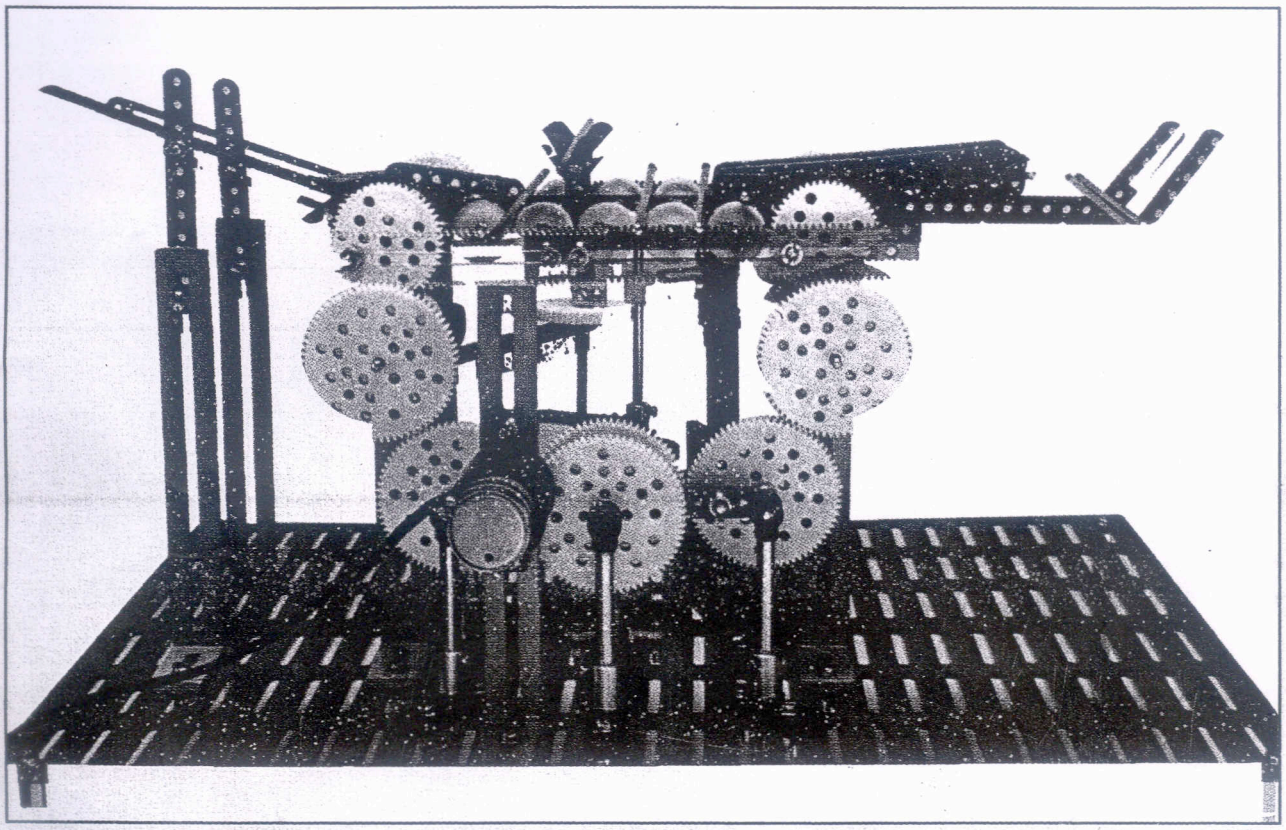
CONCEPT TO CREATION
. . . WATCH YOUR IDEAS IN ACTION



MAKIT®

✷ Patent Pending

The Creative Engineers Kit

A COLLECTION OF CAREFULLY DESIGNED, FLEXIBLE, EASY TO ASSEMBLE, PRECISION MECHANICAL COMPONENTS.

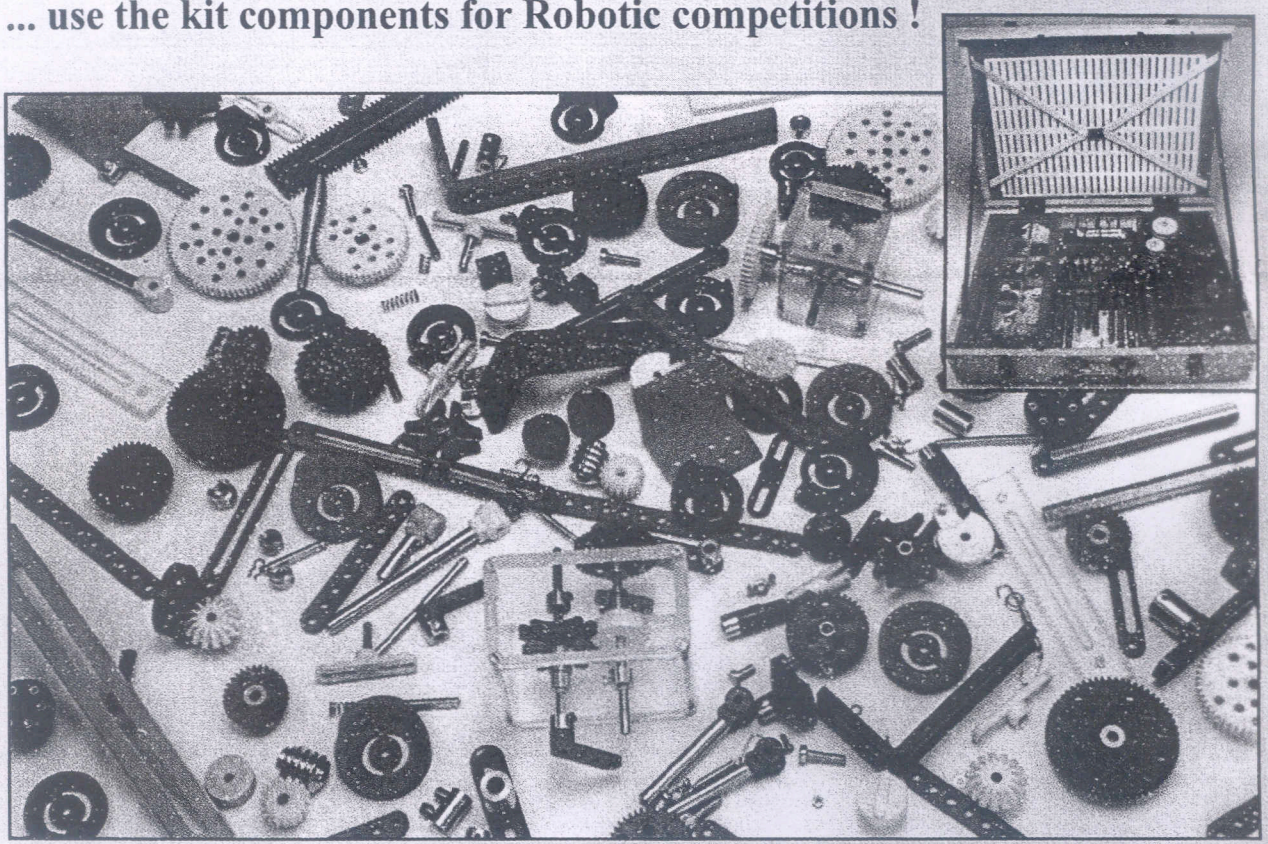
... Links, Shafts, Spur Gears, Bevel Gears, Worm Gears, Racks, Motors, Geneva Mechanisms, Oldham Couplings, Universal Joints, Pulleys etc., **useful for building miniaturised models / prototypes of mechanisms and Machines.**

Ideal for :

- R & D Centres
- Educational Institutions
- Creativity Centres
- Robotics Labs
- Mechatronics Labs
- SPM Manufactures

Now you can ....

... build your dream machine on your table !
... simulate, study and solve design problems !
... check suitability of a mechanism for proposed application !
... save precious design and manufacturing hours !
... use the kit as an excellent teaching & training aid !
... use the kit components for the project works !
... use the kit components for Robotic competitions !



- **Over 1500* precision components in more than 100* varieties**
  .....adequate for constructing even complicated Special purpose machines (SPMs)
- **Components are specially designed for easy assembly and dismantling.**
- **Components possess in-built flexibility to ensure usefulness for versatile applications.**
- **Required assembly tools are part of the kit.**
- **MAKIT® is available in 2 models.**

Master **Hitech**

* in **Master kit** only

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Vijayanagar, Bangalore - 560 040. INDIA
Ph. No. 080-23391257, Mob: 09845293360
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NAMES OF FEW IMPORTANT MECHANISMS AS MENTIONED BELOW.

Using our MAKIT-MASTER KIT Mechanical components you can build any Kind of Mechanisms or machines. Our MAKIT comes with the Mannuals which has some examples of few mechanisms as mentioned below for your easy access to our MAKIT – MASTER Mechanical kits & which is self sufficient & self explanatory, so that you can build verity's of Mechanisms & Machines using our kit component codes & from there onwards you will be very much comfortable in accessing our MAKIT – KIT components along with codes easily without any assistance or help.

1. QUICK RETURN MECHANISM
2. SLIDER CRANK MECHANISM
3. MULTIPLE BAR PANTOGRAPH MECHANISM
4. FOUR BAR ST LINE MECHANISM
5. SIX BAR MECHANISM
6. SIX BAR CRANK & ROCKER ARM MECHANISM
7. FOUR BAR CRANK & ROCKER ARM MECHANISM
8. RACK & PINION MECHANISM
9. THEO JANSEN MECHANISM
10. FOUR BAR DRAG - LINK MECHANISM
11. FOUR BAR DOUBLE SWING MECHANISM
12. FOUR BAR RHOMBOID DRAG LINK MECHANISM
13. APPROXIMATE STRAIGHT LINE MECHANISM
14. MULTIPLE BAR MECHANISM 1 WITH A TRANSLATIONAL LINK
15. MULTIPLE BAR MECHANISM 2 WITH A TRANSLATIONAL LINK
16. PEAUCELLIER LIPKIN LINKAGE ST LINE MECHANISM
17. HOEKENS MECHANISM
18. WATTS MECHANISM
19. FOUR LEGGED ANIMAL WALKING MECHANISM.(OUR OWN DESIGN)
20. SIX LEGGED ANIMAL WALKING MECHANISM.(OUR OWN DESIGN)

For your information you can build anything according to your concept & design.

We wish you all the best to create the unique design through your innovations.

Regards
Shiva Kumar.
Mob no. 9972502016

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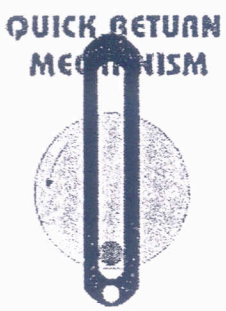
1. Quick return Crank Mechanism.

By using our MAKIT-Master kit components this mechanism can be built as explained in the following steps.

A quick return mechanism is used where there is a need to convert rotary motion into reciprocating motion. As the disc rotates the black slide moves forwards and backwards. Many machines have this type of mechanism and in the workshop the best example is the shaping machine.

By using our slider code no.(011) with the help of spur gear code no.(019)as an Disc with the pin code no.((012) locked from both the sides with the help of circlips code no.(013).the slider code no(011) is hinged at one end of the L-Postcode no.(005) and the same is being attached to the Disc so called as spur gear to give a rotary motion & then converts that in to Reciprocatory motion as shown in our Model & the Mechanism.we have connected one of the bush bearing code no.(007)to crank the disc code no.(019) with the help of Drive link code no.(010).



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2.CRANK AND SLIDER MECHANISM .

By using our MAKIT-Master kit components this mechanism can be built as explained in the following steps.This mechanism is composed of three important parts:

The crank which is the rotating disc, the slider which slides inside the tube and the connecting rod which joins the parts together.

As the slider moves to the right the connecting rod pushes the wheel round for the first 180 degrees of wheel rotation. When the slider begins to move back into the tube, the connecting rod pulls the wheel round to complete the rotation.

One of the best examples of a crank and slider mechanism is a steam train. Steam pressure powers the slider mechanism as the connecting rod pushes and pulls the wheel round. The cylinder of an internal combustion engine is another example of a crank and slider mechanism.

By using our link code no (009) of suitable size , Two L-posts code no.(005),slider code no.(011) & as a rotary motion the spur gear as an disc code no.(019) has been used as an Disc,bush bearing code no.(007) for rotary motion & as usual for cranking, the drive link code no.(010) has been used.

We have used lots of spacers code no (008) to connect the linkages to give ease of motion along with pins of code no.(012).For further locking the pins on both the sides of the axis point we have used circlips code no.(013).

Two L post code no.(005) have been used to make a stable mechanism structure .

We have used an Drive link code no.(011) for cranking the mechanism as one end is an rotary motion.

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3.MULTIPLE BAR -PANTO GRAPH MECHANISM .

By using our MAKIT-Master kit components this mechanism can be built as explained in the following steps.

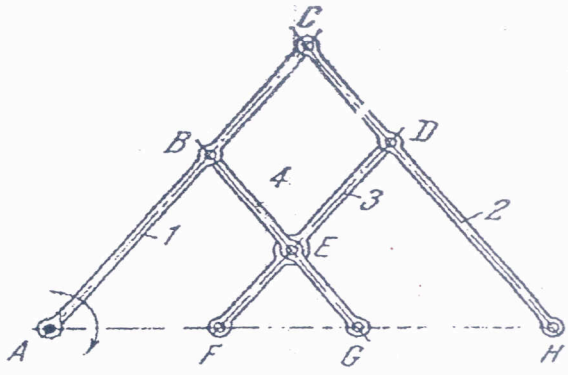
This mechanism is composed of two important parallelograms:

By using our links code no.(009) of two sets of different lengths ,each set contains two nos of same size of links.to make one bigger parallelogram & the second one has little lesser than the bigger parallelogram to achieve the arbitrary path.

We have to make one end as an fixed axis A ,selected as centre of similarity and one of the points G,H,F, is traced along any arbitrary path.the other two points describe similar paths.

This mechanism has reversibility since any point A,F,G,H,can be selected as the centre of similarity.

We have used lots of spacers code no (008) to connect the linkages to give ease of motion along with pins of code no.(012).For further locking the pins on both the sides of the axis point we have used circlips code no.(013).



The lengths of the links comply with the conditions: $\overline{BC} = \overline{ED}$ and $\overline{EB} = \overline{DC}$, i.e. figure $EBCD$ is a parallelogram linkage. An additional conditions is that $\overline{AC} : \overline{CH} = \overline{FD} : \overline{DH} = \overline{AB} : \overline{BG}$. For any configuration of parallelogram linkage $EBCD$, points A, F, G and H lie on a single straight line. When link 1 turns about fixed axis A, selected as the centre of similarity, and one of the points, G, H or F, is traced along any arbitrary path, the other two points describe similar paths. The mechanism has reversibility since any point A, F, G or H, can be selected as the centre of similarity.

3.MULTIPLE BAR -PANTO GRAPH MECHANISM .

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4. FOUR BAR STRAIGHT – LINE MECHANISM.

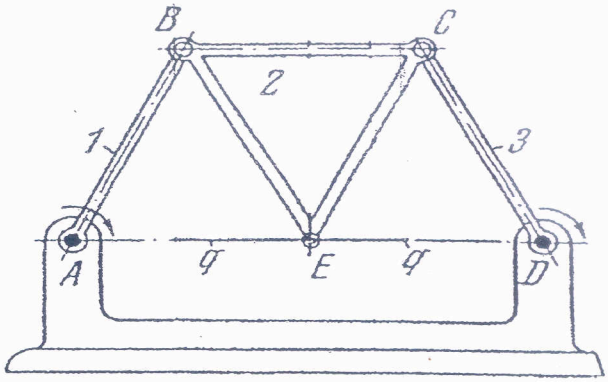
By using our MAKIT-Master kit components this mechanism can be built as explained in the following steps.

By using our FOUR links code no (009) of same lengths, we can achieve the turning movement on the fixed axis A.

Then we have to choose the linkcode no (009) AD as two times the lengthier than BC as shown in the figure for fixing up the cross members.

We have to make both the end's as an fixed axis A & D which turns about fixed points to achieve the approximate straight line Q Q, passing through points A & D.

We have used lots of spacers code no (008) to connect the linkages to give ease of motion along with pins of code no.(012).For further locking the pins on both the sides of the axis point we have used circlips code no.(013).



The lengths of the links of four-bar linkage $ABCD$ comply with the conditions: $\overline{AB} = \overline{BE} = \overline{CE} = \overline{DC}$ and $\overline{AD} = 2\overline{BC}$. When link *1* turns about fixed axis A, point E of link *2* describes a path of which a certain portion approximates straight line q-q, passing through points A and D.

4.FOUR BAR STRAIGHT- LINE MECHANISM .

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5. SIX BAR CRANK & ROCKER ARM MECHANISM .

By using our MAKIT-Master kit components this mechanism can be built as explained in the following steps.

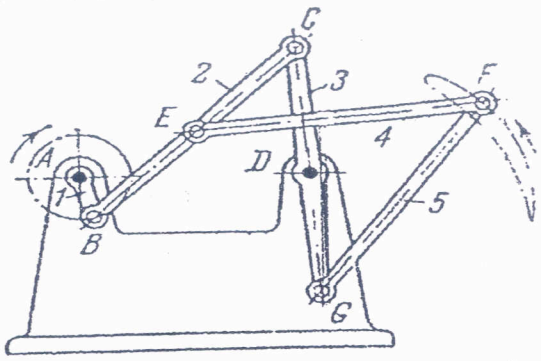
TWO L posts code no.(005) have been used to make a stable mechanism structure for holding the drive links through two bush bearings code no (007).

We have used four nos of links code no.(009) ,two nos as connecting rod & two more nos as rocker arm.

We have used two Drive links code no.(011) for cranking the mechanism to actuate the point. One is an rotary motion other point is for the cranking motion.

We have used lots of spacers code no (008) to connect the linkages to give ease of motion along with pins of code no.(012).For further locking the pins on both the sides of the axis point.

P T O



Links *4* and *5* are connected to the four-bar linkage *ABCD* with links *1*, *2* and *3*. Point *F* of two-bar group *EFG*, connected to connecting rod *2* and rocker arm *3*, describes a complex path.

5. SIX BAR CRANK & ROCKER ARM MECHANISM .

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6. FOUR BAR CRANK & ROCKER - ARM MECHANISM .

By using our MAKIT-Master kit components this mechanism can be built as explained in the following steps.

The lenghths of the links comply with the conditions:AB<CD<BC<AD And AB+BC<AD+DC.

Link 1 our code no.(009) is the crank & has complete rotation through 360 degree .

Link 3 our code no.(009) is the rocker arm which oscillates through the angle Alpha.

We have used two Bush bearings code no.(007) for actuating the connecting rod & Rocker arms.

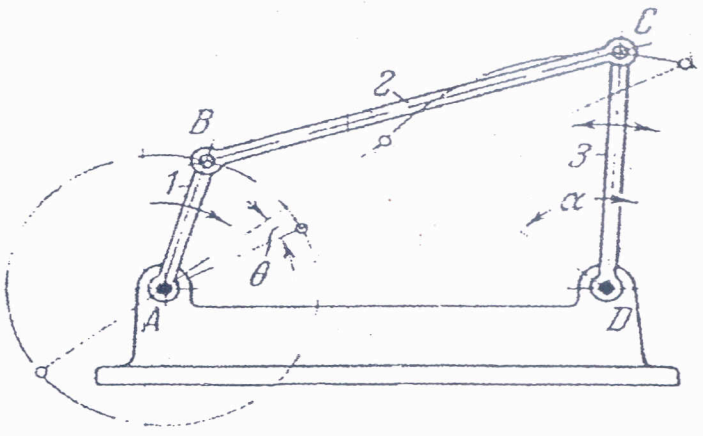
Any point of link 2 (009) describes a connecting – rod curve.The angles of Forward & reverse oscillation of rocker arm CD correspond to the angles 180'+0 and 180'-0 of rotation of crank AB.

We have used lots of spacers code no (008) to connect the linkages to give ease of motion along with pins of code no.(012).For further locking the pins on both the sides of the axis point we have used circlips code no.(013).

Two L post code no.(005) have been used to make a stable mechanism structure .

We have used an Drive link code no.(011) for cranking the mechanism as one end is an rotary motion & the other side is to oscillate on rocker arm.

PTO



The lengths of the links comply with the conditions: $\overline{AB} < \overline{CD} < \overline{BC} < \overline{AD}$ and $\overline{AB} + \overline{BC} < \overline{AD} + \overline{DC}$. Link *1* is the crank and has complete rotation through 360°. Link *3* is the rocker arm which oscillates through the angle α. Any point of link *2* describes a connecting-rod curve. The angles of forward and reverse oscillation of rocker arm *CD* correspond to angles $180° + \theta$ and $180° - \theta$ of rotation of crank *AB*.

6. FOUR BAR CRANK & ROCKER - ARM MECHANISM.

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7. RACK & PINION MECHANISM.

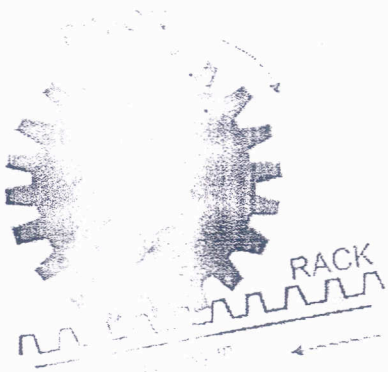
By using our MAKIT-Master kit components this mechanism can be built as explained in the following steps.

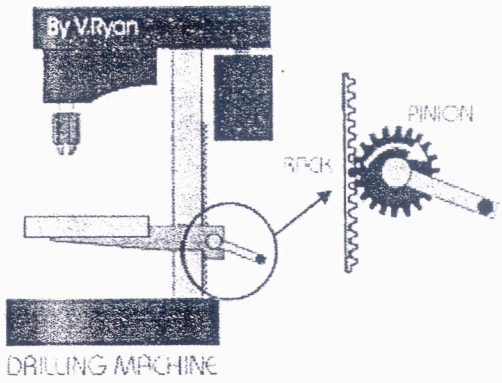
One L post code no.(005) have been used to make a stable mechanism structure for holding the spur gear through bush bearing.

We have fixed up the rack by using the link as an cross member so that whenever we start moving the spur gear forward & reverse motion the rack start moving accordingly.

We have used one Drive link code no.(011) for cranking the mechanism to actuate the point. One is an rotary motion other point as an oscillating motion.

We have used lots of spacers code no (008) to connect the linkages to give ease of motion along with pins of code no.(012). For further locking the pins on both the sides of the axis point we have used stopper bush code no.(014).





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8.THEO JANSEN'S 4 LEGGED ANIMAL WALKING MECHANISM .

By using our MAKIT-Master kit components this mechanism can be built as explained in the following steps.

By using our FOUR links code no(009.10) of same lengths ,we have to develop parallelogram by using the pin code no.(012.2) & circlips code no.(013).like this we have to develop one more set of parallelogram.(Two sets of parallelograms).

Then we have to choose the linkcode no(009.15).after choosing the 15 holes link ,attach one of the parallelograms to the one end of 15 holed link & the second parallelogram to the other end of the 15 holed link.

After this we need to attach the drive link code no.(010.4) to the 15 holed link which has attached to the 10 holed parallelogram & then this drive link is attached to the shaft of code no.(018.2) so that we can drive this with the help of one more drive link of same code no.(010.4).

Then attach 3 nos of 12 holed links code no.(009.12) to the one side of the parallelogram as shown in the picture & the second set of 3nos of links Code no.(009.12) to the other side of the parallelogram as shown.then taking 2 nos 9 holed link (code no.(009.9) as a cross member which attaches the each parallelogram as shown in the picture.

After this is ready we have to take 2 nos of 15 holed link Code no(009.15)should be attached from the drive link end as shown & the other end should be used for movement of the legs.

And then left out one end of parallelogram on both the parallelogram should be attached with the eleven holed link code no(009.11) to the the 15 holed leg exactly to the middle of the 15 holed link.

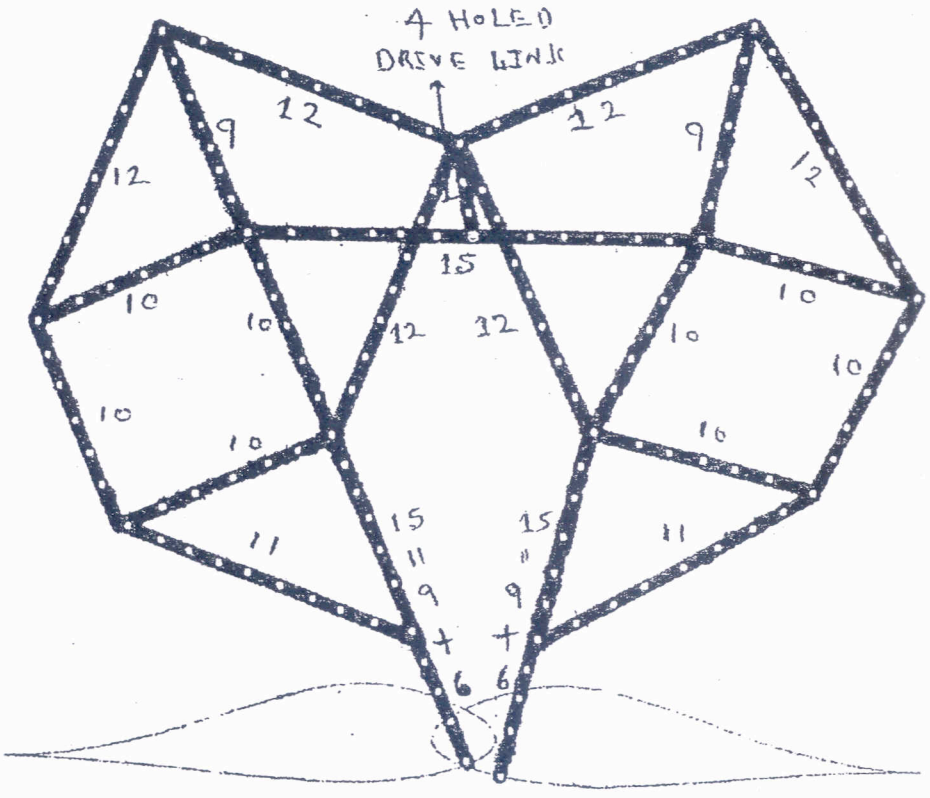
We have used lots of spacers code no (008) to connect the linkages to give ease of motion along with pins of code no.(012).For further locking the pins on both the sides of the axis point we have used circlips code no.(013).like this we can build theo jansen's mechanism.

P T O

8. THEO JANSEN'S 4 LEGGED ANIMAL WALKING MECHANISM.

This ingenious mechanism is very good example of four bar mechanism . In this mechanism 4 four bar arranged such that a rotation movement is converted to. walking pattern of a four legged animal.

There are only limited arrangement of bars which gives a good imitation of a four . legged animal walking pattern. By changing sliders you can change lengths of corresponding bars.



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9. FOUR BAR DRAG – LINk MECHANISM.

By using our MAKIT-Master kit components this mechanism can be built as explained in the following steps.

By using our FOUR links code no (009) of different lengths, we can achieve the rotating movement on the fixed axis A & D.

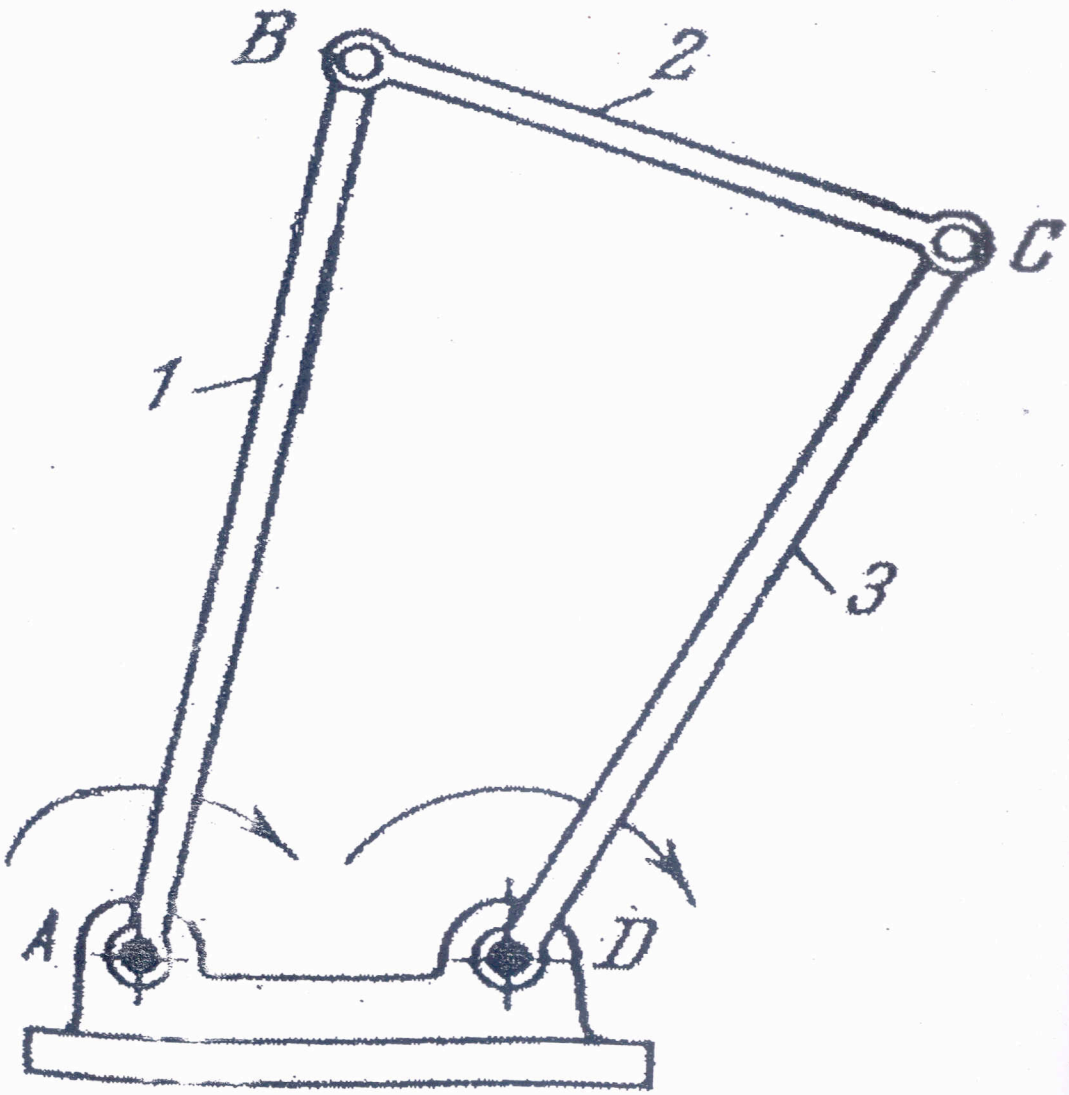
Under the conditions that AB+AD<BC+CD and AB>DC>BC>AD as per the figure shown and we have choosen the following links to achieve the required result.

Then we have to choose the linkcode no (009.08) as AD ,then (009.12) as AB then (009.10) as BC then the link code no.(009.11) as dc.

We have to make both the end's as an fixed axis A & D which turns about fixed points to achieve the result.

We have used lots of spacers code no (008) to connect the linkages to give ease of motion along with pins of code no.(012).For further locking the pins on both the sides of the axis point we have used circlips code no.(013).

PTO



Links 1 & 3 make complete revolutions , i e : they are both cranks ,under the conditions that AB + AD < BC + CD and AB > DC > BC > AD.

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10. FOUR BAR DOUBLE SWING MECHANISM.

By using our MAKIT-Master kit components this mechanism can be built as explained in the following steps.

By using our FOUR links code no (009) of different lengths, we can achieve oscillating movement on the fixed axis A & D.

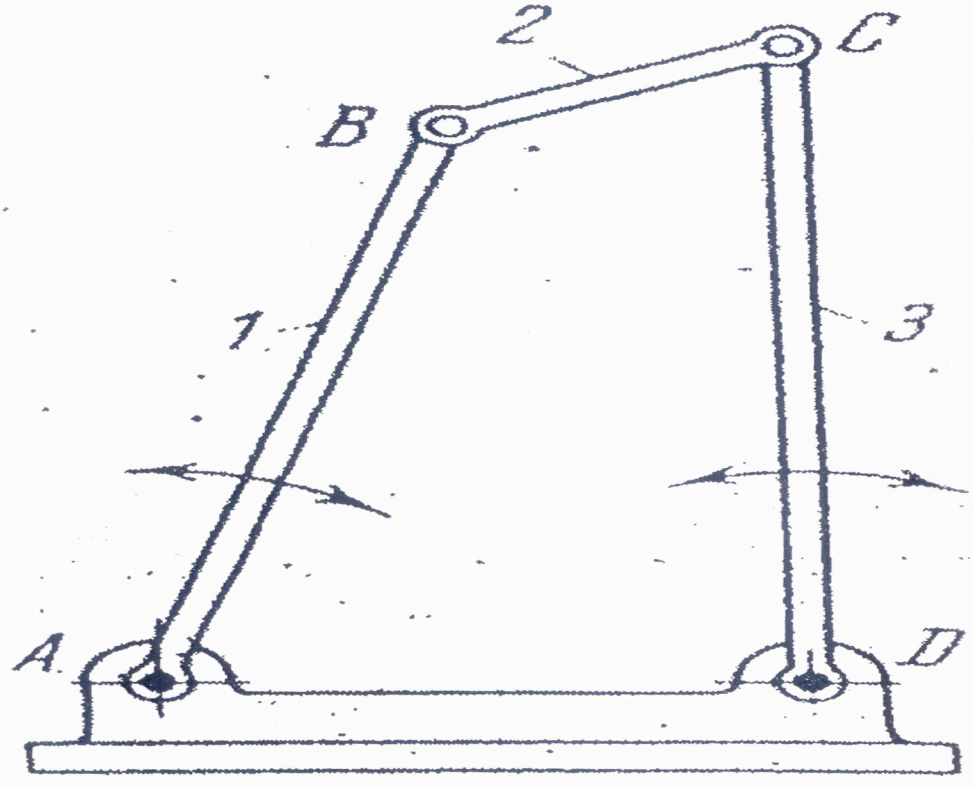
Under the conditions that BC<AD<AB<DC and AB+BC+AD+DC .LINKS 1 & 3 allow both rocker arms that they do not rotate completely rotate on the fixed axis A & D as per the figure shown and we have choosen the following links to achieve the required result.

Then we have choose the linkcode no (009.01) as AD ,then (009.12) as AB then (009.05) as BC then the link code no.(009.13) as CD.

We have to hold both the end's as an fixed axis A & D which swings about fixed points to achieve the result.

We have used pairs of spacers code no (008) to connect the linkages to get free use of motion along with pins of code no.(012).Further locking the pins on both the sides of the axis point we have used circlips code no.(013).

PTO



The lengths of the links comply with the conditions : BC< AD< AB< DC and AB+BC<AD+DC.LINKS 1 and 3 are both rocker arms in the sense that they do not rotate completely about points A and D,but oscillate.

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11. FOUR BAR RHOBOID DRAG – LINK MECHANISM.

By using our MAKIT-Master kit components this mechanism can be built as explained in the following steps.

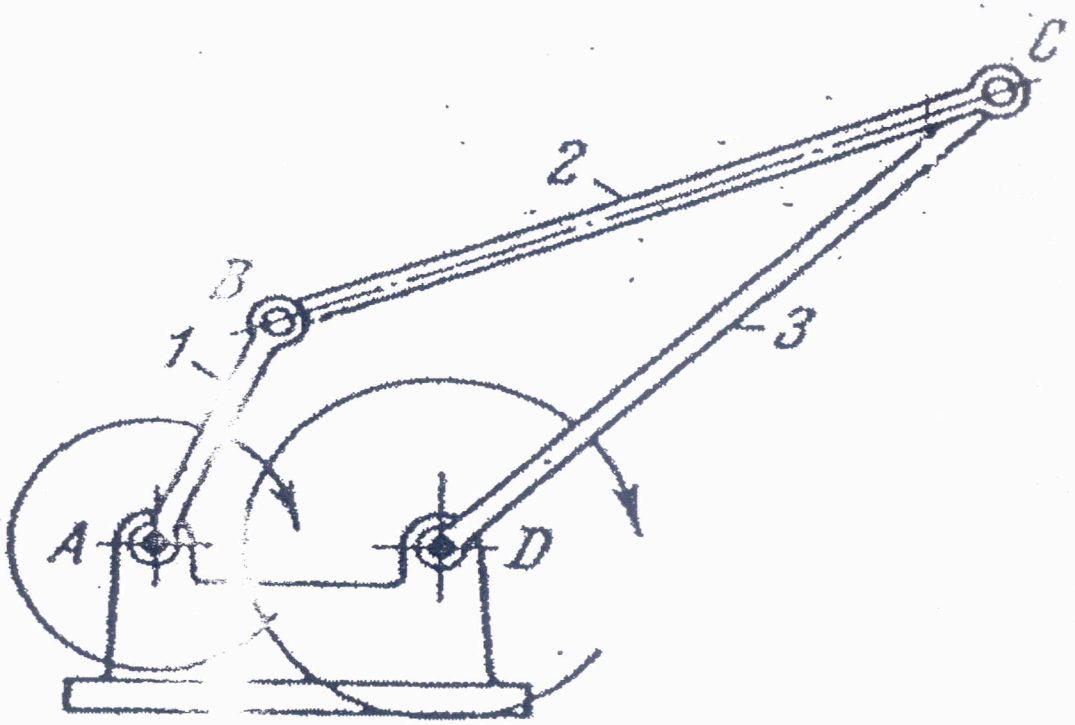
By using our one link code no (009.07) as AB & (010.2) drive link as AD , We can achieve the turning movement on the fixed axis A and then at D Also .

Then Choose the length of the Link BC = CD which we need to pick up the Link code no(009.14) two nos .& connect Bc & CD as shown in the figure for fixing up the cross members.

We have to make both the end's as an fixed axis at A & D which at A if it turns two rotation about fixed point A. And then at the same time at point D it makes only one raitation by dragging the fly wheel mass.

We have used lots of spacers code no (008) to connect the linkages to give ease of motion along with pins of code no.(012).For further locking the pins on both the sides of the axis point we have used circlips code no.(013).

P T O



The lengths of the links comply with the conditions: AB = AD. And BC= CD.link 3 makes one revolution to two revolutions of link 1.At the extreme positions (dead points) axes B and D of the links coincide and there is no positive motion of the mechanism unless some device is provided to pass through these dead points or unless the driving link has sufficient fly wheel mass.

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12 .APPROXIMATE STRAIGHT –LINE MECHANISM HAVING A LINK WITH RECTILEAR TRANSLATION.

By using our MAKIT-Master kit components this mechanism can be built as explained in the following steps.

By using our links code no.(009.14)) of the same lenghts,We can achieve the turning movement on the fixed axes A .

Then We have to choose the linkcode no(009.07) CB as connecting rod 2 at point E describes the path of which a certain portion approximates the straight line QQ,belonging to the fixed link and parallel to the line AH.

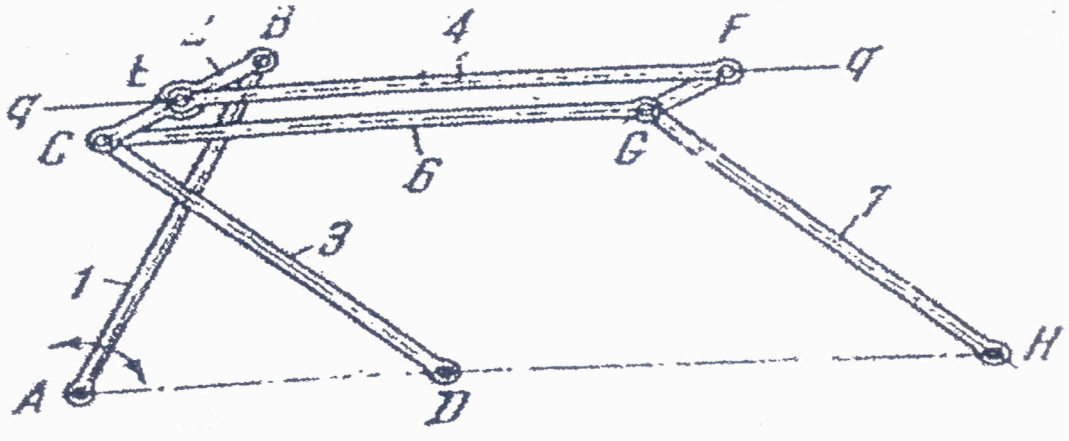
We have to make both the ends as an fixed axis A & D which turns about fixed points to achieve the approximate straight lie QQ,passing through points A & D.

Then we have to use the link code no (009.11)for AD to fix the parallel link to CG & EF.

We have used lots of spacers code no (008) to connect the linkages to give ease of motion along with pins of code no.(012).For further locking the pins on both the sides of the axis point we have used circlips code no.(013).

P T O

12. APPROXIMATE STRAIGHT LINE MECHANISM HAVING A LINK WITH RECTILINEAR TRANSLATION



The lengths of the links comply with the conditions : AD=0.8 AB , AB+DC+HG , CE=EB=GF=0.2AB and EF=CG=DH. The mechanism is based on four linakge ABCD.when link 1 turns about fixed axis A,point E of connecting rod 2 describes a path of which a certain portion approximates the straight line q-q,belonging to the fixed link and parallel to line AH. For thec specified dimensions ,figures DCGH and CEFG are parallel –crank linkages and link 4 has translational motion. During the period of time that point E travels along the approximately rectilinear portion of its path.all points of link 4 travel approximately rectilinearly and axis EF of link 4 slides along straight line q-q.Links 3 & 7 turn about fixed axis D & H .

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13. MULTIPLE BAR MECHANISM WITH A TRANSLATIONal LINK.

By using our MAKIT-Master kit components this mechanism can be built as explained in the following steps.

By using our links code no (009.10) of same lengths for AH & CN, we can achieve the turning movement on the fixed axis A.

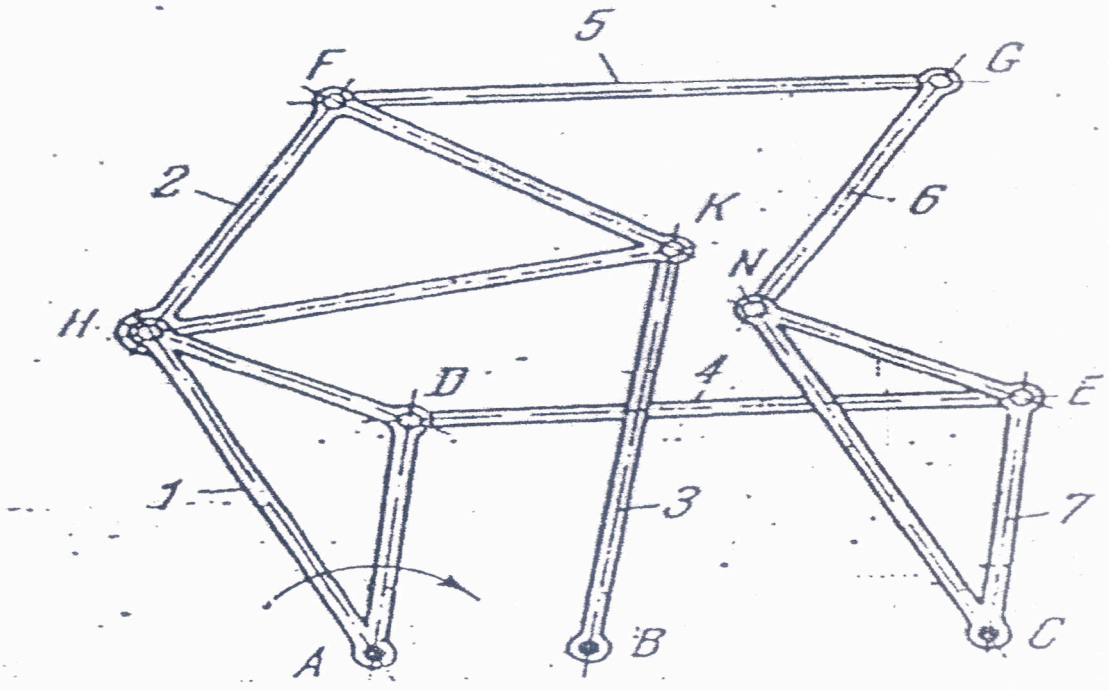
Then we have to choose the links code no (009.11) for HF & for NG as crank links then links code no(009.13)for FG,DE & to AC . Then we have to link code no.(009.07) for HD ,NE,AD & TO CE.TO ACHIEVE THE PARALLEL CRANK LINKAGES ADEC & HFGN,links 3 & 7 turn about fixed axes B & C,then the link 1 turns about fixed axes link 1.

Then we have link no.5 has translational motion & describes the same connecting rod curve that is described by point F of connecting rod 2 in the four bar linkage AHKB as shown in the figure.

We have used lots of spacers code no (008) to connect the linkages to give ease of motion along with pins of code no.(012).For further locking the pins on both the sides of the axis point we have used circlips code no.(013).

P T O

13. MULTIPLE BAR MECHANISM WITH A TRANSLATIONAL LINK



The lengths of the links comply with the conditions: AH=CN ,HF=NG, FG = DE=AC, HD=NE and AD=CE.The mechanism is based on a translator consisting of parallel crank linkagesADEC and HFGN,links 3 & 7 turn about fixed axesB & C ,when link 1 turns about fixed axis A,Link 5 has translational motion & describes the same connecting rod curve that is described by point F of connecting rod 2 in four bar linkage AHKB.

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14 . MULTIPLE - BAR MECHANISM WITH A TRANSLATIONAL LINK

By using our MAKIT-Master kit components this mechanism can be built as explained in the following steps.

This mechanism is composed of two important parallel- crank linkages BDEC and DFGE.Links 3 & 7 turn about fixed axes B & C as shown in the figure.

By using our links code no.(009.10) of BD & CE.

Then using links code no (009.07) for DF & EG for making parallel crank linkages as explained above.

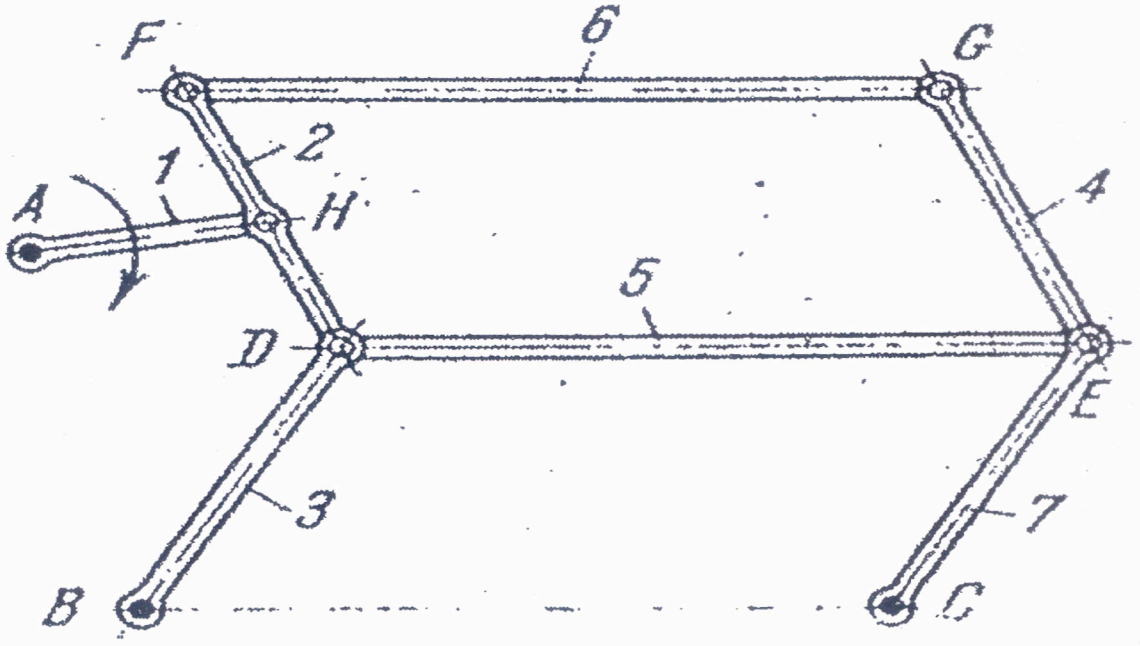
We have to make one end as an fixed axis A ,selected as centre of similarity and that fixed axes A it turns from the link 1, to build AH use the link code (009.07) and then link 6 as translational motion as it explained in our figure.

Then link code no(009.13) as been used to build the parallel cranks at FG ,DE & BC .Then AHDB creates the four bar linkage.

To fine tune, We have used lots of spacers code no (008) to connect the linkages to give ease of motion along with pins of code no.(012).For further locking the pins on both the sides of the axis point we have used circlips code no.(013).

P T O

MULTIPLE-BAR MECHANISM WITH A TRANSLATIONAL LINK



The lengths of the links comply with the conditions :BD = CE, FG = DE=BC and DF= EG.The mechanism is based on a translator conisiting of parallel – crank linkages BDEC AND dfge.Links 3 7 turn about fixed axes B and C ,when link 1 turns about fixed axis A,link 6 has translational motion and all of its points describe connecting rod curves identical to the curve described by point F of connecting rod 2 in the four –bar linkage AHDB.

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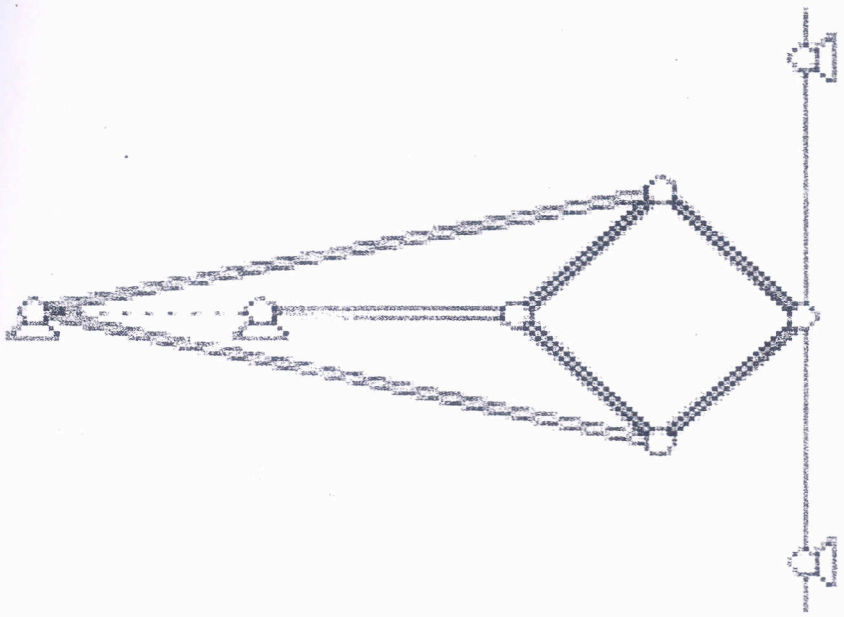
15. PEAUCELLIER LIPKIN LINKAGE



Transfering rotary motion into Straight line Motion.

Using our links code no. (009.05) of 4 nos to build the square linked structure. Then we have to use links code no. (009.12) two nos ,one member is fixed on the joint of one end of the square structure & the other member to the other end of the same structure as shown in the figure & then both the Members is fixed rigidly at the point A at an rotating axis.then one end of the link code no.(009.09) is also attached to the fixed axis B as shown in the figure.As we get the rotary motion at fixed axis A & B we get the straight line on the other end of the motion of the square structure as shown in the figure.

We have used lots of spacers code no (008) to connect the linkages to give ease of motion along with pins of code no.(012).For further locking the pins on both the sides of the axis point we have used circlips code no.(013).

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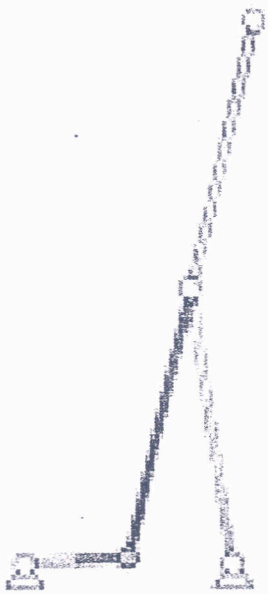
16. HOEKENS STRAIGHT LINE MEHANISM.



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17. WATTS Mechanism.