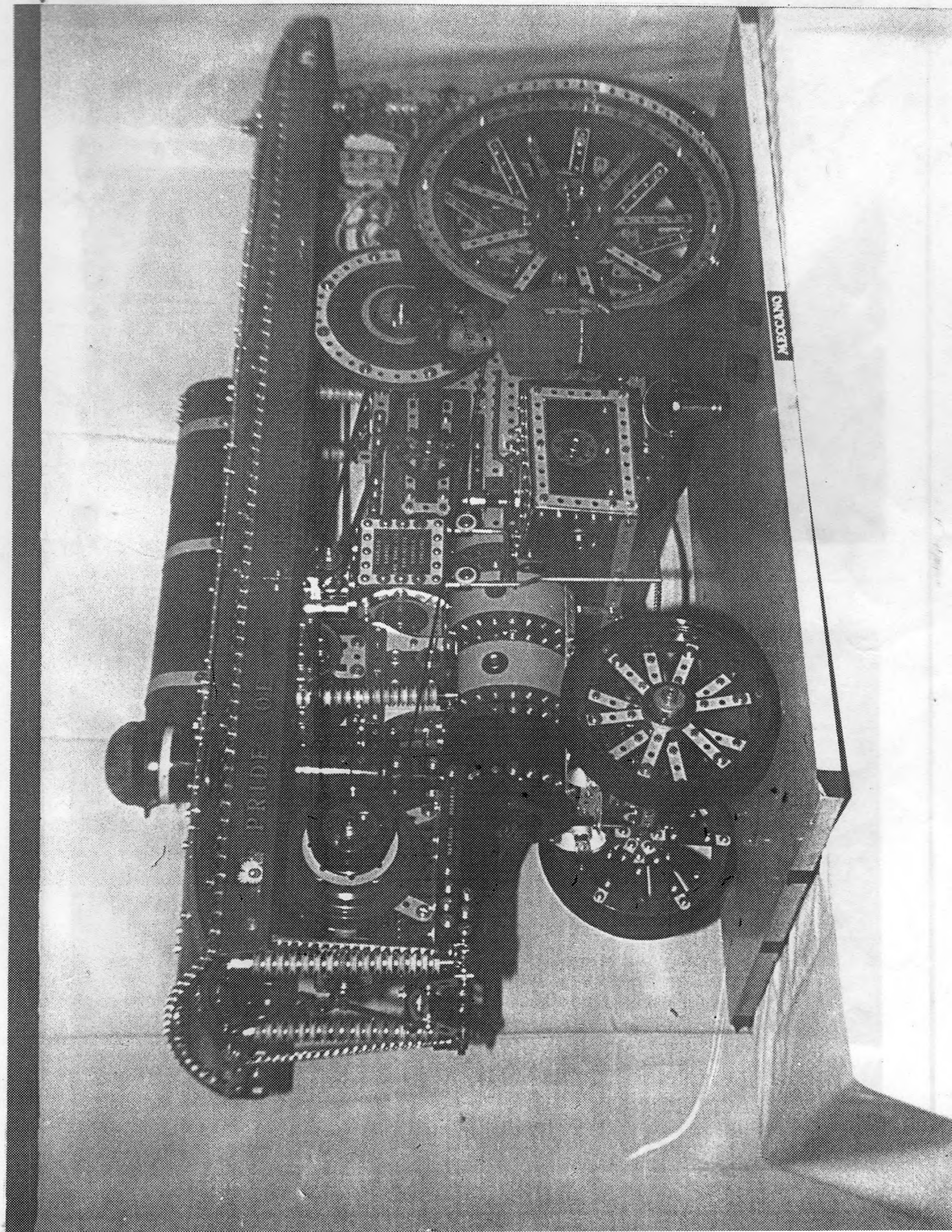
N°12

A larger version of the Burrell Showman's locomotive with flanged rings as the basis for rear wheels and circular girders for the front. Note the canopy nameboard made with Red cardboard and Gold lettering-as supplied to the customer who bought the completed model together with other Fairground model rides over a period of several years. This engine is now in a glass showcase.



(1)

SHEET ONE

23,Courtenay Park,
Newton Abbot.
Devon.

8th January,1976

~~Dear Dennis~~,

Thank you for your letter yesterday with the P/O for £3 enclosed which I acknowledge with thanks. Before I begin -have you had your Dec issue of the "Meccano Engineer" from MW Models yet ? I have just realised they only sent me lists before Xmas. Please let me know.

I have enclosed three colour negatives of the Showman's engine for you to have prints taken off -but -PLEASE return these Negs as soon as you have the prints. I would advise you have the three taken off to help you with the model. Before I go any further,I want to make it clear I have no previous instructions of this engine and the model is still "made up" so that my descriptions will call on you to "use your loaf" somewhat on small details which I may miss. I shall start with the two rear wheels and then the front pair,next,the boiler and cab,the belly-tank,the motion and power,the cylinders and valve gear etc. I shall describe the model as from the front end on the Flywheel side working back to the coal bunker - left to right. Measurements will either be in "holes" or actual lengths depending on ease of description. O.K. ? -so here we go -assuming you now have the photographs in front of you (at least P/C size,incidentally) :-

LEFT SIDE REAR WHEEL WITH WINDING DRUM.The rear axle consists of a standard Meccano axle,and,because of the weight and proportions,I have to make certain modifications which are NOT actual practice but are essential in the Meccano model to give strength and stability. The rear wheel is built up from TWO Flanged rings,face plates,plenty of wheel discs,4½" strips,4½" curved strips, strip plates,plenty of washers,and various Narrow strips.First,take EIGHT 4½" wide strips,eight 4½" NARROW strips and gently bend them all to this shape :- ↗

Any adjustment will be taken up later in construction. Place a Flanged ring on the bench with the Flange upwards and then place eight 4½"curved strips around the holes in side the flange,all overlapped to form a circle. To each overlapped curved strip bolt a 4½" bent wide strip beneath the Flanged ring.Note that the 4½"strips are bent at each end across the second hole at each end. When you have done this,you will have a "pan" shape with the bent strips now at the rear of the wheel. Next,Take TWO 12½"x2½" and ONE 9½"x2½"strip plates -bolt the two 12½"plates end to end and place around the rim of the Flanged ring -bolt the 9½"strip plate to BOTH ends of the 12½"strip plates so that a tight rim is formed around the Flanged Ring. Attach the Flanged ring to one of the joins in the rim plates by the 2nd hole in at the join through one of the holes in the upturned flange of the Flanged ring -this is the ONLY attachment required for this part of the wheel. ALL the holes in the outer edge of the rim Strip plates are filled with Bolts,Washers and Nuts but NOT the inner rim edge. The Nuts are all "square" to the edge of the rim of the wheel. The other ends of the 4½" bent strips are attached to a Face plate-boss to the rear using the round and slotted holes in the outer rim of holes of the Face plate. Place a short rod through the boss of the Face plate and "true-up" the spokes so far completed. Next,take another flanged ring and place this inside the wheel rim -flange uppermost and bolt this to the rim at the same position as the first Flanged ring and at the 2nd hole in at the rim join. EIGHT 4½" NARROW strips are attached to the Ring at the INSIDE of the flange and the bent ends of these strips are also attached to the holes of another face plate at the FRONT of the wheel at the EIGHTH hole in the strips. Suitable NARROW strips are bolted to the WIDE spoke strips,and WIDE strips are bolted behind the NARROW spoke strips.

To be continued/..... P.T.O

MAIN WHEELS -continuation.

Please see my sketches and remember that the flanged rings are "staggered" where they are bolted to the strip plates forming the rim. You will require some rubber strip about 1¼" in width and about ⅛" thick to make up the tread. I have joined the ends with thin wire after piercing each end of the rubber strips to allow the wire to pass through and be twisted. I have also cut out a "trench" in the rubber where it passes over the two bolt heads holding the strip plates to the Flanged rings. The wheel, when completed, may appear "sloppy" but this does not matter when the whole is assembled on the back axle. Each wheel is identical in construction except the differential side has a 4" circular plate instead of a Face Plate for spoke attachment and holds a LARGE BEVEL in the central large hole -boss of the gear is pressed through this large hole. The bevel is secured by TWO bolts and nuts, but NOT Meccano ones as the bolt heads will foul the small bevels in the differential. Use two flat head screws to fix the bevel in place. The hubs are made up from large numbers of wheel discs on the longest bolts (1½"). When the wheels are assembled with both layers of discs -you have a nice "chunky" rear axle bearing but allow for a rod to pass into these bunched discs and through the Face plate bosses and turn FREELY. I have used various coloured strips to make up the layers of spokes -zinc narrow on Yellow wide, Yellow narrow on zinc wide and narrow zinc on wide red strips for effect -all held in place with washers and bolts. These double layers of strips are mostly 2½" long but you can use any combination to suit yourself. The two wheel outer hubs are secured by the 1½" bolts (5) in sketch loaded with wheel discs, passed through two 6-hole discs and then spaced from the hub face plates by collars (see sketches). With the rubber tread in position, you will not require any washers and bolts on the inner rims of the wheels but you get a good effect with Washers around the outer rims and the rubber strip is thick enough to be "proud" of the rim bolt-heads.

DIFFERENTIAL. I have used TWO Gear rings for this construction but one will suffice. The gear ring is bolted to a 2½" gear with the teeth of the gear pressed into the internal teeth of the gear ring. Select your gears carefully as this component must be true and carefully built up. Flat brkts are used to retain the two gears together with the boss of the 2½" gear facing the engine side. There is NO setscrew in the bevel attached to the rear wheel. The differential proper can be built up in several ways but I used two threaded couplings bolted to the opposite BOSS holes in the gear ring but spaced from the ring by electrical-thin washers. Place the large gear unit on a suitable rod and place another large Bevel next to the 2½" gear. Place a coupling on the rod by it's central hole and space it from the bevel so that two small bevels on two short rods are journalled in the end holes of the coupling and also in the top round holes of the two threaded couplings. These short rods are fixed by grub screws in the threaded couplings but ONLY when the spacing washers give easy movement to the small bevels in mesh with the TWO large bevels on the axle and the one attached to the main wheel. The large bevel on the axle is fitted with TWO large set screws as this component takes the drive to the wheels.

WINDING DRUM. Consists of two 4" circular plates. One plate has a Face plate bolted to it and a wheel flange on the other side of the plate, flange outward. The other 4" plate has a wheel disc on the outside and another wheel flange on the inside. Both plates are bolted together with the wheel flanges clamped together to form the drum. The whole unit is attached to the back axle by a setscrew in the Faceplate only on the inside next to the engine side-plates. This now completes the rear wheels and the back axle will be described later.

To be continued/.....

SHEET THREE -BURRELL SHOWMAN'S LOCOMOTIVE.

FRONT WHEELS -IDENTICAL CONSTRUCTION.

You will require four Circular Girders and 24 narrow 2½" strips and four 6-hole bush wheels. I have drilled four extra holes in the Circular girders to accommodate six spokes in each girder making 12 spokes in each wheel. If you do not wish to do this, you must use 8-hole bush wheels but this will give you 16 spokes in the completed wheel which is in-correct. However, I will explain how I aligned the holes for the six-spoke type as follows :- bolt THREE 5½" strips across the holes in the bush wheel to correspond with the 5½" dia of the Circular girder-. bolt two of the lugs of the strips to opposite holes in the Circ girder and then drill four holes where the other four strips rest in the flange of the Circ Girder. This now gives you the correct 6-spoke layout. Dismantle the drilling jig and then bolt six 2½" Narrow strips to the rear of a six hole bush wheel with the Boss outwards. Bolt one Circ Girder to the top of the other ends of the narrow strips and behind these strips also bolt 1½" WIDE STRIPS, preferably coloured Blue, Red or Yellow. Repeat the above with another Circ Girder but with the boss of the 6 hole Bush wheel to the rear. Both flanges of the Circ Girders face outwards. Place BOTH built up wheels on a rod and stagger the wheels to show 12 spokes to the front. I have made a rubber tread for these wheels with strip rubber wide enough to cover the two rims of the Circ Girders. The wheels are bolted in place on the axles as these are free running in their bearings. The front Hubs are built up from Brass Discs spaced from the front 6 hole bush wheel by collars and the space between the two spoked Circ Girders is filled with ¼" flanged wheels or ¼" washers to give a "chunky" thick axle or wheel centre. Next, take two 5½" angle girders and bolt them together by their round holes to form a "U" girder. See sketch below. Each stub axle for the front wheels is held in the "U" of the girder frame. The bearings for the stub axles are two 2"x½" double angle strips bolted in the "U" of the 5½" A/Girders leaving one hole clear in the middle of the girder. The bolts holding the double angle strips at the wheel ends are inserted so that the threaded shanks are on top of the axle unit. The thread ends hold a collar on each bolt by the tapped portion so that the steering chain ends can be attached at these points later. Four holes in from each end of the axle unit, longer bolts hold layers of strips which represent leaf springs, namely 2½"-3½" and 4½" strips. Next take two couplings and one threaded coupling. Attach two flat trunnions using the two couplings as long spacers and the threaded coupling in the middle of the three holes at the base of the two flat trunnions. The round axle hole in the strip coupling is clear and holds the steering pivot. A bolt is screwed into the tapped hole of the strip coupling VERY TIGHTLY from one side of the trunnions and a pin taken from a Clock kit is fitted into the other rod drilled end of the strip coupling, held in the coupling by a grub screw and also a nut on the tapped end of the pin. Two wheel discs are attached to the outside of the flat trunnions and this unit is placed over the centre of the axle beam. A short rod is passed through one disc, through the centre SLOTTED holes of the axle beam and thence into the other flat trunnion -retained by collars on each side. This gives a side to side and up and down movement to the axle. Four 1" corner brkts and two 5½" curved strips are attached each side of the axle beam as in sketch:-

SHEET FOUR -BURRELL SHOWMAN'S LOCOMOTIVE.

I seem to be taking a lot of time, plus a lot of typing, to give you DETAILED descriptions so far and I think I am over-doing things which you may not agree with. However, my time is limited as I have to work but I will now proceed to send you further instructions but NOT too detailed as I believe you can use your imagination -you must have done so to build the Organ so quickly !! If you DO have any difficulties over a particular item -please let me know and I will explain in more detail for you -fair enough ?

BOILER SECTION. I built this unit from the front end back to the tender and the dimensions are based on a Ball Race flange at the front. Attach a LONG threaded pin to the centre hole in the flange. Bolt four 1"x½" angle brkts by the elongated holes to the four opposite holes in the flange but space the brkts from the flange so that the brkt lugs enable flexible plates to be attached to the lugs and flush with the rim of the flange. You will require four 12½" angle girders and the length of the boiler leaves two holes clear at the boiler rear when the flex plates are fitted. I have used BLUE flex plates for the smokebox and YELLOW ones for the rest of the boiler. The four angle girders are arranged inside the four lugs beneath the flex plates and the angle girders are attached by their round holes. This gives a Boiler dia of 5½" but do NOT fit bracing strips at this stage. At the front top of the boiler bolt a 5½"x2½" flanged plate by one bolt only to form part of the Dynamo platform. To the centre of the blue Flex plate(three holes in from the front) attach a threaded boss on the outside -this is for the screwed rod to hold the chimney in place). To the centre hole of the blue flex plates underneath the boiler secure a LONG threaded pin -this will hold the perch brkt already made up for the front axle. Each side of this threaded pin are fitted four obtuse angle brkts three holes each side and spaced three holes to allow two 1½" flat strips to be attached each side of the threaded pin.It is best to attach the obtuse angle brkts to 2½"flat strips bolted across the blue flex plates for strength. Next,attach two 5½" x 2" trianguler plates to the smokebox on the centre line of the boiler each side. The plates should be curved slightly at the 2"part and can be bolted to the curvature of the smokebox. Also,on the boiler centre-line attach two 5½"curved strips facing forwards,one on each side. The dynamo platform is extended forward by another 5½x2½ flanged plate butted against the first plate and joined at the sides by 4½/strips. The curved 5½"strips are also extended by 2½" strips to give a 13 hole length in the dynamo support platform. Formed slotted strips are bolted between the two ends of the 2½"strips for two holes in.The front 5½"flanged plate is attached to the support strips by 1" triang plates.(see sketch). The Dynamo is made up from 4" circ plates,ball race flange and uses four 2½"curved strips as legs to attach to 5½"angle girders bolted to the flanged platform plates. The dynamo is complicated to describe but has a width of 2½"extended each side by commutators and bearings for the pulley etc. A control block is attached to the front of the dynamo and is made up from a 2½ x 1½ flanged plate with suitable supports. I have used formed slotted strips around the Dynamo casing for strength. The pulley can be made up from a Face plate and several wheel flanges butted together with a Brass wheel disc at the outer side. This pulley has to line up with the flywheel so leave this until later and adapt your construction accordingly. The stack consists of THREE cylinders joined on their insides by narrow strips. Bolt a ½"angle brkt to one of the holes at the bottom of the cylinders for attachment to the boiler so that the threaded boss is central in the stack. An 1½" tyre forms an ideal stack hinge at the bottom.

contd.....

SHEET FIVE-BURRELL SHOWMAN'S ENGINE.

EXCITOR PLATFORM. See drawing No 1. This is clear from the sketch and is 2½" in width and attached to the boiler by the four obtuse angle brkts overlaid with 2½" strips at the position shown in one of the sketches. Build up a non-working Excitor using Boiler ends, blue plastic plates, formed slotted strips etc. You can also add a commutator if you wish and dummy brush gear. Attach to the top 2½x2½" flat plate by angle brkts or other means. I have made Brass "Stars" for bolting to the platform sides and the sides are also edged with NARROW strips. Note that the top portion of the platform is ⅜" in width as dictated by the ⅜" flat girder. The curved strip is attached to the slotted hole of the flat girder.

CYLINDER BLOCK. See drawing No2. The top plate must not be fixed until the whole unit is bolted to the top centre line of the boiler. The top plate is also spaced from the block by nuts and washers on the shanks of the four bolts. The maker's name plates are made up from a square of 2½" narrow strips on the Flywheel side and attached to the 2½x½" double angle strips with the curved BLUE plastic plates underneath. The Maker's plate on the other side is smaller and is made up from 2½" narrow strips and also 1" narrow strips (cut from longer ones). Use small set screws for the narrow strips to represent the actual finish on the engine.

CYLINDER BLOCK. See drawing No 3. This is the inside of the motion and the various rods set in the Rod Sockets MUST be true and allow the crossheads to slide easily. Here again, use small setscrews to give clearance and also spacing washers where required. My model is very free running and it pays to oil all rods and linkages.

CYLINDER BLOCK. See drawing No 4. The Governor and safety valves and lubricator are built up on the 2½x2½ flat plate before attachment to the block. The Governor must be built up carefully to work properly, Adjust the 1x½" A/brkt so that the lug holds the socket coupling holding the ½" contrate in gear with the ⅜" pinion on the governor shaft. The drive to the governor is taken from an 1" pulley on the Flywheel shaft just inside the flywheel but outside the side plates. The lubricator is worked by a 1½" NARROW strip on the Valve rod coupling and linked to the 2½" narrow strip with the Pawl As the valve coupling reciprocates, the 1½" arm transmits a to and fro movement to the Pawl and turns the Ratchet wheel in the Channel bearing. You will see the Valve gear later in another drawing.

NOTE. I have used a special cut-down version of a Meccano 20v Motor for my model but think you could use a 12vGearbox type if available owing to space restrictions.

FLYWHEEL.

Consists of a 6" circ plate, hub disc, and 8-hole bush wheel. Attach the Bush wheel inside the Hub disc with it's boss inwards towards the side-plate. I have also bolted wheel flanges and various curved strips around the rim holes of the circ plate. Use a wheel disc on the outside of the wheel flange, preferably a Brass one.

BURRELL SHOWMAN'S ENGINE VALVE MECHANISM.

Achannel bearing is bolted to the top exposed two holes of the boiler.Each valve arm consists of a crank with a 2"SLOTTED strip bolted to the lugs of the cranks so that the slotted part of the 2" strips-is fully exposed. These two cranks are then pivotally attached to each side of the channel bearing with pivot bolts with the bosses of the cranks outwards. The two arms can then move independent of each other. Attach two 3½" narrow strips to the straps of two small eccentrics-using bolts taken from swivel bearing collars (or Universal couplings). This enables the two eccentrics to work very close to each other on the C/shaft. The free ends of the 3½"narrow strips are fitted with small threaded pins or,better,pivot bolts. These bolts hold a 2½"bent narrow strip which is pivotally attached to the sides of the couplings on the valve rods. Also,the pivot bolts hold a spacing collar on each unit,the outside space between the pivot bolt head and collar has a 1½"strip free to pivot and then each pivot bolt is passed through the SLOTTED holes of the valve arms -and free to move. When each eccentric revolves,reciprocating motion is imparted to the valve rods held in the channel bearing but also each arm from the eccentrics is free to slide in the slotted holes of the 2" strips. The lift to each arm is provided by the 1½"strips which are attached to the arms of two Cranks(pivotally)held on a rod passed through the inner holes of the Channel bearing. A double arm crank is also fitted to this rod INSIDE the channel bearing and enables a long rod to go to the rear control quadrant. You will see that the long rod actuates the two outside cranks which in turn "lift" the valve arms in the slotted holes of the 2"slotted strips. If this whole unit is built up carefully-there is no "slop"and the motion is quite good in operation. See sketches below:-

SKETCH.Strips F and G are 2½"and 3½" NARROW. Crank "A"is double armed whilst Crank "B" is single armed.The 1½"strip linked to Pivot Bolt(Red)and end of crank "B"is NARROW(not shown in sketch). The strip "F"must be bent to shape before connection to the coupling on the valve rod. Make up TWO sets of valve gear for each eccentric so that the double arm crank between the channel bearing-lifts both arms by cranks on each side of the channel bearing. The valve "Lift"is just sufficient to allow the Pivot Bolt(RED)to slide in the slotted 2" strip. Don't forget the Pivot Bolt(RED)holds a collar for spacing as well as the ends of strips F and G plus link from lift arm crank "B".

Irealise it is difficult to visualise the above but as long as you remember that the movement of the strips in the slotted hole of the arm "D"adjuss the trave l of the valve couplings-this is all that is necesaary.

If you still have difficulty-let me know please.

FLYWHEEL BRAKE. Note that the 1x½" and ½"x½" A/Brkts are bolted to the collar at right angles to each other so that the long lug of the ½x½ brkt holds a Rod socket,loosely pivotted,the tapped holes having a suitable screwed rod passed through and thence to the operating rod above the main steering wheel.

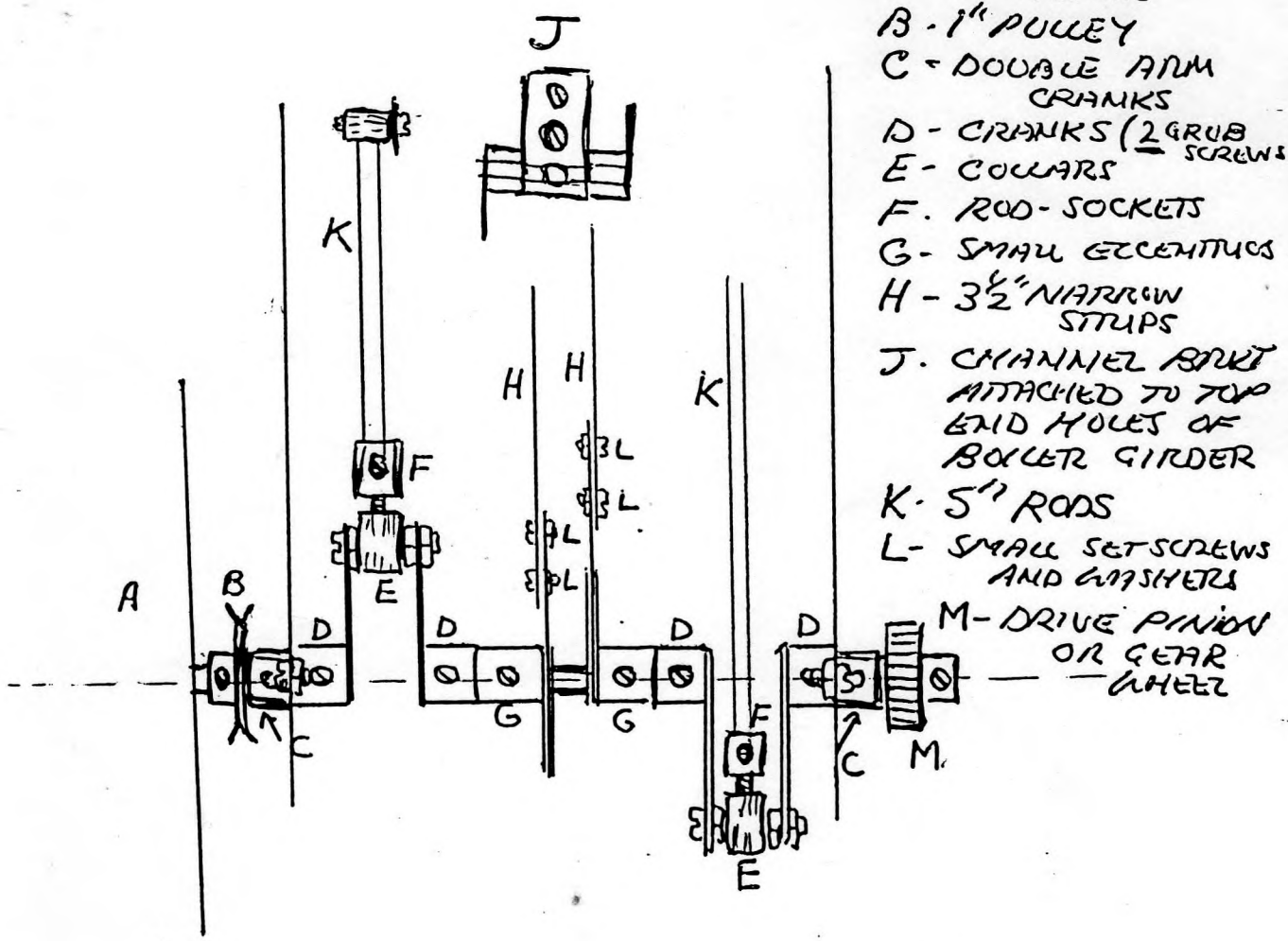
The Longlug of the 1x½" A/Brkt rests on the rim or the Hub Disc forming the rim of the Flywheel and you must utilise some method of having a spigot to hold the collar which is free to rotate on the spigot. The two A/Brkts are attached to the collar by a SHORT bolt only.

As regards Headlamps,mine were made from Large Flanged wheels with the bosses of the wheels held by bolts INSIDE the lugs of 1x½"Double brkts so that the flange portion of the wheels is flush against the Lamp body. Not too difficult if you experiment with various parts and Brass ½"Pulleys etc.

SHEET SIX-BURRELL SHOWMAN'S ENGINE.

DRAWING 5 and 6.Full size. You will note that the firebox and tender consists of a 12½"A/G and a 1½"A/G butted together with the flat plates bolted INSIDE the round-hole flange of the girders and the slotted holes of the girders at the bottom and bent under the base. The ONLY attachment at this stage for the boiler is at the two holes at the end of the boiler on each side as shown on my sketch. This is the centre line of the boiler and the Belly Tank is bolted by two 4½"A/G'S to the boilerc centre line and also at the front of the Firebox by 3" A/G'S which are,in turn,attached to 3" Flat girders bolted to the Belly tank.This is all the support you will require for the Boiler but you must make sure the Boiler runs parallel with the rear of the engine by carefully adjusting all support girders both on the boiler sides and the Belly Tank.

DRAWING SEVEN -shows a rough sketch of the Belly Tank and note that I have used some made up plates from old 3½ x 2½ flanged plates to give 3½x2½ FLAT plates. You do NOT need to do this if you would rather not but adjust your construction to fit the parts you have available. The curved portion under the boiler can be filled in with various triang plates and curved strips but I have no attachment to the boiler at the front of the belly tank. You can use Flex plates for the Belly Tank sides if you wish with plenty of Nuts,Washers and Bolts to represent rivets. I have NOT shown the rear of the tender in the drawing as this will be done after you have fitted the motion. I will describe the Crankshaft build-up but you will have to devise your own gearing to the Flywheel and rear axle depending on the Motor you intend to use. Here is a sketch of the Crankshaft etc:-



BURRELL SHOWMAN'S ENGINE VALVE MECHANISM.

(7) & 8

Achannel bearing is bolted to the top exposed two holes of the boiler.Each valve arm consists of a crank with a 2"SLOTTED strip bolted to the lugs of the cranks so that the slotted part of the 2" strips-is fully exposed. These two cranks are then pivotally attached to each side of the channel bearing with pivot bolts with the bosses of the cranks outwards. The two arms can then move independent of each other. Attach two 3½" narrow strips to the straps of two small eccentrics-using bolts taken from swivel bearing collars (or Universal couplings). This enables the two eccentrics to work very close to each other on the C/shaft. The free ends of the 3½"narrow strips are fitted with small threaded pins or,better,pivot bolts. These bolts hold a 2½"bent narrow strip which is pivotally attached to the sides of the couplings on the valve rods. Also,the pivot bolts hold a spacing collar on each unit,the outside space between the pivot bolt head and collar has a 1½"strip free to pivot and then each pivot bolt is passed through the SLOTTED holes of the valve arms -and free to move. When each eccentric revolves,reciprocating motion is imparted to the valve rods held in the channel bearing but also each arm from the eccentrics is free to slide in the slotted holes of the 2" strips. The lift to each arm is provided by the 1½"strips which are attached to the arms of two Cranks(pivotally)held on a rod passed through the inner holes of the Channel bearing. A double arm crank is also fitted to this rod INSIDE the channel bearing and enables a long rod to go to the rear control quadrant. You will see that the long rod actuates the two outside cranks which in turn "lift" the valve arms in the slotted holes of the 2"slotted strips. If this whole unit is built up carefully-there is no "slop"and the motion is quite good in operation. See sketches below:-

SKETCH.Strips F and G are 2½"and 3½" NARROW. Crank "A"is double armed whilst Crank "B" is single armed.The 1½"strip linked to Pivot Bolt(Red)and end of crank "B"is NARROW(not shown in sketch). The strip "F"must be bent to shape before connection to the coupling on the valve rod. Make up TWO sets of valve gear for each eccentric so that the double arm crank between the channel bearing-lifts both arms by cranks on each side of the channel bearing. The valve "Lift"is just sufficient to allow the Pivot Bolt(RED) to slide in the slotted 2" strip. Don't forget the Pivot Bolt(RED)holds a collar for spacing as well as the ends of strips F and G plus link from lift arm crank "B".

Irealise it is difficult to visualise the above but as long as you remember that the movement of the strips in the slotted hole of the arm "D"adjuss the travel of the valve couplings-this is all that is necesaary.

If you still have difficulty-let me know please.

BURRELL GEARING.

Drive from Motor is taken by Sprocket chain to a 1½"Sprocket in the middle of shaft "C" which also has an 1"Gear wheel at the left side between the side plates and a ½"pinion on the other side of the sprocket between the plates. Another ½"pinion is on the right side OUTSIDE the plates. "D"is a loose ½"pinion held behind the other ½"pinion on a pivot bolt to the right side. "E"is the sliding shaft which has a 1"Gear and a ½"pinion located between the plates. A lever is fixed to the centre of this shaft which either engages the two 1" gears on the left side or the three ½"pinions on the other side thus giving reverse motion. A ½x½" pinion is on the outside of this sliding shaft which engages with a 2½"gear on shaft "F"so that the long ½" pinion on sliding shaft "E" allows reverse and forward motion to be imparted to rear wheels. A ½" pinion on the outside of the 2½" gear on shaft "F" engages with the 3½" differential gear on rear axle.

Shaft "B" carries TWO 2½" gears bolted together and spaced with collars. The inner 2½" gear engages with a ½" pinion on the Flywheel shaft while the other 2½ gear takes the drive from shaft "C".

Your motor source needs to be on a large reduction before taking the drive to the 1½" sprocket on shaft "C" due to the step-up gearing to the Flywheel shaft.

and two for the valve motion. The sides of the block are decorated by name plate formed from two 2½"narrow and two 2" narrow strips bolted to a Blue 2½" x 2"flat plate and edged at the top with two 2½" angle girders,one on each side. FIREBOX END.The depth of the firebox is 4½" down from the centre line of the boiler and is extended to the rear by two 12½" and two 1½" angle girders. The Flywheel side is made up from three 3½ x 5½" flat plates,leaving two holes above the boiler centre line. Two more 5½ x 3½"Flat plates are bolted to the top of the vertical Flat plates to form the motion side plates. Two 9½" angle girders are bolted to the bottom of the firebox by their round holes. The width of the firebox is 3½" and is filled in with two 5½ x 3½" flat plates to take the motor and gearing. The 20v(Non-reverse)motor is bolted to two layers of 5½ x 2½"flat plates and side plates are attached to take the gearing which is as follows:- One ½" pinion to a 2½" gear on a short shaft holding another ½" pinion engaged with a further 2½" gear which has a ¼" sprocket at the centre of it's shaft. This ¼" sprocket takes a chain drive to a 1½" sprocket on a shaft holding the following gears :- 1" Pinion (at left looking to front) and one ½" pinion(on right of motion). One ½" pinion is attached to side of motion by Pivot bolt and is free to rotate on this Bolt. A further rod(to the rear) has another 1" and another ½" pinion on a sliding shaft. This shaft imparts motion to the rear wheels for forward and reverse. A long ½" pinion on the outside (right)of the side plates,engages with a 2½" gear on a rod holding a further ½" pinion which engages with the 3½" differential gear on the main rear axle. The shaft holding the 1½" sprocket drive from the motor,has a ½" pinion on the right outside plate which engages with two 2½" Gears,bolted together,but separated from each other by collars. One of these 2½" gears engages with a ½" pinion on the crankshaft. CRANKSHAFT. Two cranks made up from four cranks bolted together with long bolts and holding collars as the Big Ends. Two small eccentrics are attached centrally face to face with 3½" narrow strips bolted to them by means of four very small bolts (for swivel bearings).These strips are attached to 2" slotted strips bolted to single arm cranks and joutnalled in a channel bearing attached to the two end holes of the top boiler girder. Two right angle cranks are attached to the rear holes of the channel bearing by a short rod and give lift to the valve arms by means of two 1½" strips pivotally attached to the right angle cranks and to the threaded pins at the ends of the 3½/narrow strips fromythe eccentrics The crank webs have rod sockets held in the collars which hold rods.

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BURRELL SHOWMAN'S SCENIC TRACTION ENGINE.
BUILT JANUARY 1975.

BOILER. Built up from front end with a 4"Circular Plate with four 1" x ½" angle brackets attached to plate and separated from plate to allow for the clearance of four 12½" angle girders attached to the small lugs of the four angle brackets. The front end of the boiler has two Blue Flex plates and two 3½ x 2" triangular plates attached, plus two 5½" curved strips. The two curved strips are bolted to the centre line of the boiler. A 3½ x 2½" flanged blue plate is attached to the top of the boiler by one bolt only and another similar plate is butted against the other plate and joined by two 3½" angle girders to form the Dynamo platform. The 5½" curved strips are extended by two 2½" strips two holes out. One inch triangular plates are bolted to these strips and support the front end of the dynamo platform. Four formed slotted strips are curved to shape and are attached to the front end of the platform. The Boiler is made up from four widths of 5½ x 2½" flex plates and one width of 5½ x 1½" flex plates leaving two holes clear of the 12½" angle girders for attachment to the firebox. The Flex plates are edged with RED, BLACK and Blue flex strips with Brass bolts and washers and Zinc Bolts and washers. All holes are filled in with Bolts and washers. The chimney is made up from three joined cylinders. The bottom cylinder is attached by a ½ x ½" angle brkt to the top of the boiler and is wrapped around by two BLACK 2½ x 1½" and one Flex Yellow strip. The cyl joins are to the front. A screwed Boss is bolted to the middle of the chimney and to the boiler top to take a screwed rod through the centre of the stack. The Excitor platform is made up from two 2½ x 2½ flat plates and two 3" flat girders topped by two 3" angle girders, the whole bolted to four obtuse angle brkts bolted to the boiler side four holes up from centre line. The cylinder block is made up from two 2½ x 2½ flat plates, four semi-circular plates, six 2½" angle girders, two 2½ x ½ double angle strips, and blue plastic plates curved to shape. the edges of the cylinders are two 2½" stepped curved strips. The square top of the block has long bolts bolted, thread upwards, for the attachment of a square 2½2flat plate to take the Governor etc. Six Rod sockets are attached to the rear end of the block, four forthe piston crossheads

8A

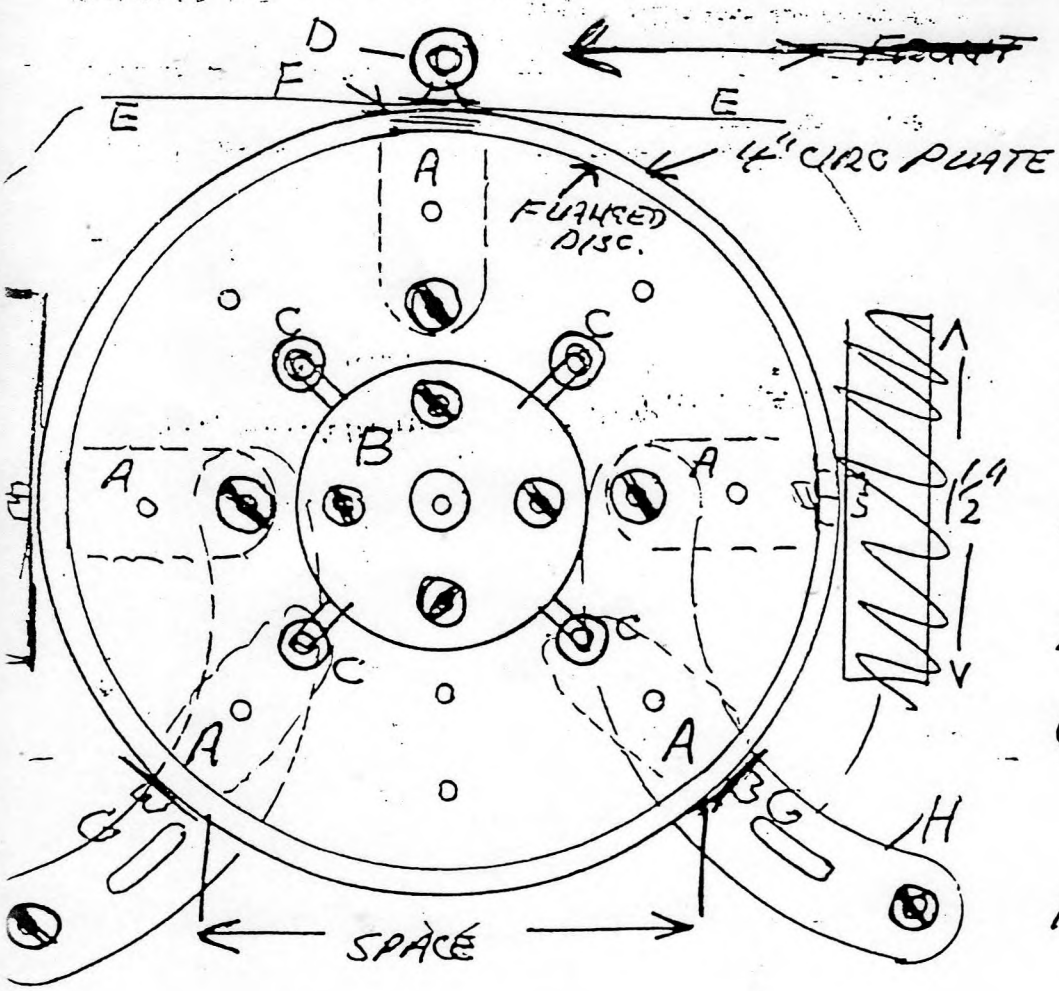
BURRELL SHOWMAN'S ENGINE -contd.

MOTION PLATES AND TENDER. The width of the engine is the same as the boiler-3½" and you fill in the base of the tender with flat plates after you have assembled the Motor drive on this base plate. I have left out any details of the power unit as it all depends on the type of Motor you will use. The drive to the rear wheels is taken to the 3½"Gear ring being part of the Differential unit already described. The drive to the Motion and Flywheel can be taken from a layshaft (sliding)which can incorporate a reverse or reduction gearing as required. My model was fitted with a reverse gear only as I used a specially cut-down 20V motor with NO reverse incorporated. The Meccano sideplate motor could be used but it will be difficult to fit in the confines of a 3½"width and I suggest the 12v with gearbox type.
I have re-inforced the rear axle by building up a framework of 5½"strips outside the winding drum and by using Bushwheels,wheel discs INSIDE the framework on the rear axle line. This is important as you have a tendency for the back wheels to sag alarmingly if no supports are made where possible.The differential side is very prone to sag due to the build up of the differential unit taking up a great deal of the back axle before the wheel is fitted. The gear trains must be enclosed in a suitable cover plate made up from flat girders,a circ girder(to cover the differen and a 4"circ plate to cover the gears above the differential. Rear brakes are fitte also a Flywheel rim brake (I have not described these unless you want details).
THE CANOPY.

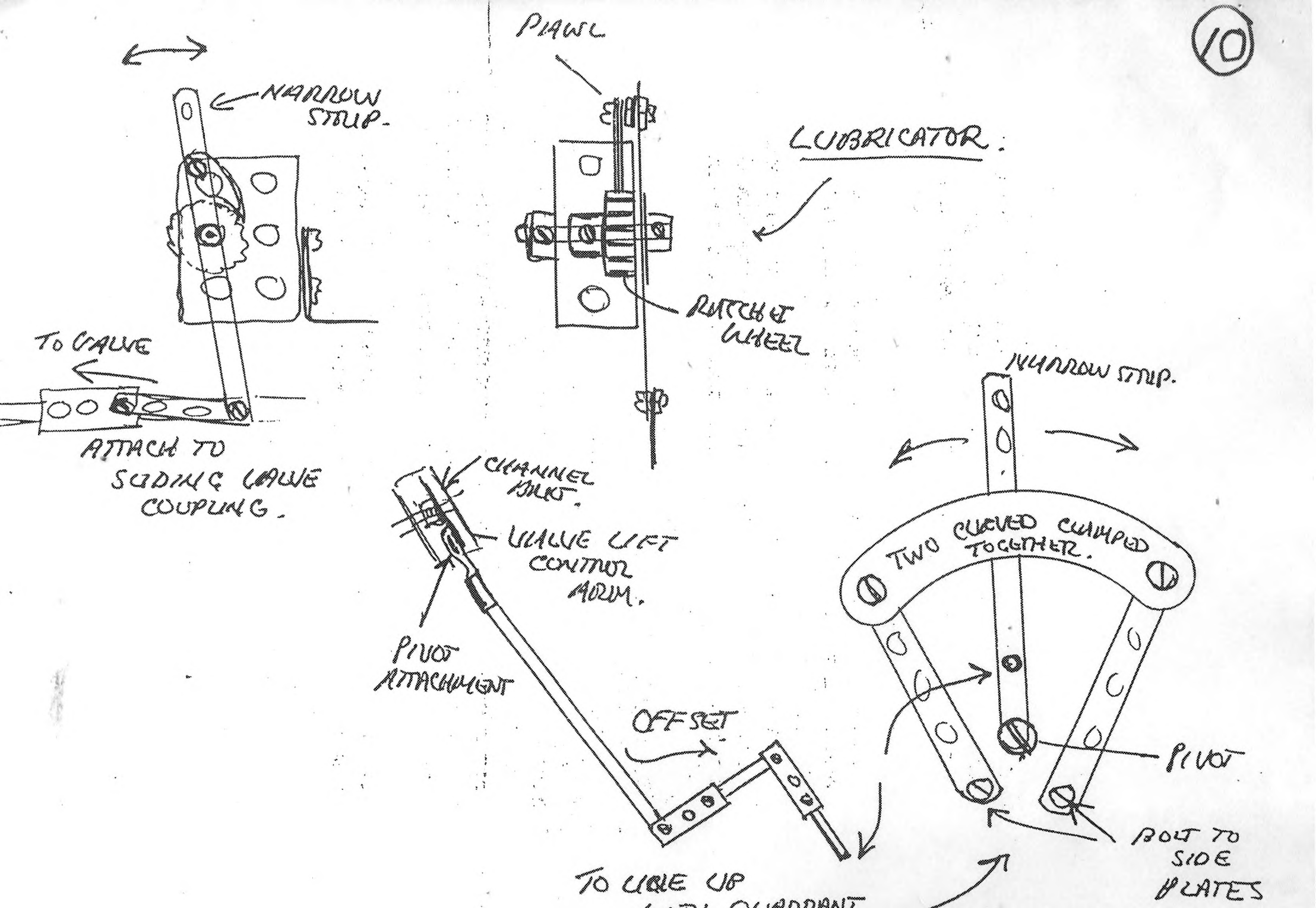
See drawing of main details. I have covered in the top of the canopy with BLUE plastic plates but the main curvatures are made up from 9½"strip plates bolted insi the round holes of the angle girders. Obtuse angle brkts attached to the edge of th canopy allow Flat girders to be bolted along the whole length to give vertical "hea boards" and improve the effect. The front STANCHIONS are attached to the front bracing strips in the position shown and the rear stanchion can be attached to the canopy by double angle strips but the main supports here are from the strips extend up from the tender (see drawing). My main stanchions are rods fitted with YELLOW plastic pulleys separated by collars and held in Rod sockets attached to the dynamo platform at the front,from the leading edge of the Excitor platform,at the top of t motion plate in front of the Flywheel,and at the centre of the coal bunker. Cross-bracing is effected by Rods attached to rod and strip connectors.
The Chimney stack is enlarged from the dia of the cylinders,where it enters the hol in the canopy and is made up from 1½"wide plastic plates separated from,but bolted the top cylinder,to allow a wheel flange to cover the plastic plate diameter.
Use boiler ends and wheel flanges for the chimney cap. The extension chimney is mad from three boiler sections bolted together and retained by formed slotted strips(2) attached to hinges and held in place by Rubber bands. The crane attachment is a sim build-up from the tender rear to the swivel on the top of the canopy.
If you have any difficuly with this area of building -let me know please.

Various fitting,including a Tool Box,are straight forward and you should be able to get details from the photographs -please return the negatives as soon as you have finished with them.

Take TWO 4"Circ plates and fit two Wheel discs at the centres of each plate for the main axle. Next attach ~~four~~ 5 1"x ½" angle brkts to each plate at opposite sides at the 2nd holes in from the edge of the plates. The A/Brkts are bolted by the slotted holes and SPACED FROM THE PLATES BY ONE WASHER ON EACH OF THE FOUR BOLTS. The short lugs of the A/Brkts should lie almost to the edge of the plates. On the flywheel side plate, next attach a Flanged disc at four bolt positions and using four couplings as spacers. See sketches below. Before attachment of the Flanged disc, bolt two 3" curved strips to the Circ plate which act as legs for eventual attachment to the angle girders on the Dynamo platform. The other side of the Dynamo does NOT have a flanged disc but two 3" curved strips are attached for legs in the same position as on the other plate. Next, take some BLUE PLASTIC plates, either 5½x2½" or similar and some 2½" flat strips. Attach the flat strips and two ends of the Blue Plastic plates to the top lugs of the 1"x½"A/Brkts on each Circ plate. This gives a width of 2½" between the Circ plates and the spacing washers on the 1"x½"A/Brkts allow the Blue Plastic plates to be curved between the Circ plates and attached to the other lugs on the circ plates and overlaid with 2½" strips. Allow a space at the bottom of the Dynamo to get your hand inside the Dynamo proper for adjustments. The commutator side is made up from several formed slotted strips attached to the Dynamo top where the Blue plates are fixed to the 1"x½"A/brkt lugs. These formed strips are bent to allow a three point fixing to a Wheel disc in line with the centre of the Dynamo and give a space for a dummy commutator made up from two large Flanged wheels or similar. You can also add Brush holders made from couplings, long bolts and compression springs and a Handrail support should also be fixed to the top centre of the 2½" strip. This is the basic Dynamo and a Wiring box should be made up from 2½"and 1½" A/Girders etc, to be bolted to the front centre line of the Dynamo and suitably embellished with Collars etc to represent Gauges and wiring connections for cables. See sketches below:-



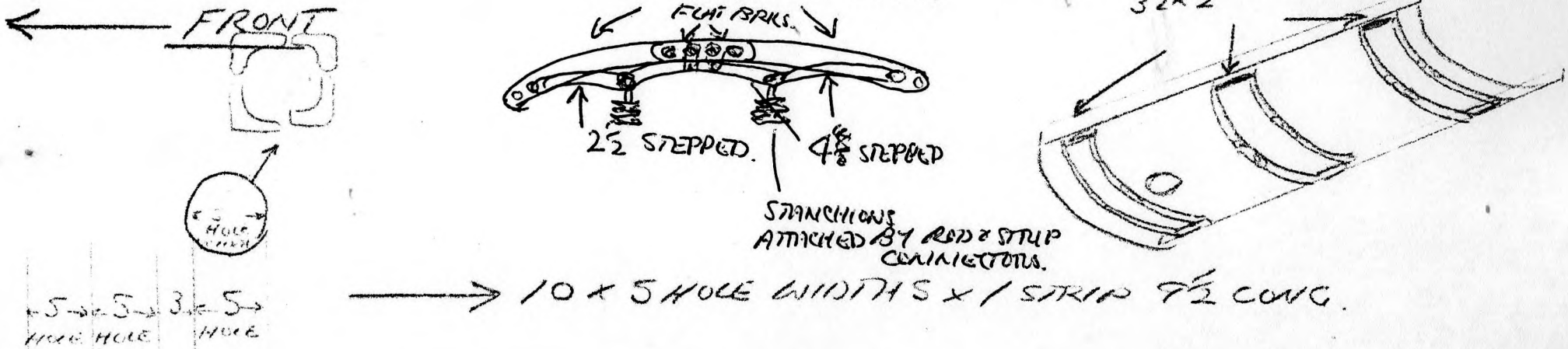
A = 1"x½" A/BRKTS
B = WHEEL DISC
C = COUPLINGS (4
D = HANDRAIL SUPPORT
E = BLUE PLASTIC PLATES
F = 2½" STRIPS.
G = ATTACH ENDS OF BLUE PLASTIC PLATES TO "G"
H - 3" CURVED STRIPS.


NARROW STRIP.
TO VALVE
ATTACH TO SLIDING VALVE COUPLING.
PAWL
LUBRICATOR.
RATCHET WHEEL
CHANNEL PINS.
VALVE LIFT CONTROL ARM.
PIVOT ATTACHMENT
OFFSET
TO VALVE GEAR
NARROW STRIP.
TWO CURVED CLAMPED TOGETHER.
PIVOT
BOLT TO SIDE PLATES

CANOPY

CANOPY WIDTH 9½" STRIP PLATES CURVED TO SHAPE.

INSIDE BRACING - TWO 5½ CURVED STRIPS OVERLAPPED 4 HOLES. - ATTACHED TO VARIOUS 3½×½" DOUBLE ANGLE STRIPS. 6 LOTS OF BRACING TIES. -
AT FRONT - 2 HOLES IN
AT REAR - 3 HOLES IN.

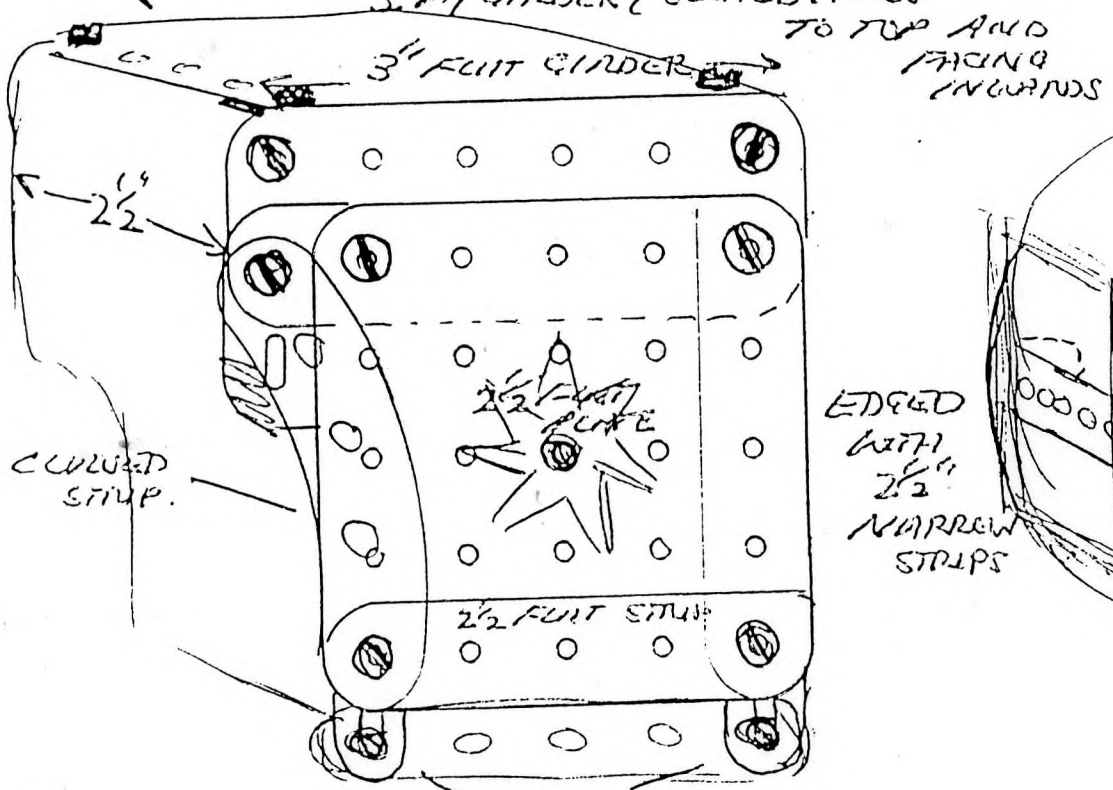


24½" A/G + 9½" A/G BUTTED TOGETHER - SLOTTED HOLES NOT USED OF A/G's.

(1)

EXCTOR PLATFORM.. (SAME BOTH SIDES)

$2\frac{1}{2}$" FLAT PLATE ON TOP

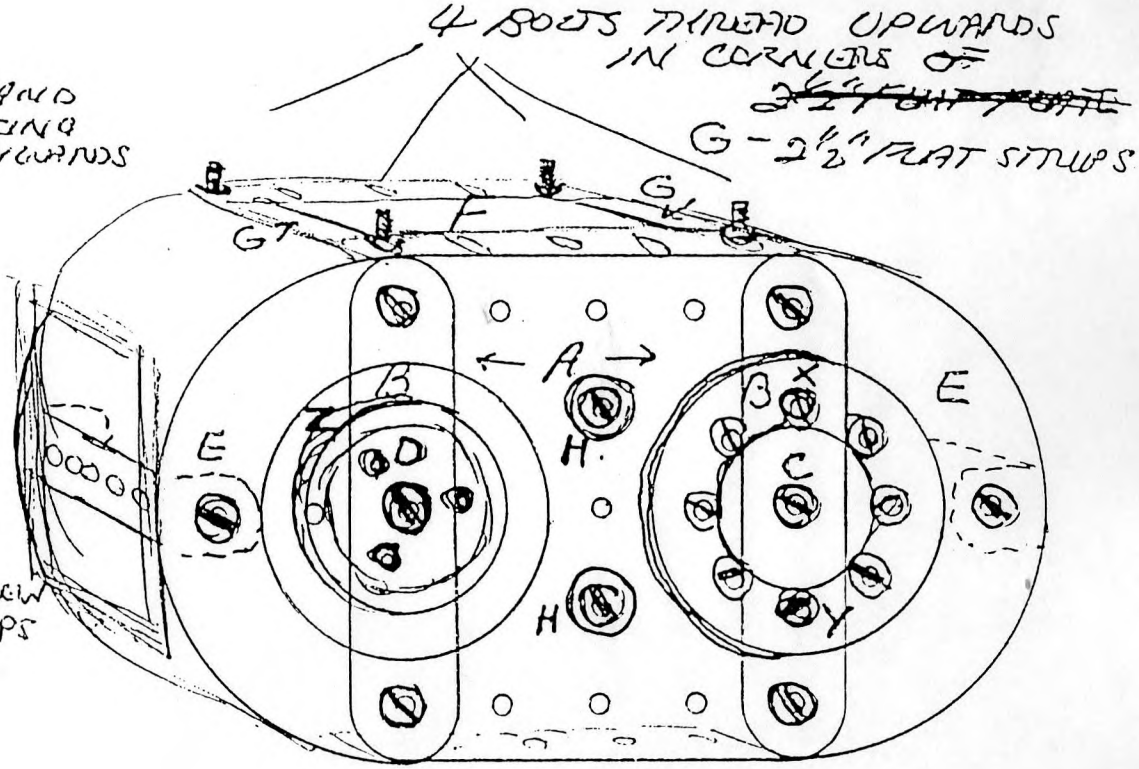


ANGLE A/BRKTS. BOLTED TO BOILER WITH $2\frac{1}{2}$" STRIP ON TOP.

(2)

CYL BLOCK FROM FRONT

(12)



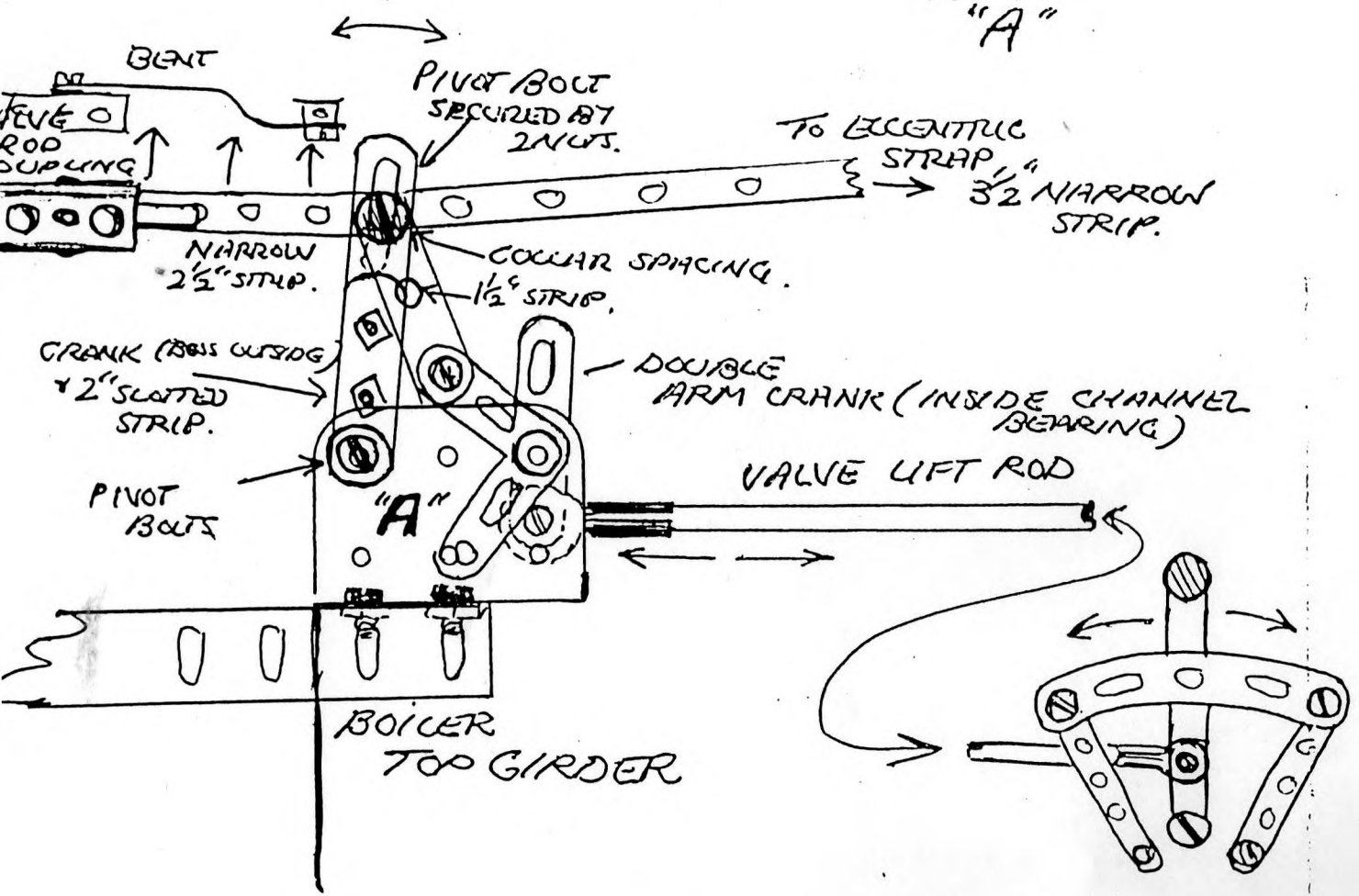
A - $2\frac{1}{2}$ FLAT PLATE
* B - WHEEL DISCS SPACE (4) AT X → (1) AT Z HELD BY BOLT D ONLY
C - $\frac{3}{4}$" WASHERS. (3)
D - 1" COOSE PULLEYS (2)
E - SEMI-CIRC PLATES.
F - $2\frac{1}{2}$" FLAT PLATE
H - COLUMNS ATTACHED BY BOLTS.

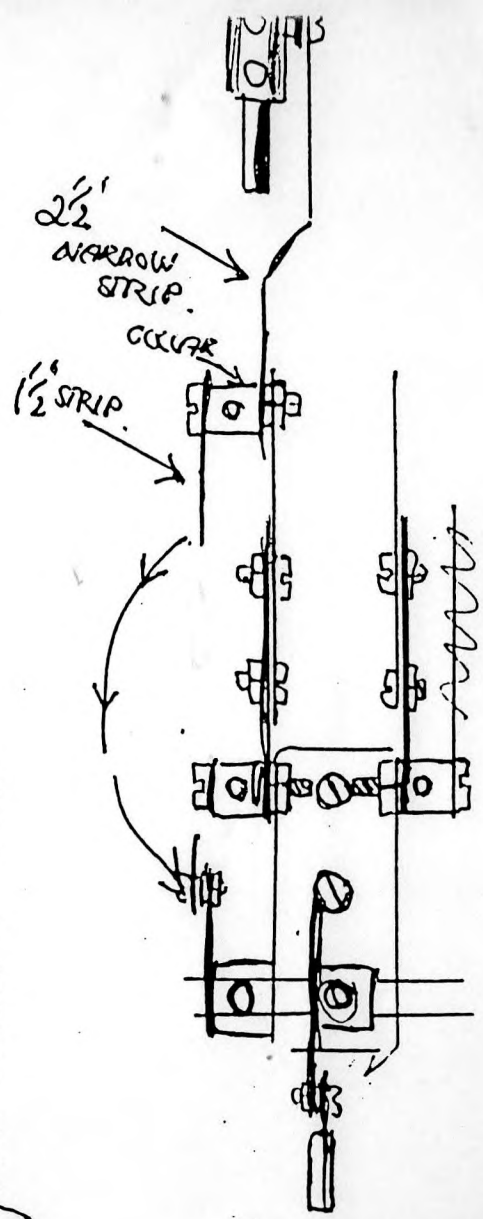
* BOLT 4 DISCS TOGETHER BY OUTER HOLES. SPACE FROM CYL BLOCK BY WASHERS AT X & Y

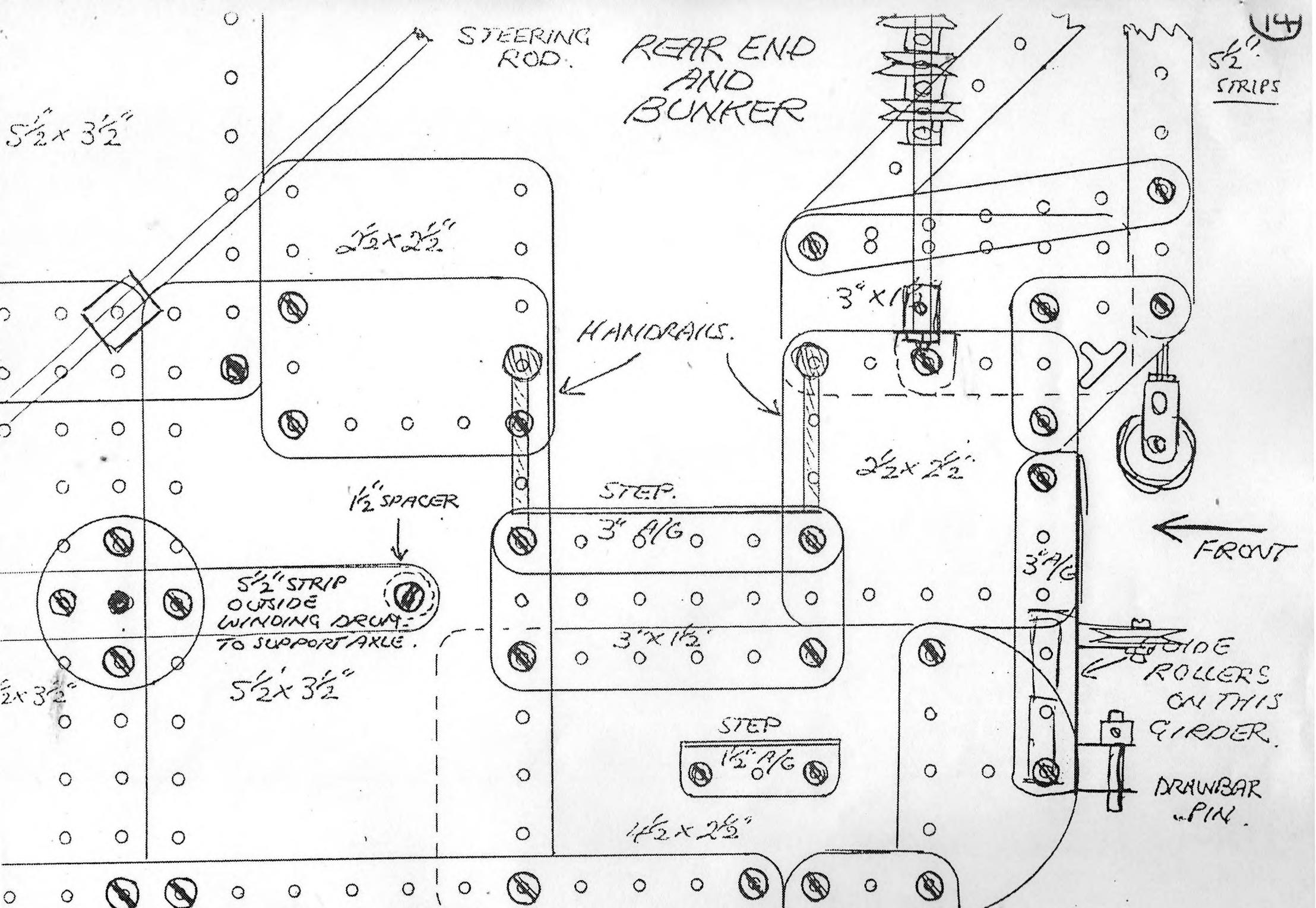
VALVE GEAR.

FLYWHEEL SIDE

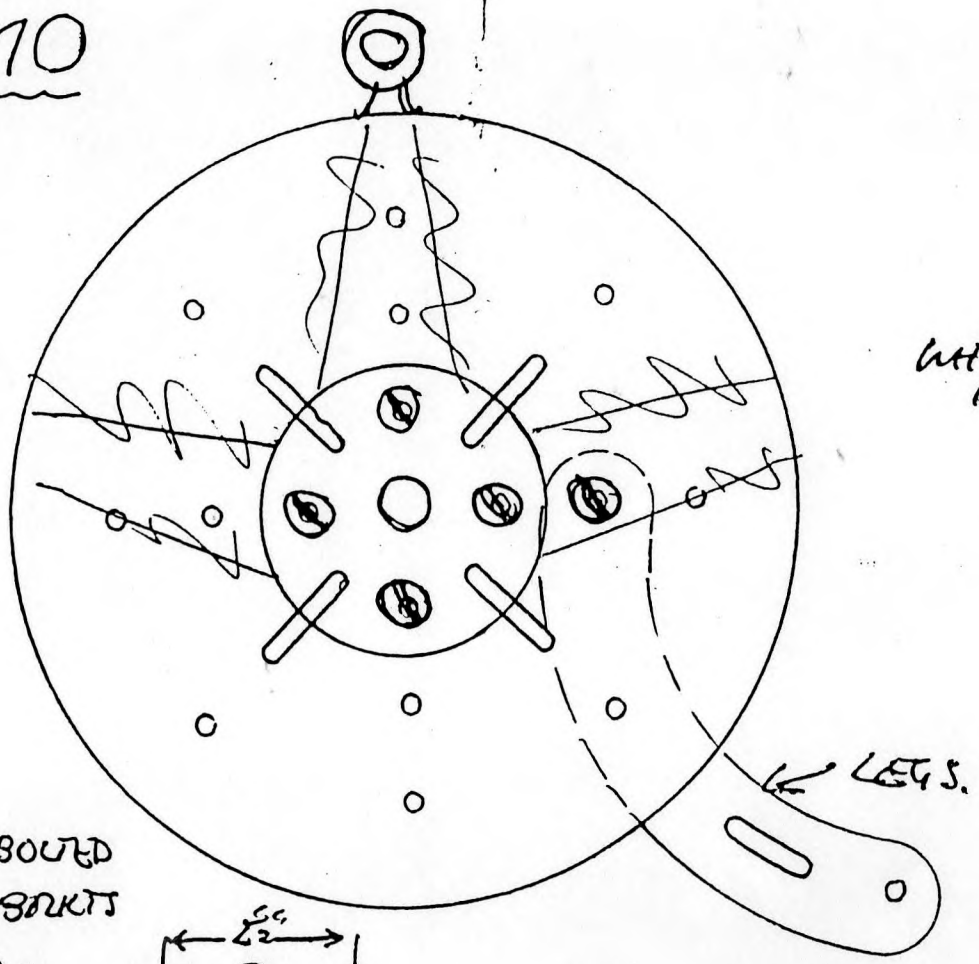
(DUPLICATE LINKAGES EITHER SIDE OF CHANNEL BRKT "A")

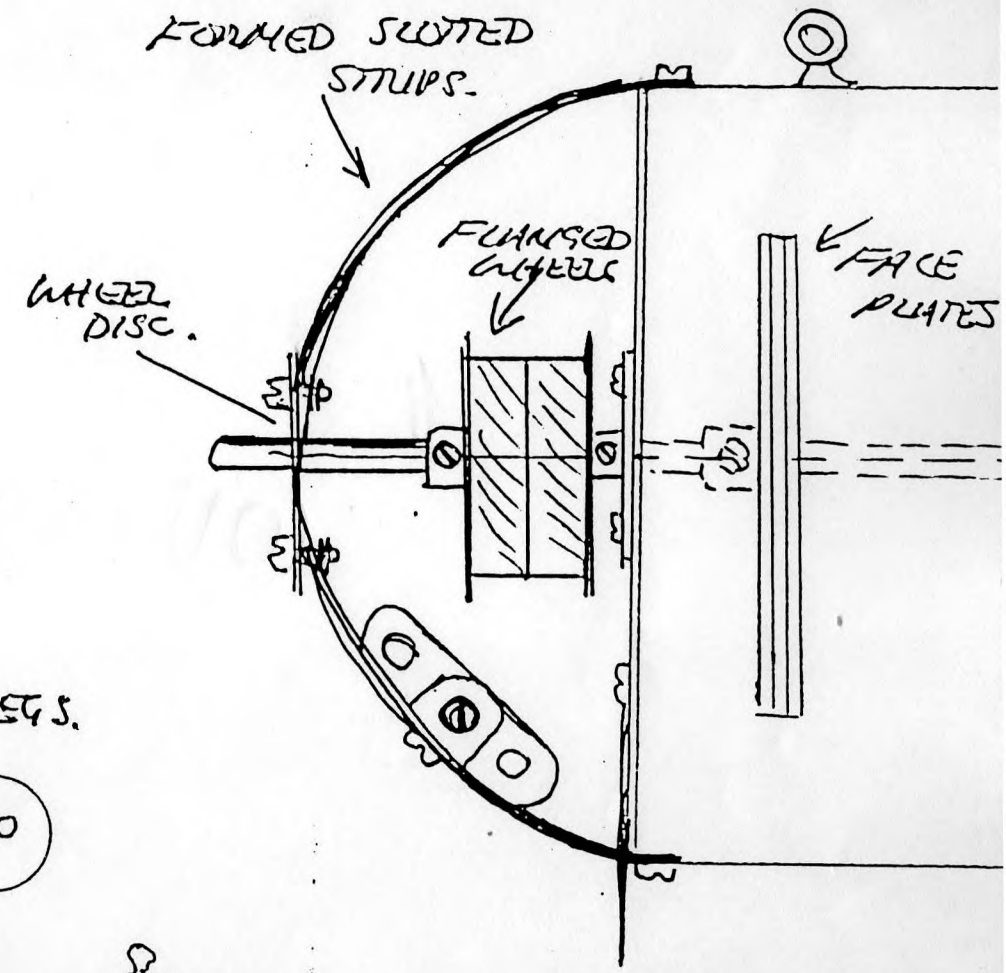


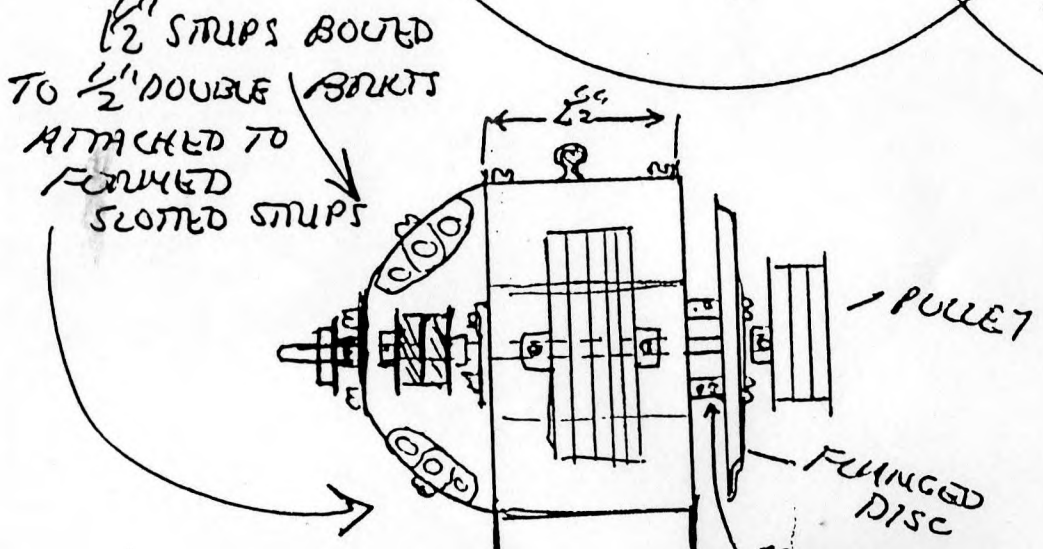


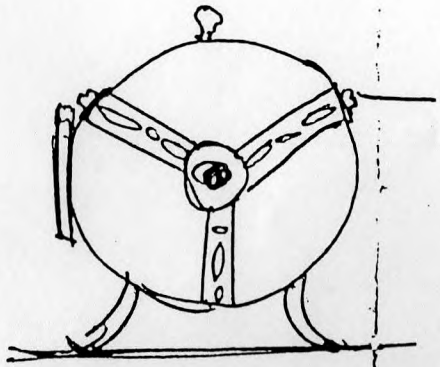

REAR END AND BUNKER
STEERING ROD.
5½" STRIPS
5½" x 3½"
2½" x 2½"
3" x 1½"
HANDRAILS.
2½" x 2½"
1½" SPACER
STEP.
3" A/G
FRONT
3" A/G
5½" STRIP OUTSIDE WINDING DRUM. TO SUPPORT AXLE.
3" x 1½"
SIDE ROLLERS ON THIS GIRDER.
5½" x 3½"
STEP
1½" A/G
DRAWBAR PIN.
1½" x 2½"

DYNAMO









FORMED SLOTTED STRIPS (3 SETS) SHOULD BE SPACED EVENLY LIKE THIS & BOLTED TO PLASTIC PLATES & CENTRE WHEEL DISC.

REAR END

(6)

SAME BOTH SIDES TO HERE

NOTE:- VERTICAL SIDE PLATES ARE BOLTED INSIDE ROUND HOLE FLANGE OF 12½ & 1½" A/G's.

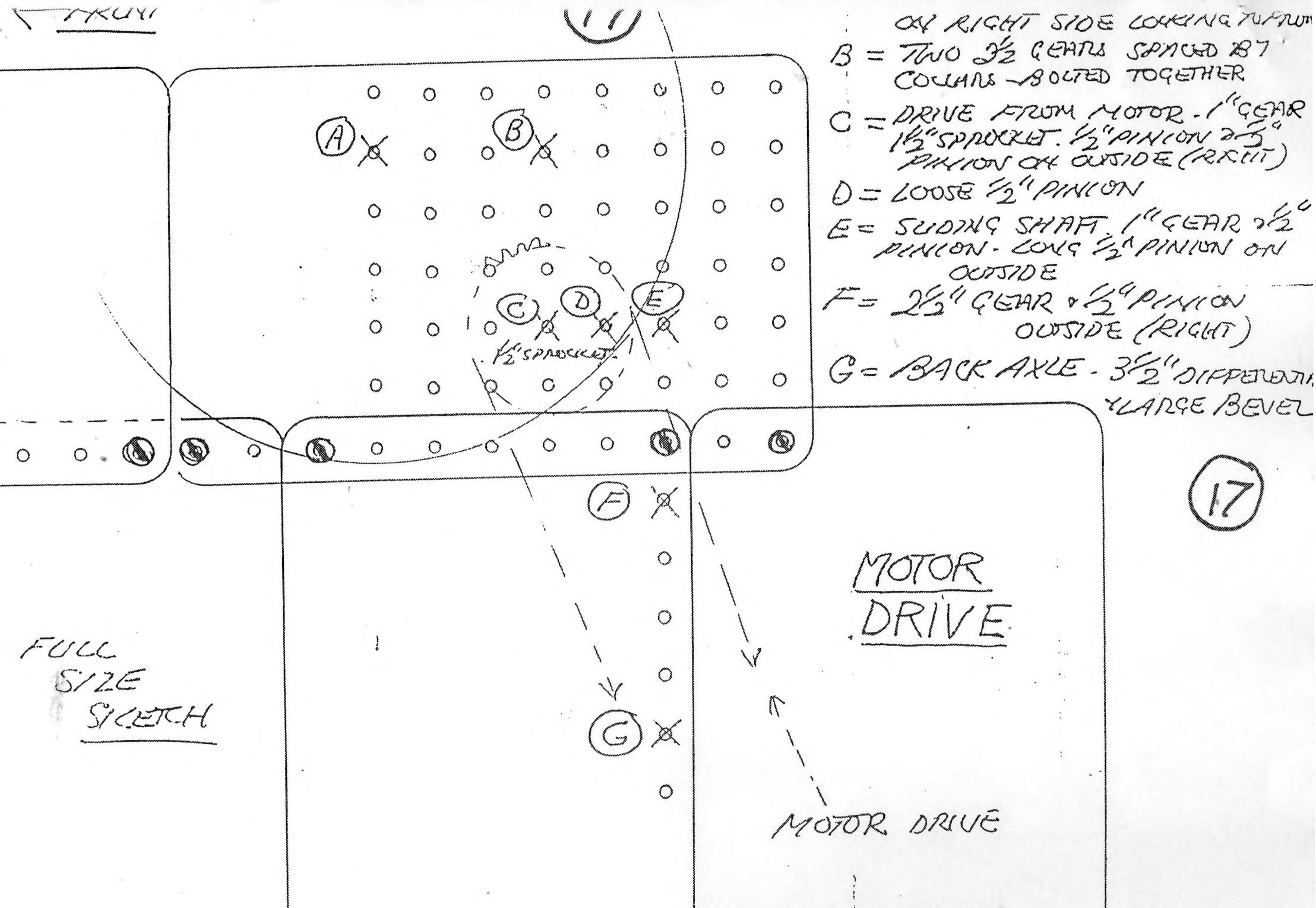
2½ x 2½.

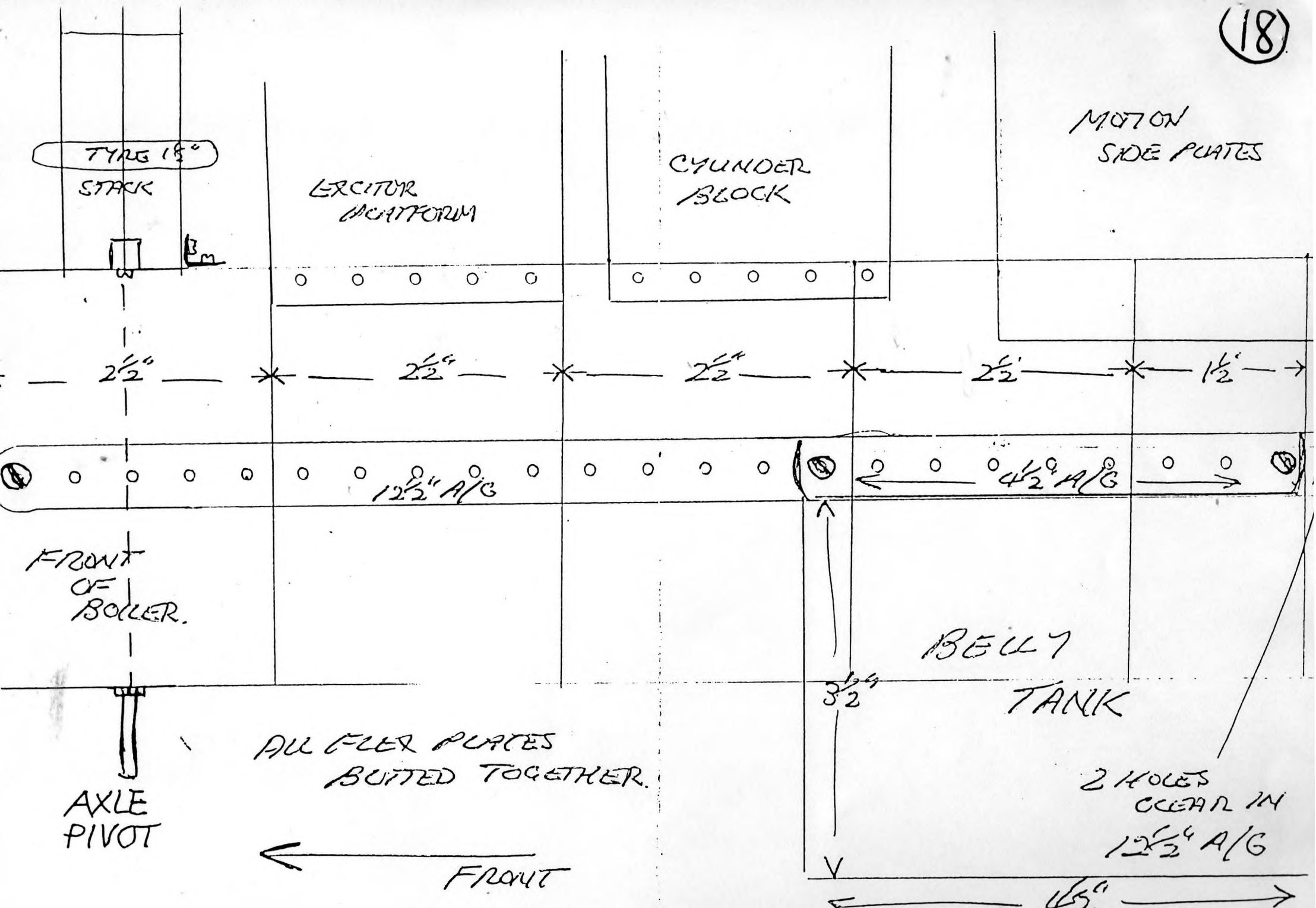
STEP HERE

4½ x 2½"

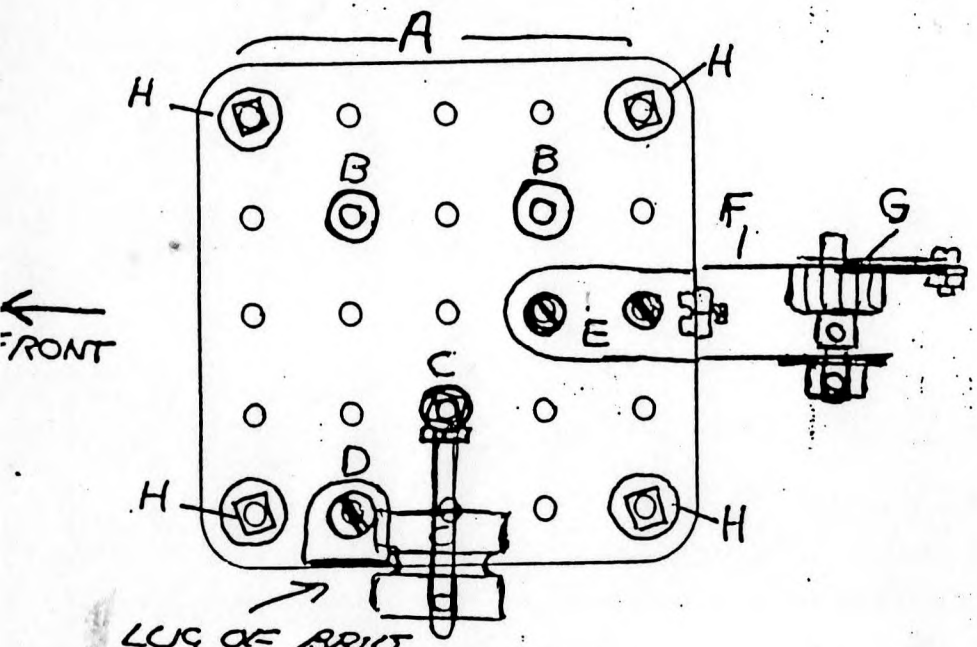
1½" A/G

JOIN TOGETHER (FULL SIZE) SHEETS 5 & 6


A
B
C
D
E
½" SPROCKET
F
G
MOTOR DRIVE
B = TWO 3½ GEARS SPACED 2" COLLARS — BOLTED TOGETHER
C = DRIVE FROM MOTOR - 1" GEAR 1½" SPROCKET. ½" PINION 2½" PINION ON OUTSIDE (RIGHT)
D = LOOSE ½" PINION
E = SLIDING SHAFT. 1" GEAR ½" PINION - LONG ½" PINION ON OUTSIDE
F = 2½" GEAR ½" PINION OUTSIDE (RIGHT)
G = BACK AXLE - 3½" DIFFERENTIAL LARGE BEVEL
17
MOTOR DRIVE
FULL SIZE SKETCH
MOTOR DRIVE

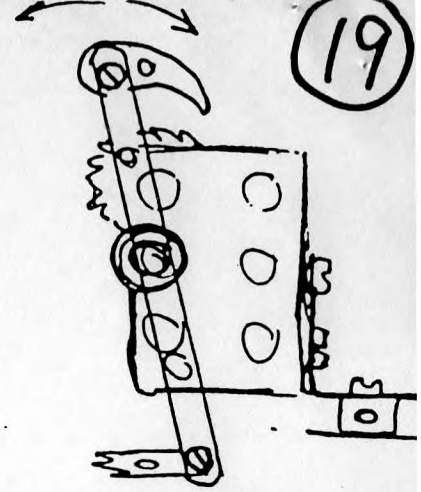

TYRE 15"
STACK
EXCITOR PLATFORM
CYLINDER BLOCK
MOTOR SIDE PLATES
2½"
2½"
2½"
2½"
1½"
12½" A/C
4½" A/C
FRONT OF BOILER.
AXLE PIVOT
ALL FLEX PLATES BUTTED TOGETHER.
FRONT
BELT TANK
3½"
2 HOLES CLEAR IN 12½" A/C
16"

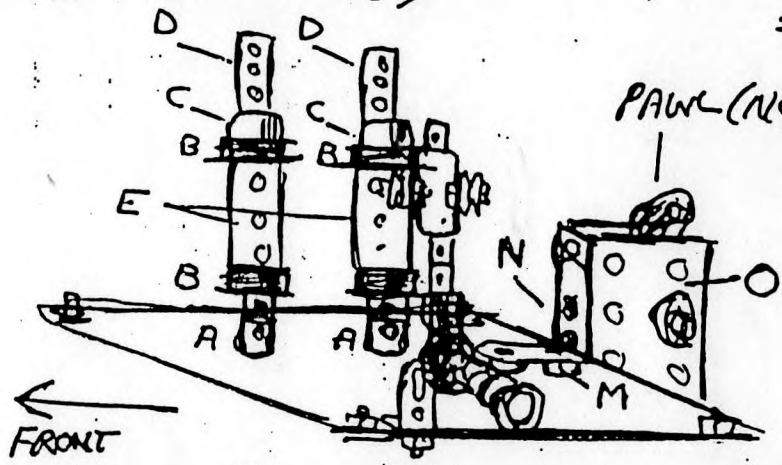
A = TOP PLATE 2½×2½
B = ROD SOCKETS
C = THREADED PIN (SHORT)
D = 1"×½" A/BRKT
E = 1" A/BRKT.
F = CHANNEL BEARING
G = RATCHET WHEEL
H = SECURING NUTS

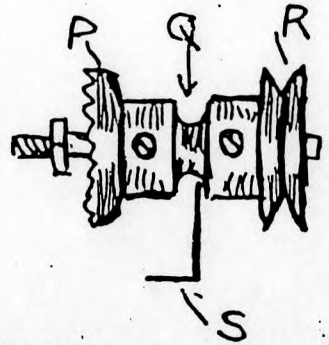


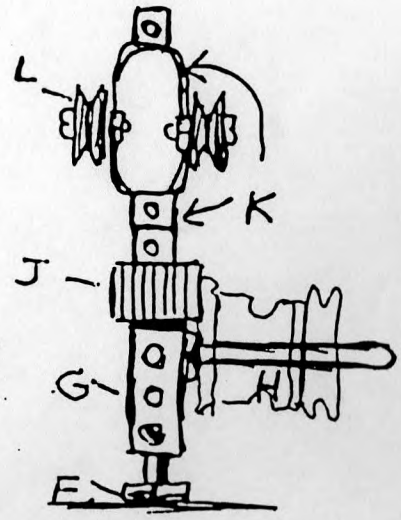
FLYWHEEL SIDE

A - ROD SOCKETS
B - ¾" FLANGED WHEELS
C - CHIMNEY ADAPTORS
D - COUPLINGS
E - SLEEVE PIECES
F - THREADED PIN (SHORT)
G - COUPLING.
H - LONG PIN
J - ½" PINION
K - SMALL FORKS (2)
L - ½" PULLEYS (2)







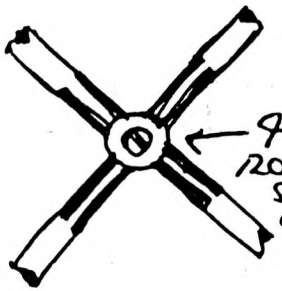


M - 1" A/BRKT SPACED BY COLLARS FROM PLATE
N - CHANNEL BRACKET
O - SHAFT WITH RATCHET.
P - ¾" CONTRATE
Q - SOCKET COUPLING.

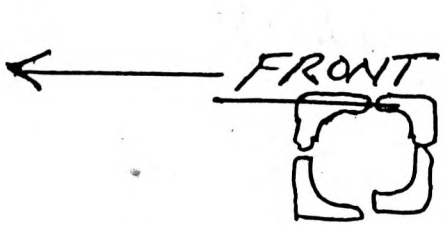
CANOPY

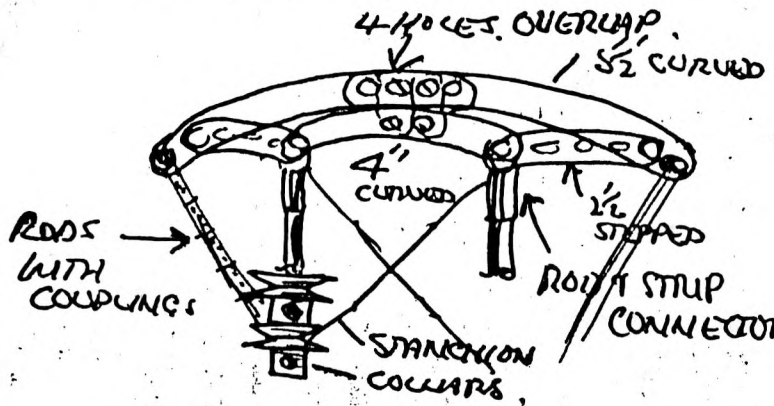
CANOPY WIDTH 9½" STRIP PLATES CURVED TO SHAPE.

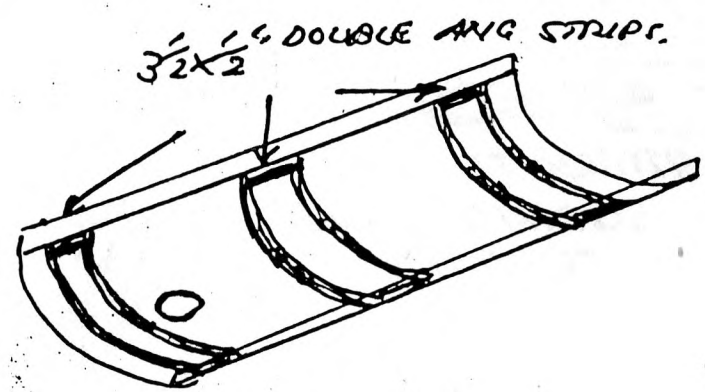
CROSS-BRACING.

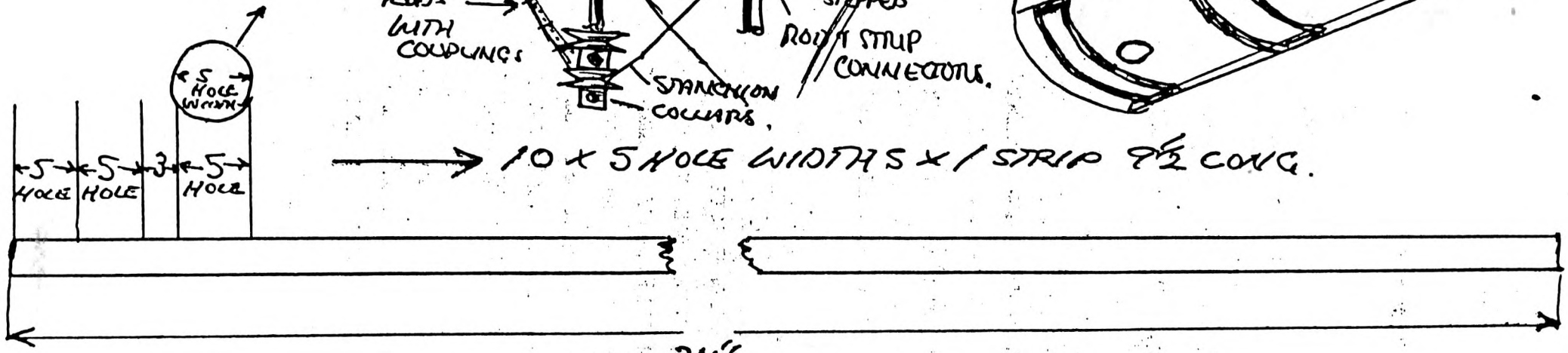


INSIDE BRACING - TWO 5½ CURVED STRIPS OVERLAPPED 4 HOLES. - ATTACHED TO VARIOUS 3½x½" DOUBLE ANGLE STRIPS. 6 LOTS OF BRACING TIES. - AT FRONT - 2 HOLES IN AT REAR - 3 HOLES IN.



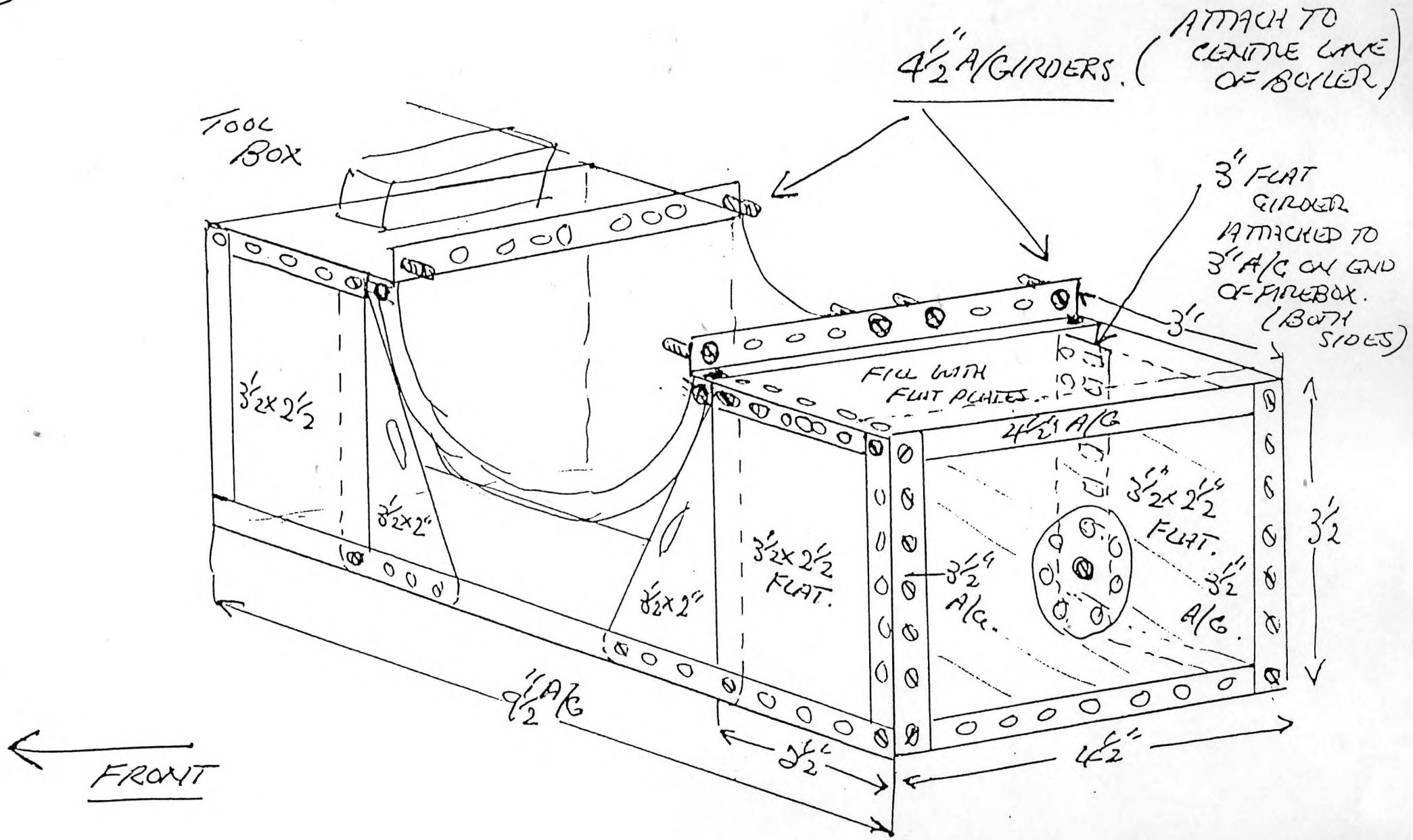


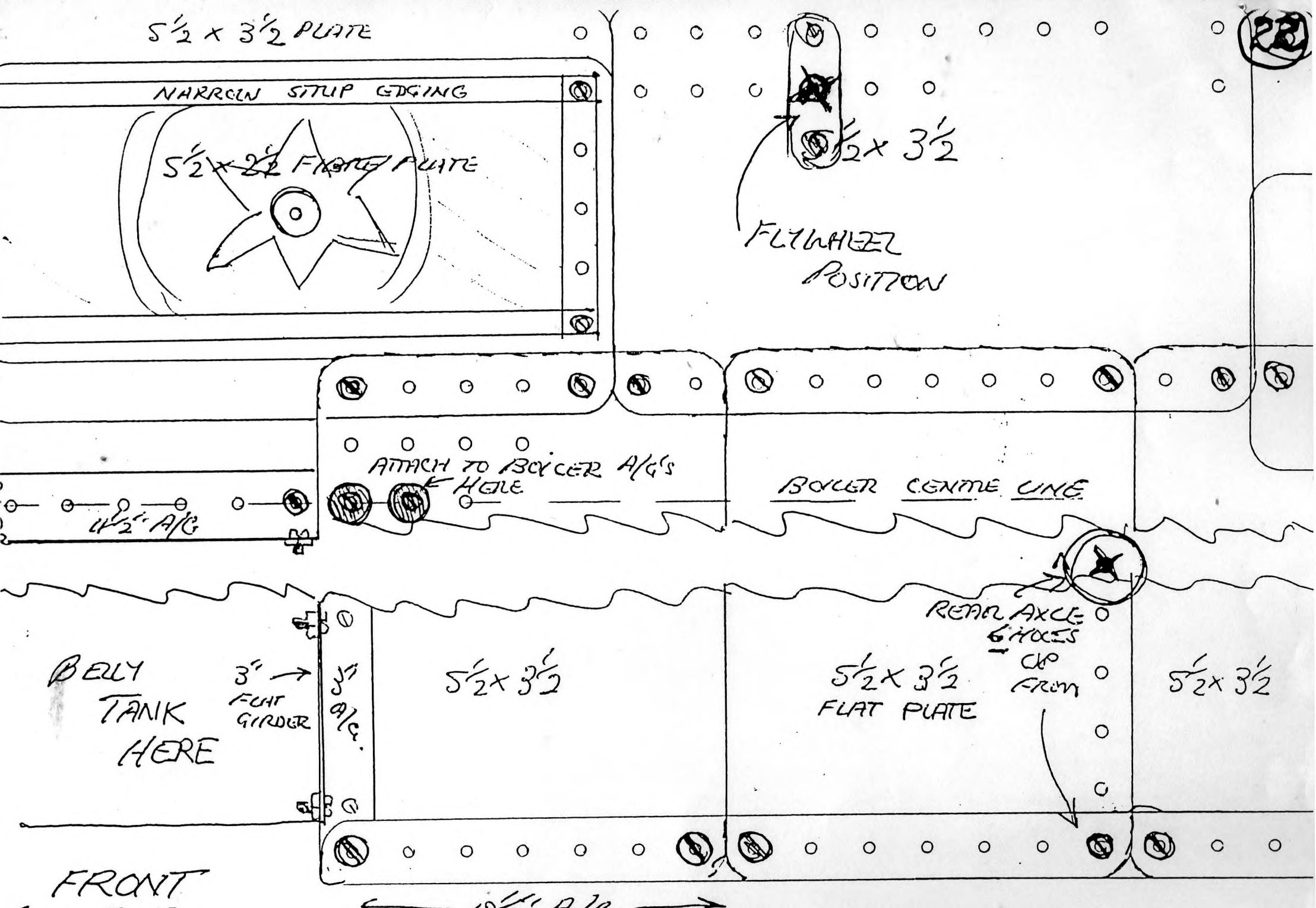




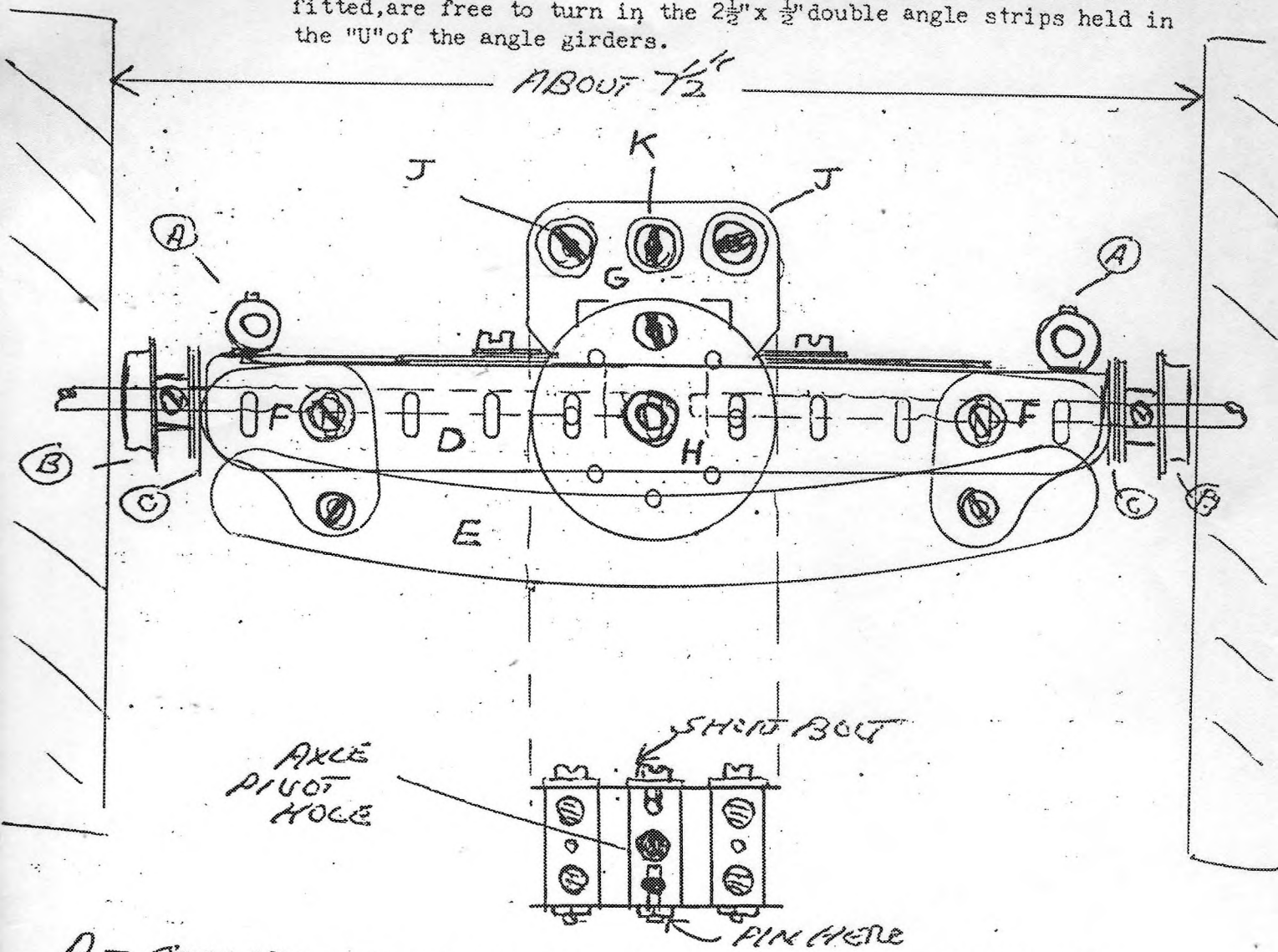
24½" A/G & 9½" A/G BUTTED TOGETHER - SLOTTED HOLES NOT USED OF A/G's.

BELLY TANK.

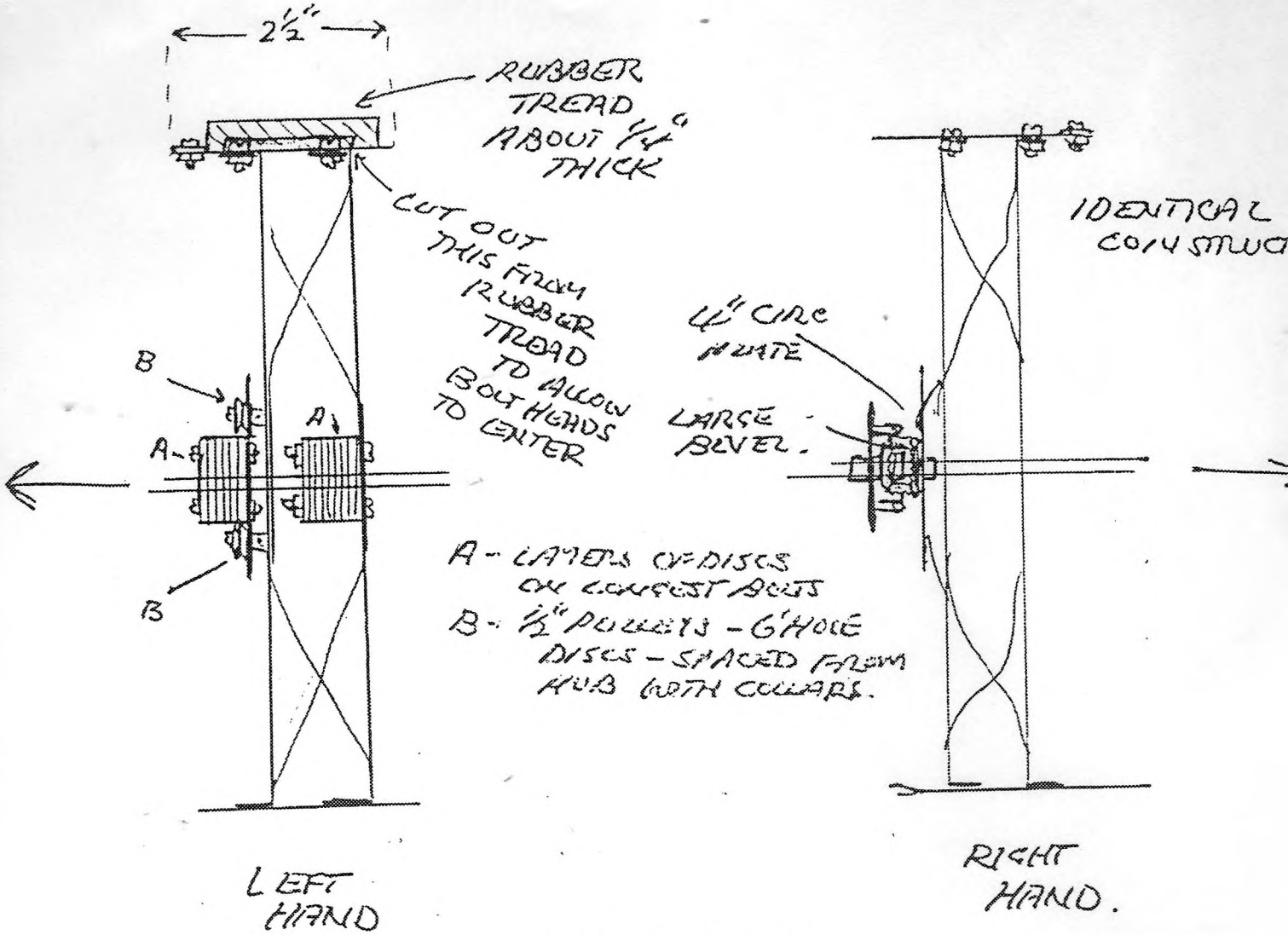

4½" A/GIRDERS. (ATTACH TO CENTRE LINE OF BOILER)
TOOL BOX
3" FLAT GIRDER ATTACHED TO 3" A/G ON END OF FIREBOX. (BOTH SIDES)
FILL WITH FLAT PLATES.
3½ x 2½
3½ x 2"
3½ x 2½ FLAT.
4½" A/G
3½" A/G.
3½ x 2½ FLAT.
3½" A/G.
3½
9½" A/G
2½"
4½"
FRONT


5½ x 3½ PLATE
NARROW STRIP EDGING
5½ x 2½ FRONT PLATE
5½ x 3½
FLYWHEEL POSITION
ATTACH TO BOILER A/G'S HERE
BOILER CENTRE LINE
4½" A/C
REAR AXLE 6 HOLES CUT FROM
BELLY TANK HERE
3" FLAT GIRDER
3" A/C.
5½ x 3½
5½ x 3½ FLAT PLATE
5½ x 3½
FRONT

NOTE:- Use short bolts or washers as spacers so that the stub axles, when fitted, are free to turn in the $2\frac{1}{2}$"x $\frac{1}{2}$" double angle strips held in the "U" of the angle girders.

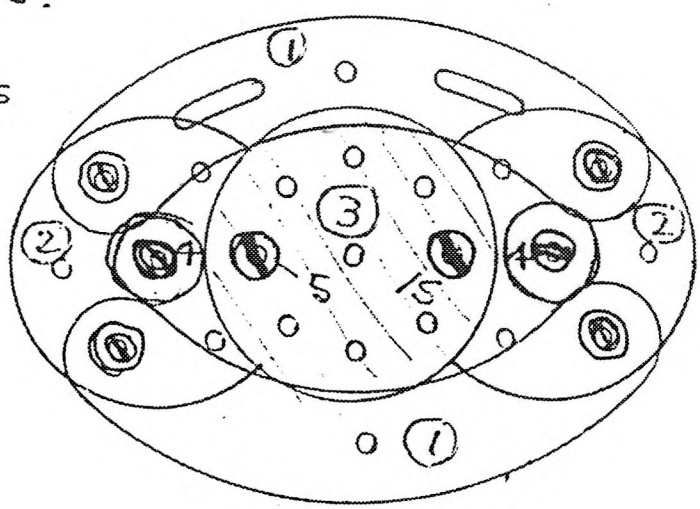


A = COLLARS - FREE TO SWIVEL ON BOLT SHANKS.
B = ¾" FLANGE WHEELS (FOR SPACING PURPOSES ONLY)
C = ¾" WASHERS (" — " — — " — ")
D = 5½" A/GIRDERS.
E = 5½ CURVED STRIPS.
F = 1" CORNER BRKTS.
G = FLAT TRUNNIONS
H - 8 HOLE WHEEL DISCS.
J - CONG BOLTS 1⅛"
K = SMALL BOLT INTO TAPPED HOLE OF STRIP COUPING.

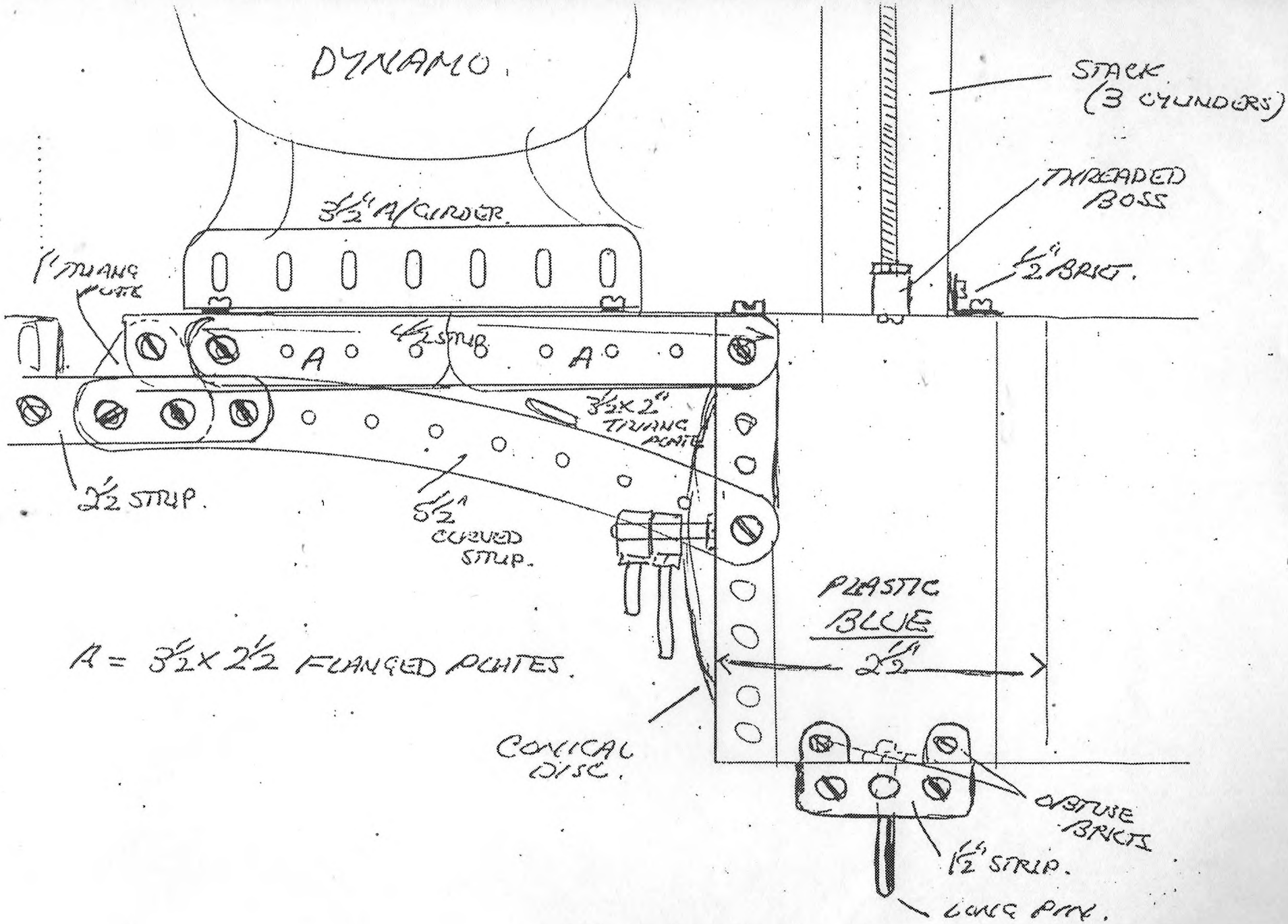


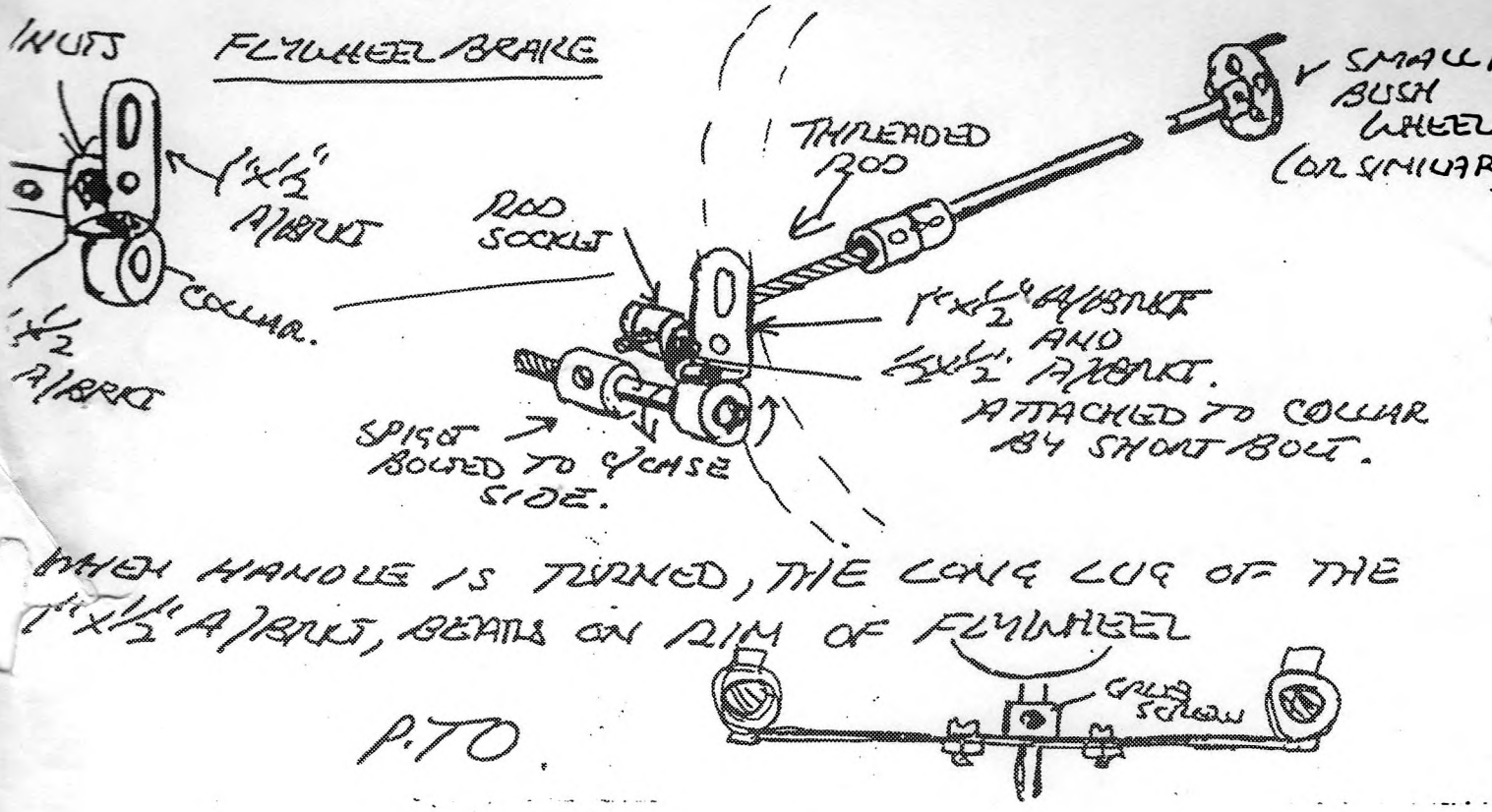
FROM REAR LOOKING TO FRONT OF ENGINE

(1) 3" CURVED STRIPS.
(2) 6-HOLE DISCS.
(3) LAYERS OF DISCS USING LONGEST BOLTS.
(4) ½" BRASS PULLEYS WITH BOSS
(5) LONG BOLTS 1⅝"



WHEEL HUBS. (BOTH WHEELS)

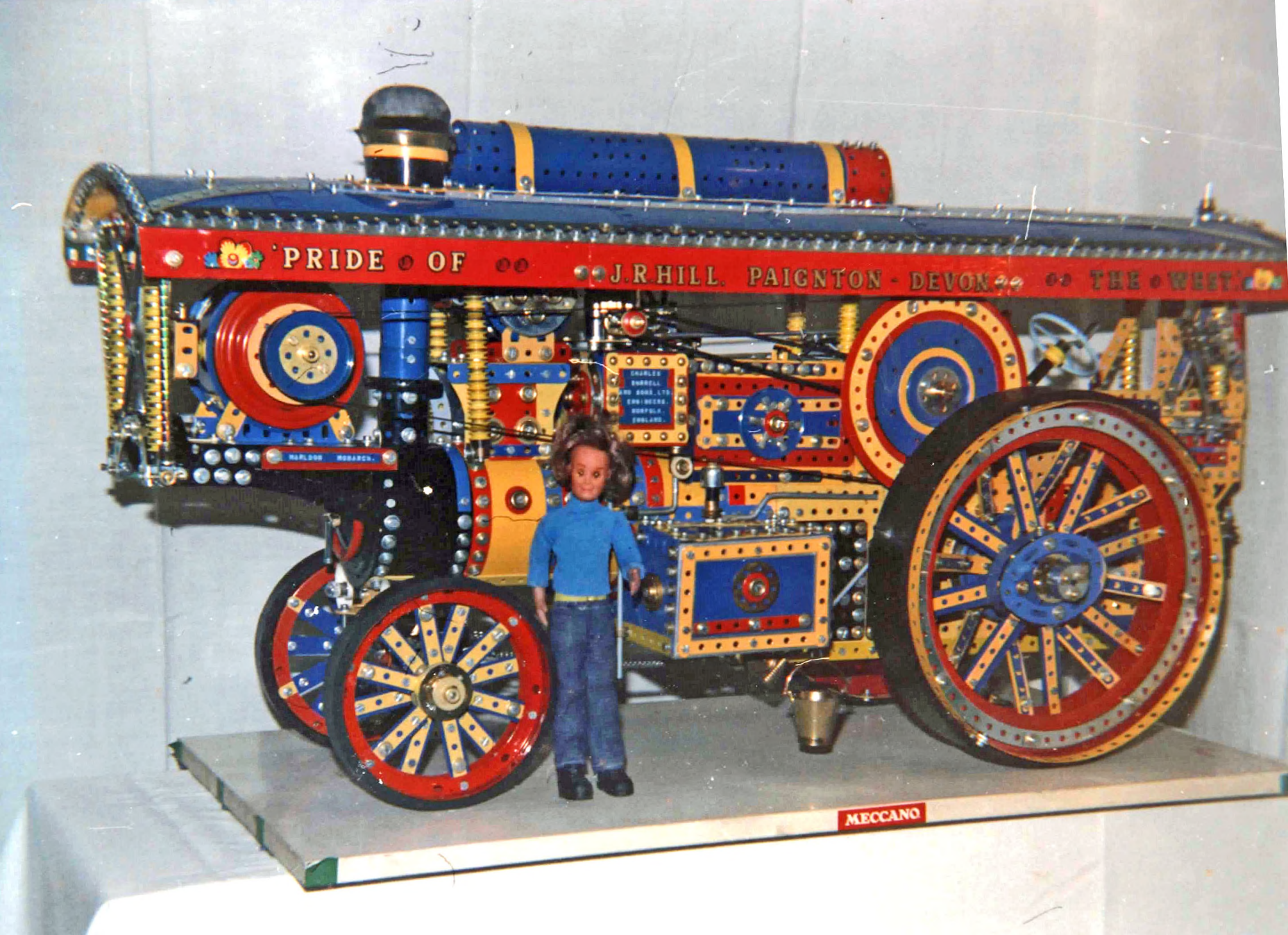

DYNAMO.
STACK (3 CYLINDERS)
THREADED BOSS
½" BRIG.
3½" A/CURVE.
1" TRUNK PLATE
½" STUB
A
A
3½ x 2" TRUNK PLATE
2½ STRIP.
5½" CURVED STRIP.
A = 3½ x 2½ FLANGED PLATES.
PLASTIC BLUE
2½"
CONICAL DISC.
OBTUSE BRICK
½" STRIP.
LONG PIN.

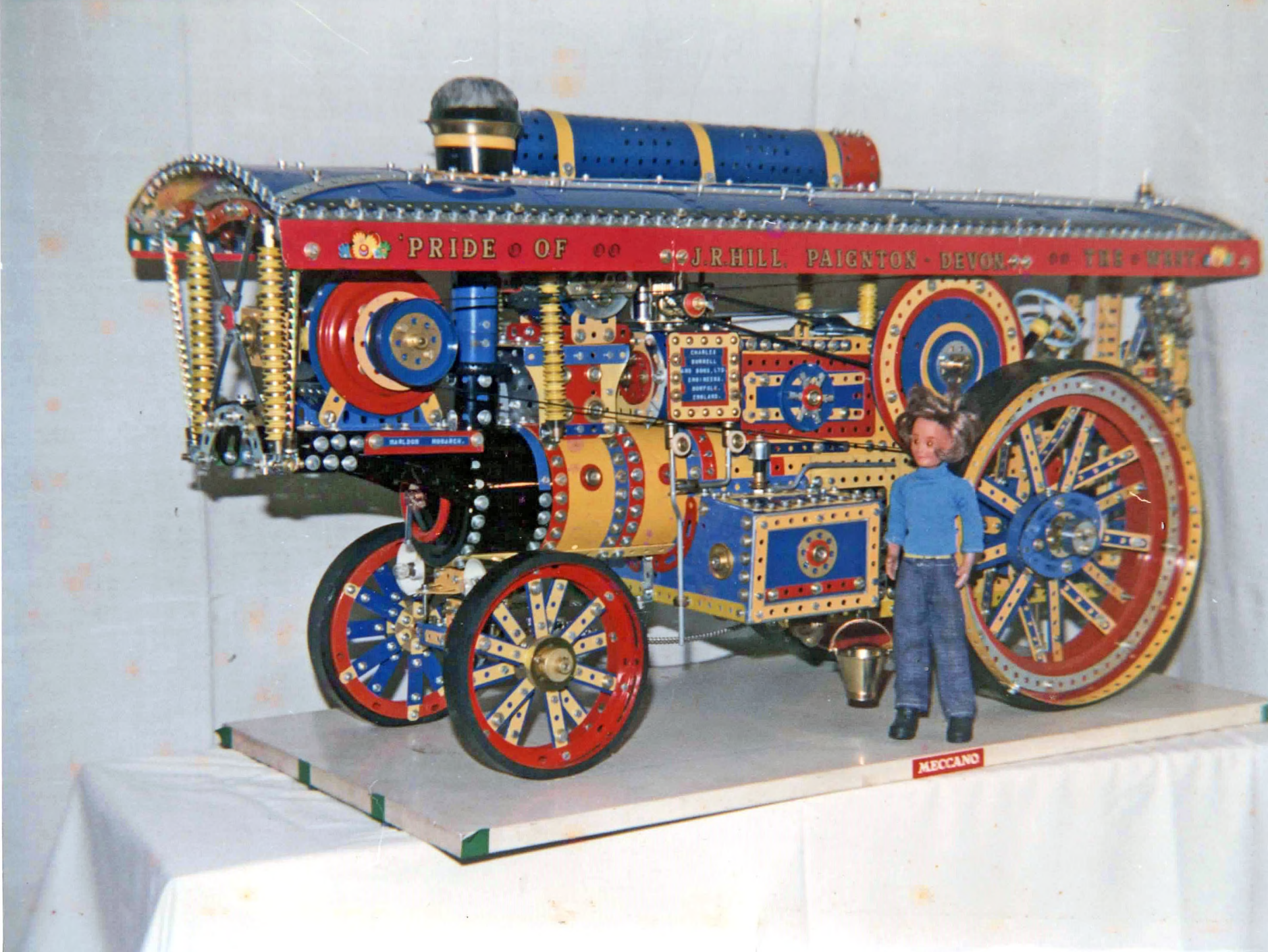


FLYWHEEL BRAKE. Note that the 1x½" and ½"x½" A/Brkts are bolted to the collar at right angles to each other so that the long lug of the ½x½ brkt holds a Rod socket, loosely pivotted, the tapped holes having a suitable screwed rod passed through and thence to the operating rod above the main steering wheel.

The Longlug of the 1x½" A/Brkt rests on the rim of the Hub Disc forming the rim of the Flywheel and you must utilise some method of having a spigot to hold the collar which is free to rotate on the spigot. The two A/Brkts are attached to the collar by a SHORT bolt only.

As regards Headlamps, mine were made from Large Flanged wheels with the bosses of the wheels held by bolts INSIDE, the lugs of 1x½" Double brkts so that the flange portion of the wheels is flush against the Lamp body. Not too difficult if you experiment with various parts and Brass ½" Pulleys etc.


'PRIDE OF
J.R HILL. PAIGNTON - DEVON
THE WEST
MECCANO


'PRIDE OF
J.R.HILL. PAIGNTON - DEVON.
THE
MECCANO