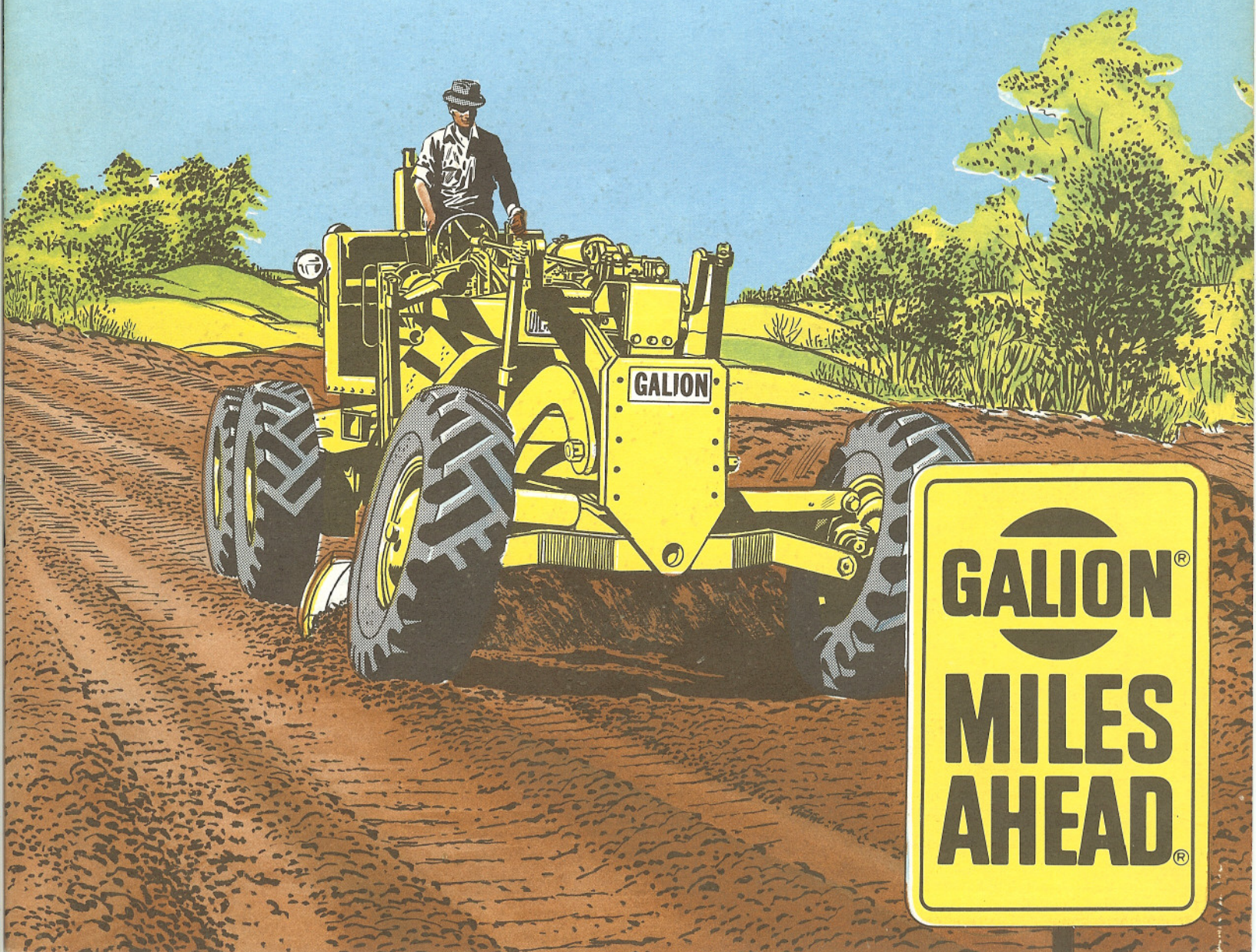


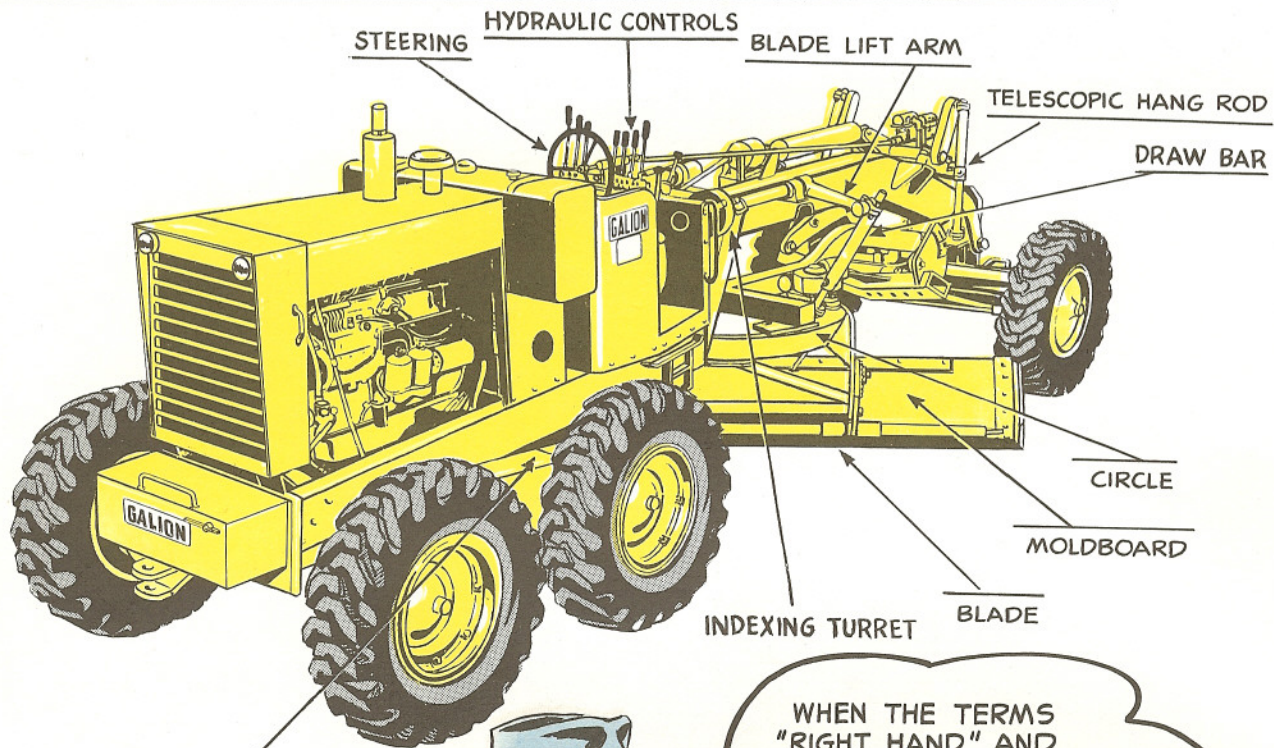
## How to operate a Galion Motor Grader





IN FLEXIBILITY AND VERSATILITY OF BLADE POSITIONING, YOU WILL FIND THE GALION MOTOR GRADER THE MOST ADVANCED AND EASIEST TO MANAGE MACHINE YOU HAVE EVER OPERATED. THE EFFICIENCY OF THE GALION GRADER IS LIMITED ONLY BY THE ABILITY OF THE OPERATOR -- THEREFORE, IT WILL PAY YOU TO STUDY THESE INSTRUCTIONS AND PRACTICE HANDLING THE MACHINE. THE PURPOSE OF THIS BOOKLET IS TO SHOW YOU **HOW** TO BECOME A BETTER OPERATOR.

## IMPORTANT PARTS OF THE GALION MOTOR GRADER



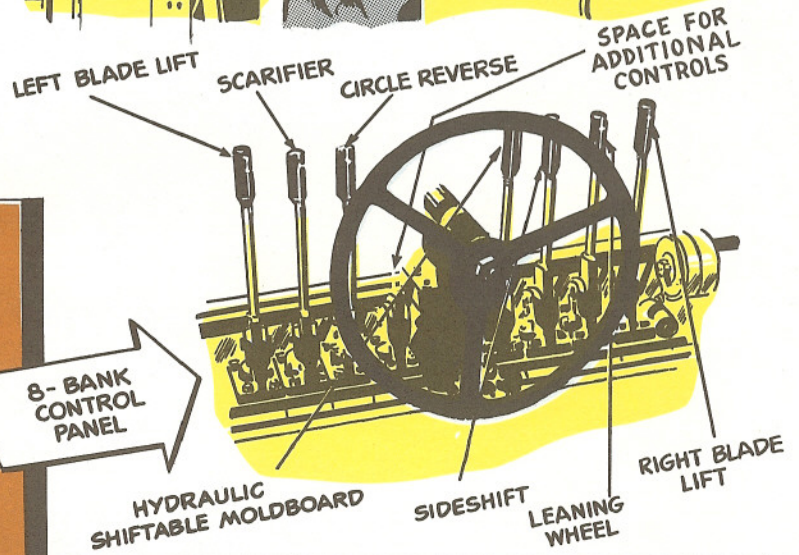
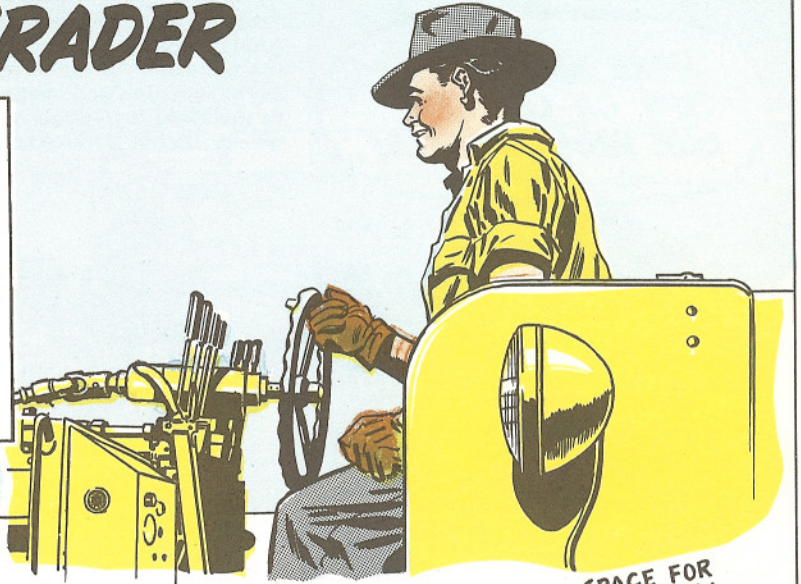
4-WHEEL TANDEM DRIVE

WHEN THE TERMS "RIGHT HAND" AND "LEFT HAND" ARE USED, IT MEANS THE OPERATOR'S RIGHT OR LEFT HAND AS HE FACES THE FRONT.



# STEERING THE GRADER

If you are accustomed to the hard work of mechanical steering, you will be pleasantly surprised at the way GALION has removed the effort from this operation. The use of hydraulic power in steering with the combination of mechanical gearing when required, gives you the satisfaction of knowing you are doing good precise work because you are operating the machine with confidence.



## HYDRAULIC CONTROLS

The control system on the Galion Motor Grader is Galion-engineered to combine simplicity, safety, and convenience with positive action.

It takes but simple finger-tip pressure to operate the levers which control the movement of mold-board, leaning front wheels and all attachments. (See illustration.) You have complete control of the grader at all times.

The danger of damage to the machine due to overloading is eliminated by the built-in safety valve.



**NOTE:** In operating the control levers there is no danger of kicking-out or jerking of the levers. They can be held in the full forward or backward position until the desired operation is completed. When the lever is released, it will automatically return to the neutral position.



**HERE ARE SOME  
TIPS ON LEANING  
OUR FRONT WHEELS!**

Proper use of the leaning front wheels is a great aid in both steering and grading operations. Lean the top of the wheels in the direction you are moving the material. For instance, when the moldboard is extended to the right side of the machine and moving a heavy cut or windrow to the left, a pulling force to the right is exerted on the front end of the machine — thus the top of the wheels should be leaned to the left to counteract this pulling force.



Likewise, when the grader itself is working on the sloping side of a ditch, lean the top of the front wheels enough to keep them in a vertical working position. This will help keep the grader from drifting down the slope.

On high bank-cutting operations, lean the top of the wheels toward the bank. This keeps the blade properly positioned for bank sloping as illustrated.

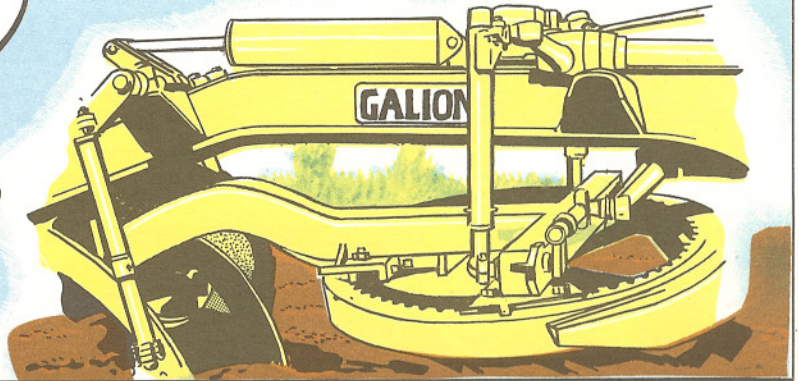
**HERE'S SOMETHING  
TO REMEMBER!**



Wheels may be leaned to the extreme angles, right or left — without danger of kick-back. No jerking, no bumping, no injury to machine or operator.

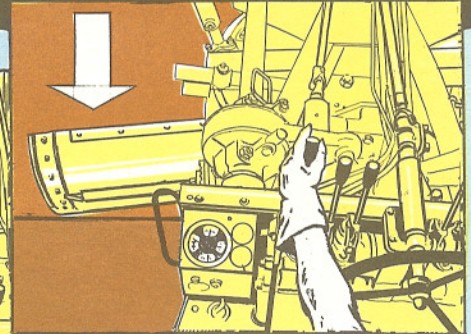
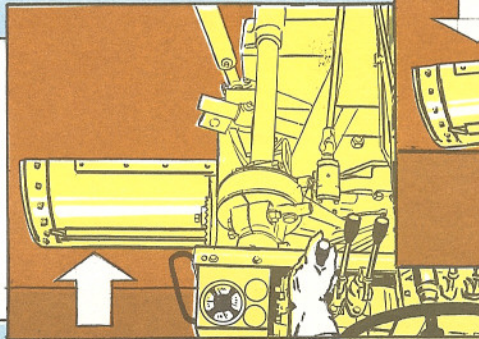
## BLADE POSITIONS

THE GALION BLADE LIFT MECHANISM HAS LIFT ARMS WHICH SAFELY STAND THE VARIOUS STRAINS DEVELOPED AT THE BLADE. ALSO TO GIVE COMPLETE CONTROL OF THE BLADE IN THE MOST DIRECT AND SIMPLE MANNER--SO AS TO PERMIT FREE AND FULL MOVEMENT OF THE BLADE TO **ANY** DESIRED OPERATING POSITION.

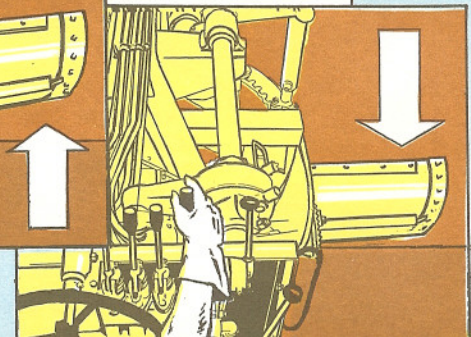
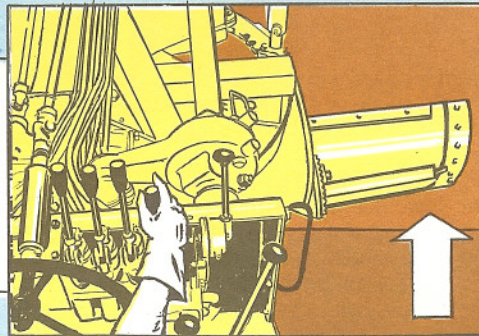


## BLADE LIFT Normal Position

The basic or normal position of the telescoping arms is with the pins inserted in the next to bottom holes. In this position you can do all normal grading and ditching. Pull the extreme left hand control lever completely back to raise the left end of the moldboard. Push it forward to lower or to force the blade into the ground.

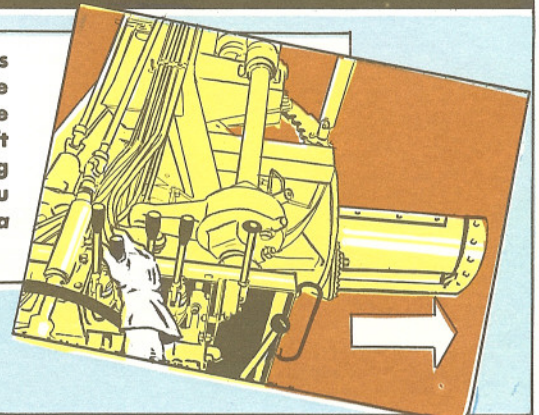
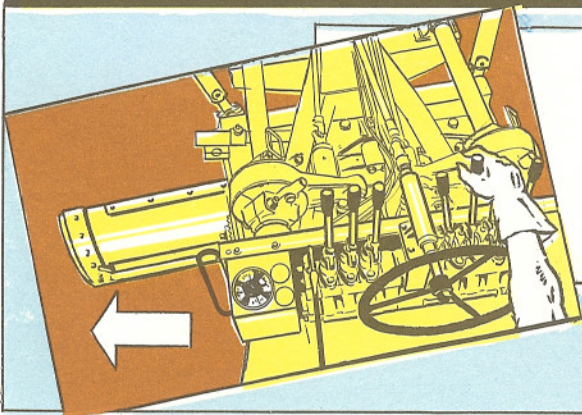


To produce the same action on the right side of the moldboard, you operate the extreme right hand lever in the same manner. You can use both controls at the same time and the moldboard will move just as quickly and surely as when only one control is used.



## BLADE SIDE-SHIFT Normal Position

The side-shift control enables you to move the entire circle and the moldboard and blade assembly to the right or left as needed. The telescoping side-shift arm provides you with an adjustment for extra reach.

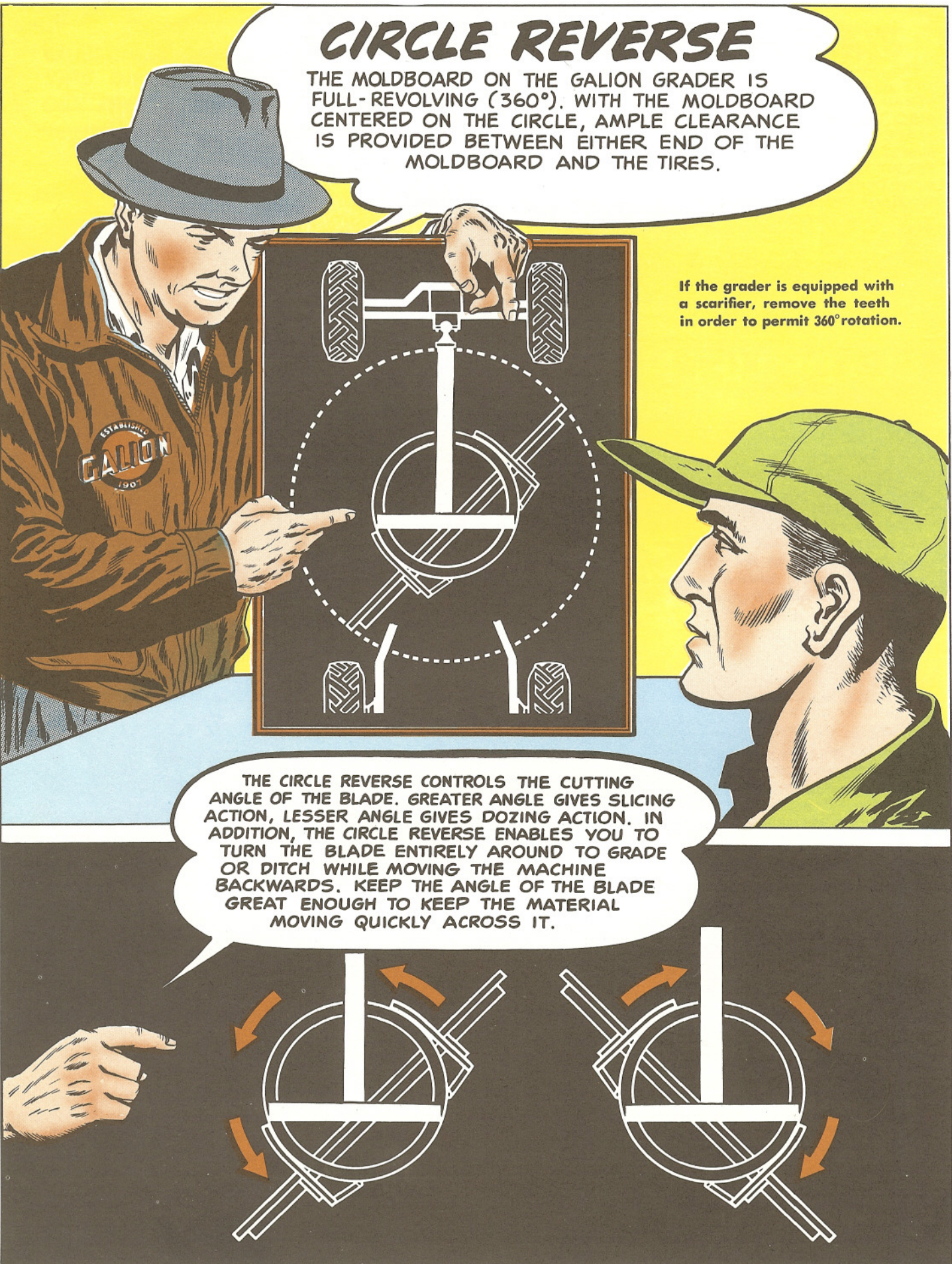


# CIRCLE REVERSE

THE MOLDBOARD ON THE GALION GRADER IS FULL-REVOLVING (360°). WITH THE MOLDBOARD CENTERED ON THE CIRCLE, AMPLE CLEARANCE IS PROVIDED BETWEEN EITHER END OF THE MOLDBOARD AND THE TIRES.

If the grader is equipped with a scarifier, remove the teeth in order to permit 360° rotation.

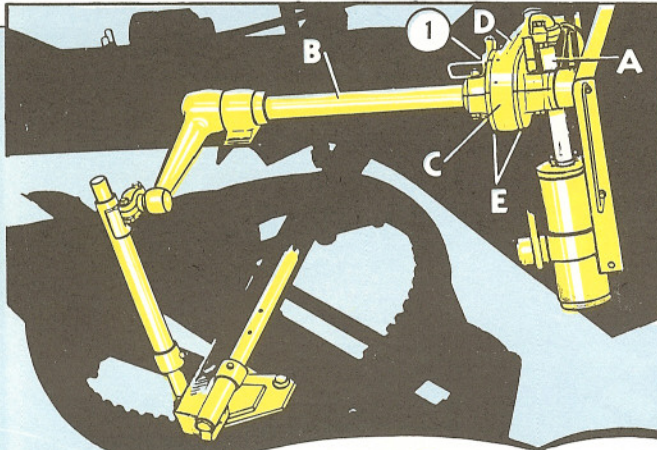
THE CIRCLE REVERSE CONTROLS THE CUTTING ANGLE OF THE BLADE. GREATER ANGLE GIVES SLICING ACTION, LESSER ANGLE GIVES DOZING ACTION. IN ADDITION, THE CIRCLE REVERSE ENABLES YOU TO TURN THE BLADE ENTIRELY AROUND TO GRADE OR DITCH WHILE MOVING THE MACHINE BACKWARDS. KEEP THE ANGLE OF THE BLADE GREAT ENOUGH TO KEEP THE MATERIAL MOVING QUICKLY ACROSS IT.



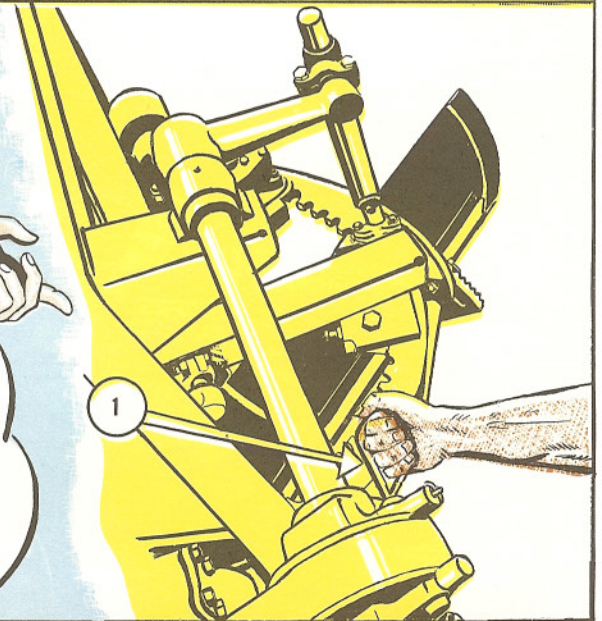
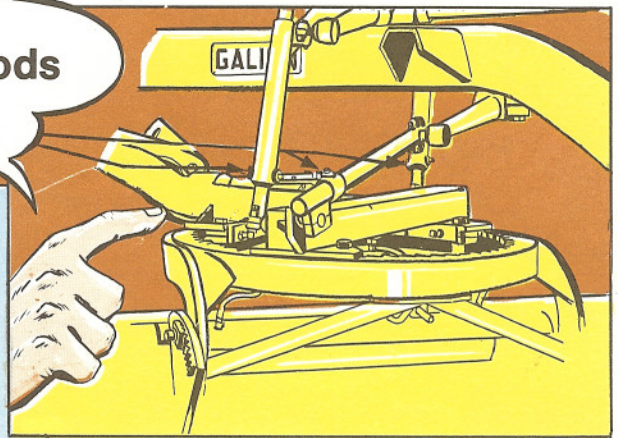
## Adjustment of telescoping hang rods and side shift linkage.

### ADJUSTMENT OF INDEXING TURRETS

Each moldboard lift cylinder piston rod (A) is coupled to the arm extending from its indexing turret on lift shaft (B). The turrets are so designed that the center section (C) forming the base of the arm (D) rotates between two stationary collars (E) which are keyed to the lift shaft (B) . . . . .



. . . . . When the locking pin (1) is in place, the turret center (C) is locked to the two collars (E), and any movement of the cylinder piston rod rotates the lift shaft (B). The locking pin (1) can be set in choice of three positions without leaving operator's cab. These positions are marked plainly on turret by punch marks. These pin position changes are made to obtain the various types of bank sloping positions.



## POSITIONING FOR BANK SLOPING

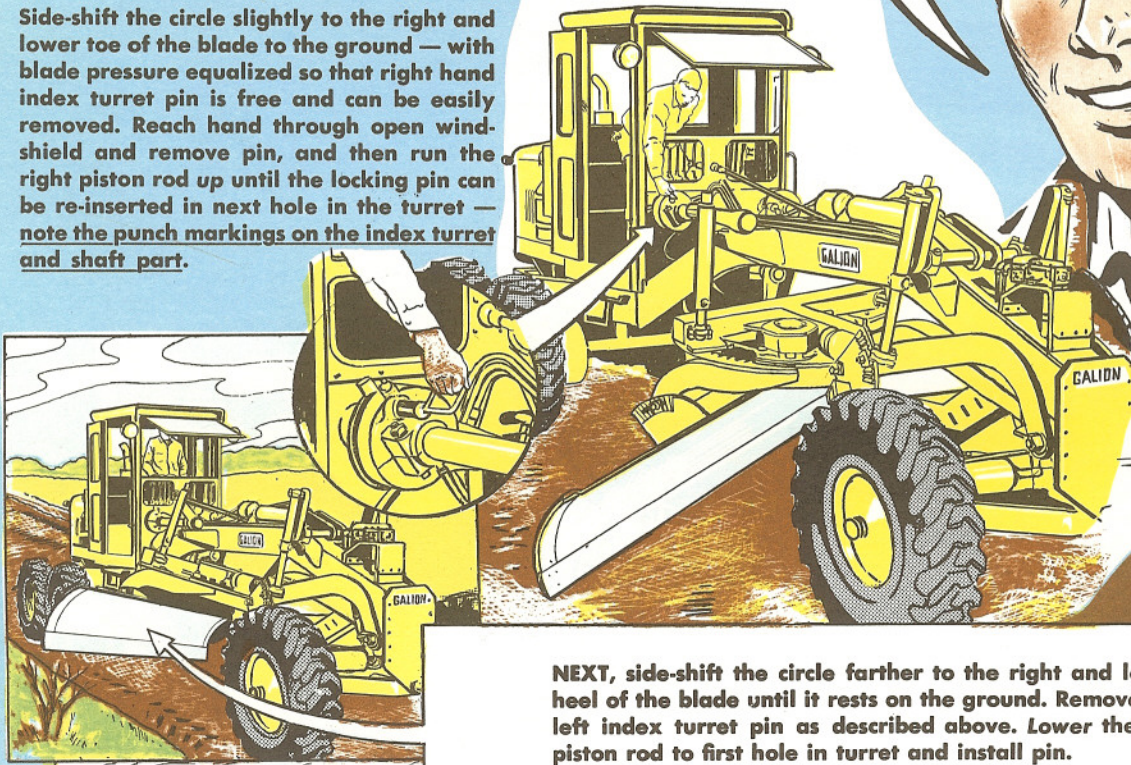
BANK SLOPING IS ANOTHER TYPE OF OPERATION ON WHICH THE GALION SHIFTABLE MOLDBOARD IS A BIG ADVANTAGE. THE EXTREME REACH, SO OFTEN REQUIRED, IS EASILY OBTAINED BY SHIFTING THE MOLDBOARD. YOU SIMPLY SLIDE THE MOLDBOARD TO THE BANK SLOPING REQUIREMENT --- QUICK, EASY AND WITHOUT LOSS OF TIME OR MOTION AND WITHOUT LEAVING THE OPERATOR'S PLATFORM.



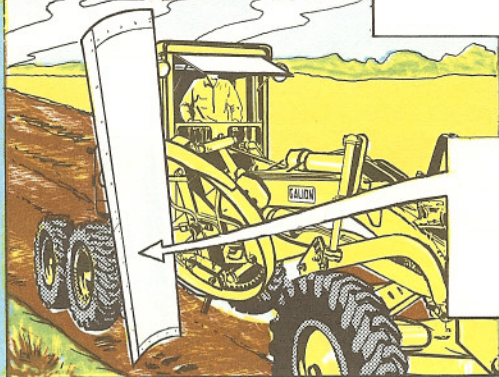
# LET'S TALK ABOUT POSITIONING MOLDBOARD FOR BANK SLOPING



Side-shift the circle slightly to the right and lower toe of the blade to the ground — with blade pressure equalized so that right hand index turret pin is free and can be easily removed. Reach hand through open windshield and remove pin, and then run the right piston rod up until the locking pin can be re-inserted in next hole in the turret — note the punch markings on the index turret and shaft part.



**NEXT**, side-shift the circle farther to the right and lower heel of the blade until it rests on the ground. Remove the left index turret pin as described above. Lower the left piston rod to first hole in turret and install pin.



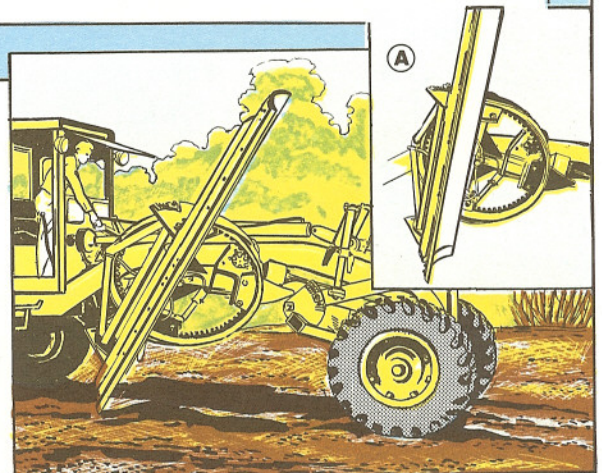
**NOW**, side-shift the circle to its extreme right position, raising the toe and lowering the heel of the blade at the same time. As shown in sketch, blade will be in normal bank sloping position.

Should you be required to cut a steeper slope (moldboard more vertical) proceed from the above position as follows: Put the toe of blade against bank. Remove right index turret pin. Then run the right piston rod up to last hole in index turret, install pin and raise toe of blade.

Reverse the above procedure to get the moldboard back to normal grading position.

**PLEASE NOTE** { All of the above blade positions are obtainable in a few minutes without the operator leaving the platform.

**NOTE:** Extreme bank sloping angles, illust. (A) may be attained by lengthening the telescoping lift arm.

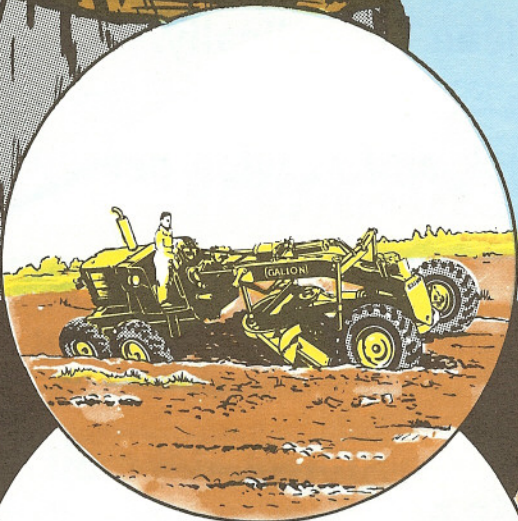
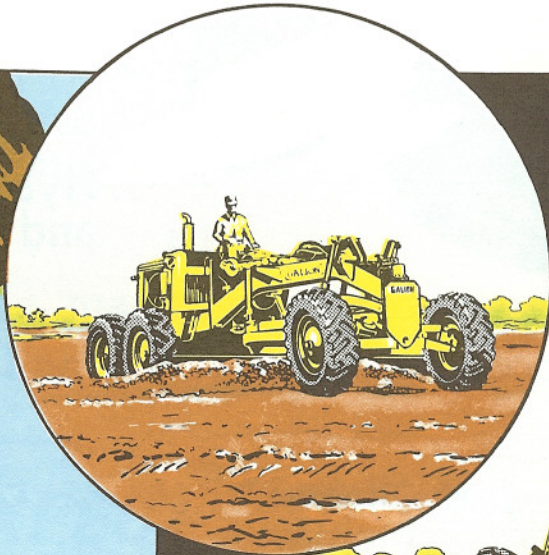


# PRACTICE — TO BE A BETTER OPERATOR

READ EVERY PAGE OF  
THIS BOOK CAREFULLY



A new operator should practice the use of the moldboard controls with the machine standing still. No actual work should be attempted before being thoroughly familiar with the operation of the controls and mechanism. The results obtained with a motor grader are in direct proportion to the ability of the operator.





**HERE ARE SOME TIPS THAT  
WILL KEEP YOUR  
GALION TOPS!**

1. Check air cleaner . . . perform service requirements.
2. Buy clean fuel and keep it clean.
3. Hydraulic System - check level and service filter.
4. Breathers . . . service and clean periodically.
5. Engine oil and filters . . . check and service per requirements.
6. Lubricate circle daily and clean before adjustment.
7. Batteries: Maintain proper electrolyte level, clean and grease terminals.
8. Exercise good housekeeping in cab and keep glass clean (replace if broken.)
9. Check the oil levels - if low, use proper lubricant to maintain correct level.

10. Radiator - check coolant level and keep radiator core free of dirt, dust and debris.
11. Clean and lubricate power slide moldboard rails.
12. Maintain recommended pressure in all tires.
13. Filler openings must be kept clean.
14. Don't use mismatched or unevenly worn tires.
15. If rims are not centered on the wheels, excessive wear and bounce will result.
16. To increase belt life, maintain correct tension.

***YOU CAN EXPECT  
THOUSANDS OF HOURS OF  
DEPENDABLE SERVICE***

from this motor grader provided it is operated properly and given an effective preventive maintenance program.

***REMEMBER - A safe dependable Galion  
Motor Grader is only as safe and  
dependable as you are.***





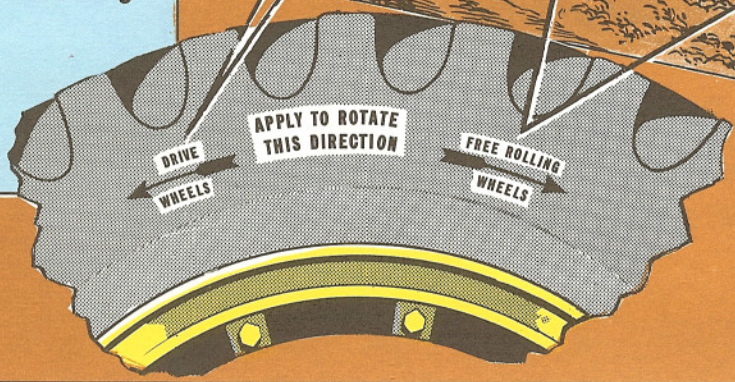
# OPERATING IN REVERSE

When conditions require reverse grading, the moldboard can be quickly reversed as illustrated by the sketch. It is necessary to turn the circle only approximately 70° to change the moldboard from forward to reverse position.

# CORRECT MOUNTING OF TIRES

The manner in which tires are mounted on a grader, in relation to the tread design, has a noticeable effect on traction and self cleaning.

If tires are mounted incorrectly on grader, loss of traction will result because tires will not be self cleaning.



Maintain the tire pressures recommended in your instruction manual.

Tires of the same outside diameter should always be used on the rear or drive wheels.

# CONTROLS

## T600B

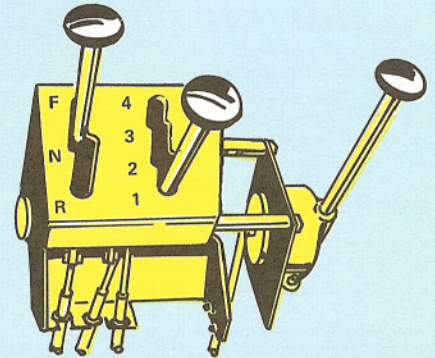
### SHIFTING TRANSMISSION

SHIFTING OF THE POWER SHIFT TRANSMISSION IS BY HYDRAULIC ENGAGEMENT OF THE TRANSMISSION CLUTCHES. IT IS SHIFTED BY TWO CONTROL LEVERS. THE LEVER NEAREST THE OPERATOR CONTROLS FORWARD AND REVERSE, WITH THE CENTER POSITION BEING NEUTRAL.

THE OTHER LEVER CONTROLS GEAR SELECTION: 1, 2, 3, OR 4.

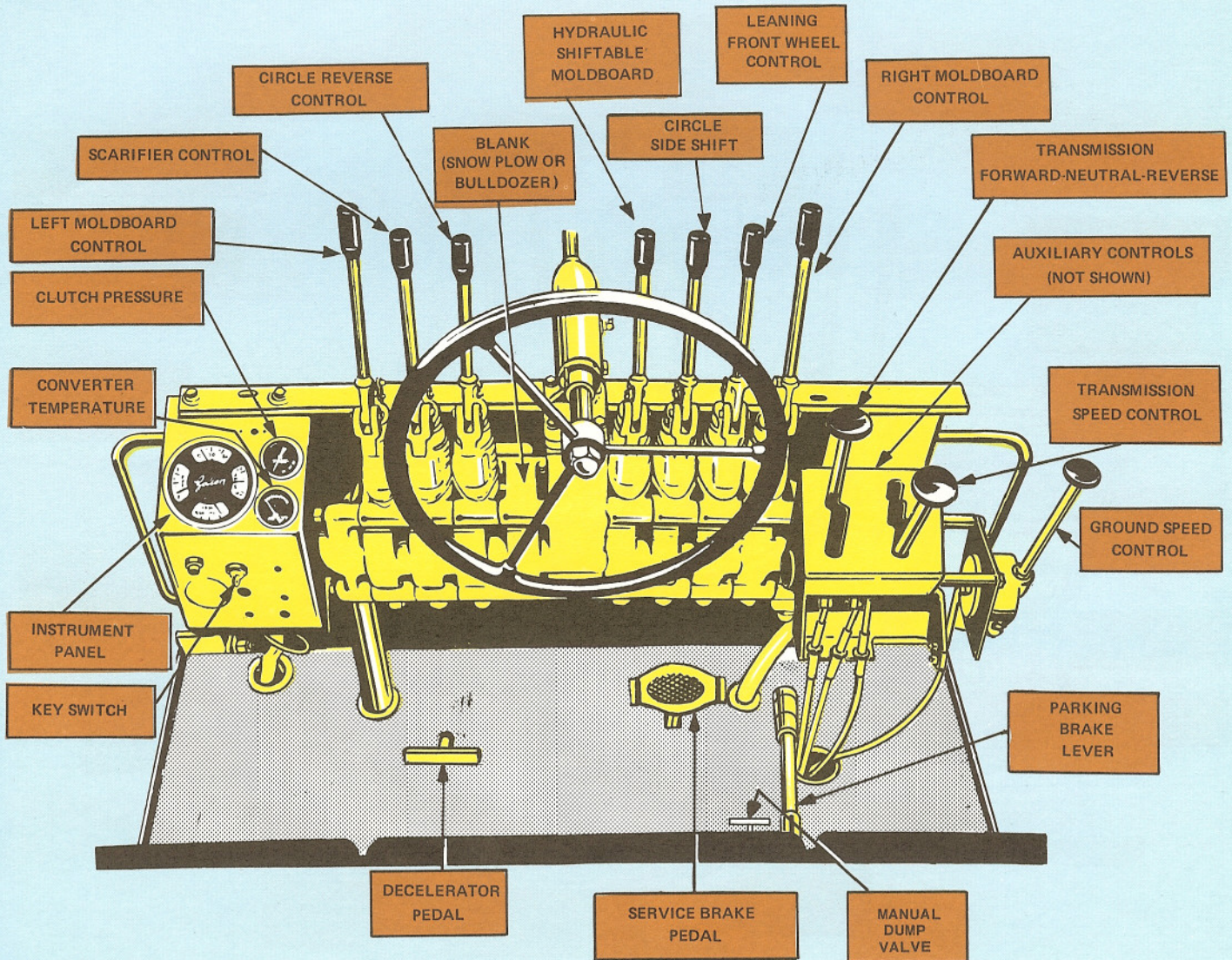
THE FORWARD-REVERSE LEVER MUST BE IN NEUTRAL (MID-POSITION) TO COMPLETE THE CRANKING MOTOR CIRCUIT WHEN STARTING THE ENGINE.

GENERALLY, WORKING SPEEDS ARE 1 AND 2 AND TRAVEL SPEEDS ARE 3 AND 4.



### SPEEDS, FORWARD & REVERSE

FIRST	1.2	-	3.2
SECOND	2.4	-	6.7
THIRD	4.3	-	12.0
FOURTH	8.5	-	21.0



# CONTROLS

## T400A, T500A, T500L

### SHIFTING TRANSMISSION

SHIFTING OF THE POWER SHIFT TRANSMISSION IS BY HYDRAULIC ENGAGEMENT OF THE TRANSMISSION CLUTCHES. IT IS SHIFTED BY THREE CONTROL LEVERS. THE LEVER NEAREST THE OPERATOR CONTROLS FORWARD-REVERSE, WITH THE CENTER POSITION NEUTRAL. THE CENTER LEVER CONTROLS GEAR SELECTION: 1 OR 3, 2 OR 4, DEPENDING ON THE POSITION OF THE RANGE LEVER. WHEN RANGE IS IN "LOW", THE GEAR SELECTOR LEVER SELECTS 1 OR 2; WHEN RANGE IS IN "HIGH", THE GEAR SELECTOR LEVER SELECTS EITHER 3 OR 4.

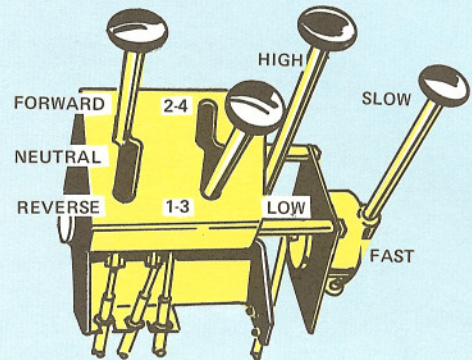
EACH OF THE THREE LEVERS SELECT NEUTRAL WHEN IN THE MID-POSITION. THE FORWARD-REVERSE LEVER MUST BE IN NEUTRAL TO COMPLETE THE CRANKING MOTOR CIRCUIT WHEN STARTING ENGINE.

GENERALLY, WORKING SPEEDS ARE 1 AND 2, AND ARE OBTAINED BY SHIFTING THE CENTER LEVER OF THE CONTROLS, WITH THE RANGE LEVER IN THE "LOW" POSITION.\*

TRAVEL SPEEDS ARE 3 AND 4 AND ARE OBTAINED BY SHIFTING THE CENTER LEVER OF THE CONTROLS, WITH THE RANGE LEVER IN THE "HIGH" POSITION.\*

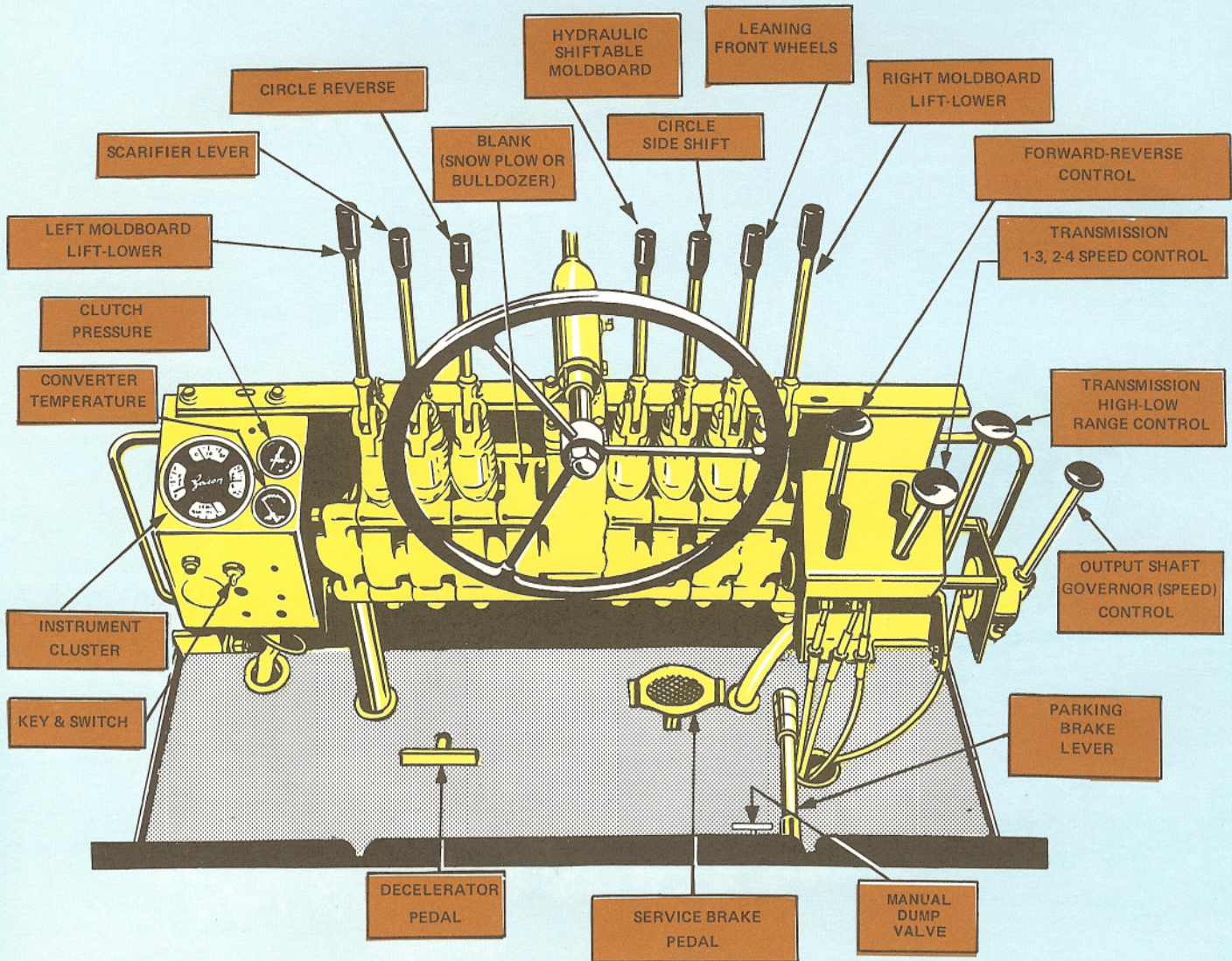
SOME OPERATIONS MAY REQUIRE HIGHER SPEEDS OF 3 OR 4, IF SO, THESE ARE ALSO WORKING SPEEDS WHEN NEEDED.

\* TO OBTAIN "HIGH" OR "LOW" RANGE, THE MACHINE SHOULD BE BROUGHT TO A COMPLETE STOP.



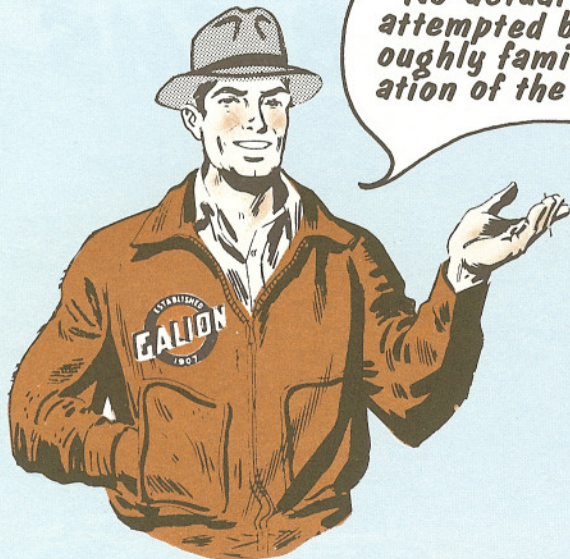
### SPEEDS, FORWARD & REVERSE

FIRST	1.0	-	2.9
SECOND	2.0	-	5.4
THIRD	3.8	-	10.5
FOURTH	7.2	-	19.8

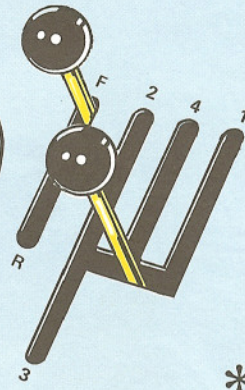


# CONTROLS

## 503L



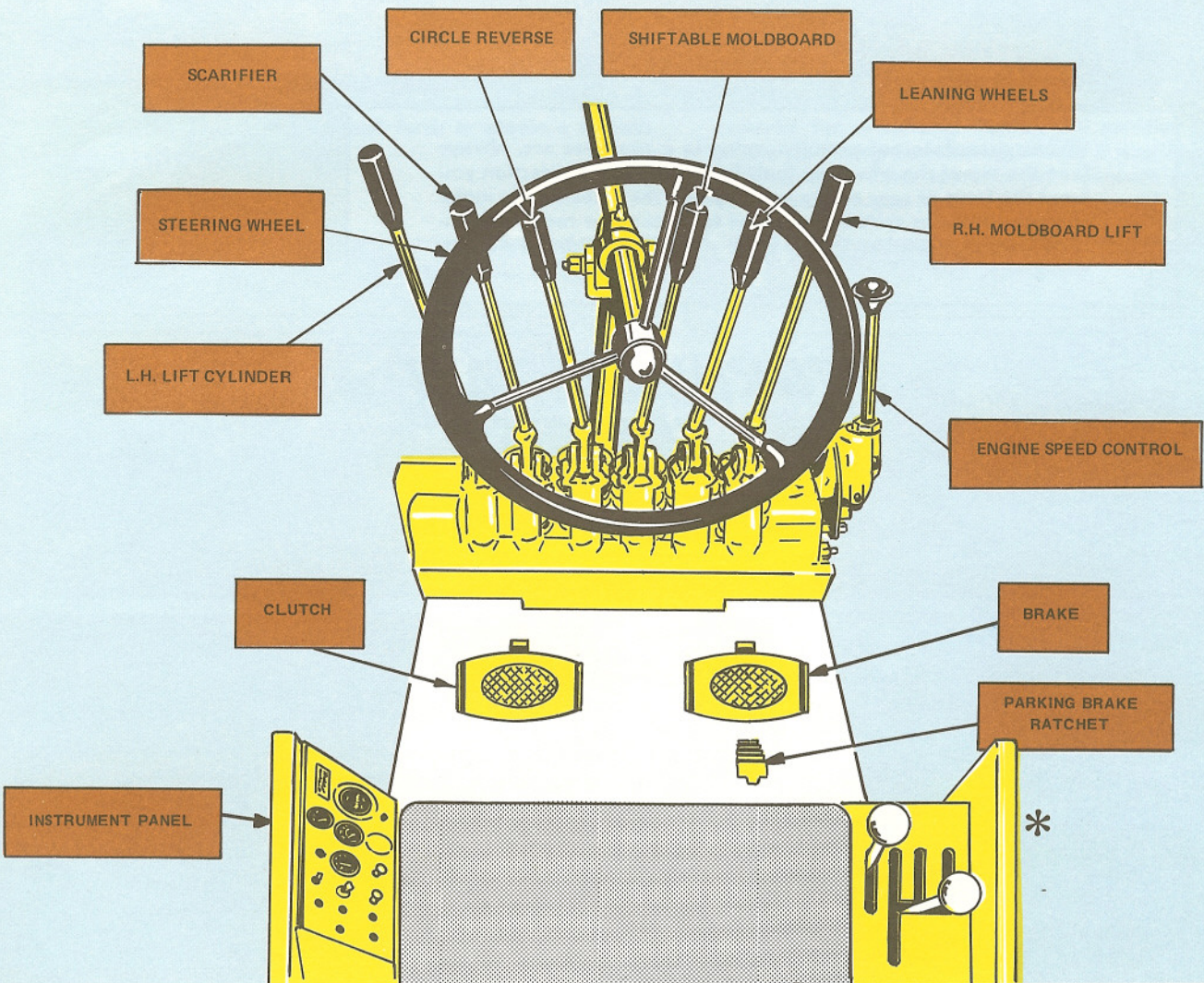
*No actual work should be attempted before being thoroughly familiar with the operation of the controls.*



### SPEEDS

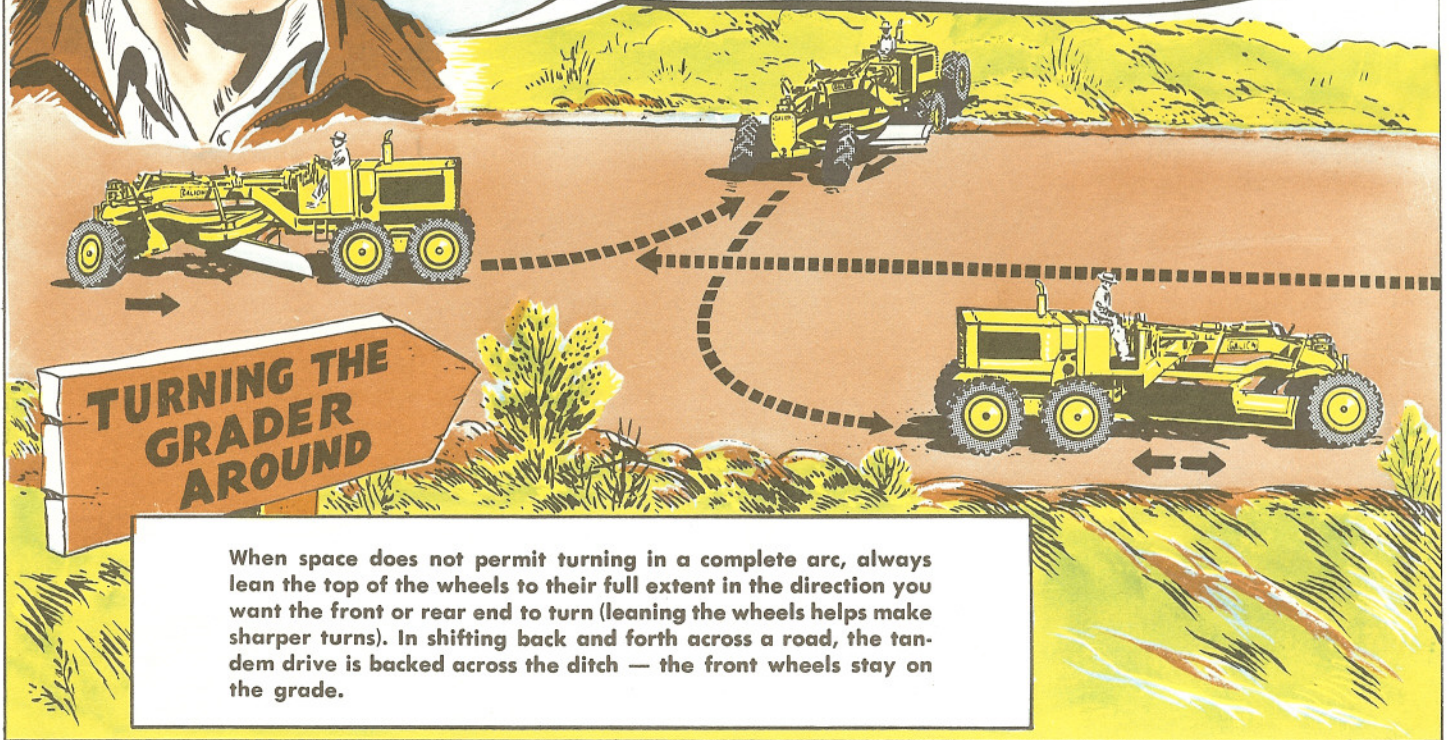
FORWARD & REVERSE

FIRST	.72	-	2.1
SECOND	1.5	-	4.2
THIRD	3.5	-	10.0
FOURTH	6.4	-	17.8





# MOTOR GRADER OPERATION ON SPECIFIC PROBLEMS

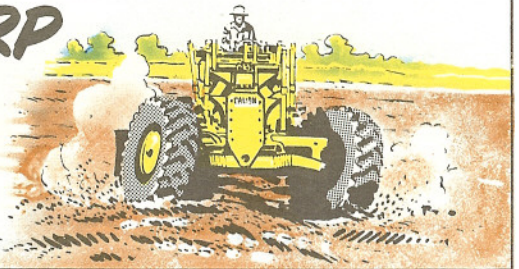


When space does not permit turning in a complete arc, always lean the top of the wheels to their full extent in the direction you want the front or rear end to turn (leaning the wheels helps make sharper turns). In shifting back and forth across a road, the tandem drive is backed across the ditch — the front wheels stay on the grade.



## TURNING SHARP CURVES

Always lean the top of the front wheels in the direction of the turn.



## ROAD MAINTENANCE

If working the right hand side of the road and windrowing to the center, the circle should be positioned well to the left to obtain a well balanced load. If a heavy cut is being made, the wheels should be leaned to the left. The moldboard should be turned at enough of an angle so that the material flows freely along the moldboard.

# MOLDBOARD PITCH ADJUSTMENTS

THE PITCH OF THE MOLDBOARD IS IMPORTANT TO GET GOOD ROLLING MOTION TO THE MATERIAL BEING MOVED.

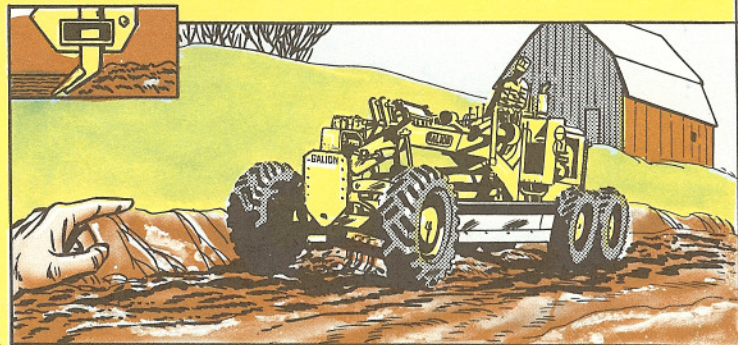
For cutting action, use backward pitch on the moldboard (1). For greater mixing and rolling action on the material being moved, the moldboard should be pitched to a more upright position (2). When spreading surface material, or maintaining, the moldboard should be tipped forward (3). This accomplishes a partial compaction of the surface material and assures filling all low spots. There are many controlling factors in the selection of blade pitch, such as type of operation, kind of material, depth of cut, speed of operation, etc. You should experiment with different pitch positions for best results.



## REWORKING ROUGH SURFACES

When the old surface being worked over is rough, a cut deep enough should be made to obtain a smooth base, after which the material is worked back and forth to obtain a smooth uniform surface.

When working over old oiled or blacktop surfaces, it is first necessary to use the scarifier to completely loosen the hard material for reworking. Setting the scarifier deep will increase the lifting and tearing action. It may be necessary to remove every other tooth to get adequate penetration on very hard surfaces.



## RESURFACING WITH OIL MIX



In blading oil mix, a medium speed such as third gear should be used. The moldboard should be pitched well forward and angled at about 30°. This position should give widest possible spread with maximum mixing action.

# DITCHING

## MARKING CUT

Ditch line stakes should be set according to the plans. The marking cut should be shallow so as to make it easier to establish a *straight* ditch line. This will help to maintain accurate alignment on succeeding heavier cuts.

For efficient ditching, the moldboard should be positioned at about a 45° angle — with the toe of the blade directly behind the front wheel. The blade should be angled enough to make the desired cut — with the heel of the blade raised enough to form the windrow either *inside* or *outside* the rear wheels. Remember to lean the top of the front wheels away from the ditch.

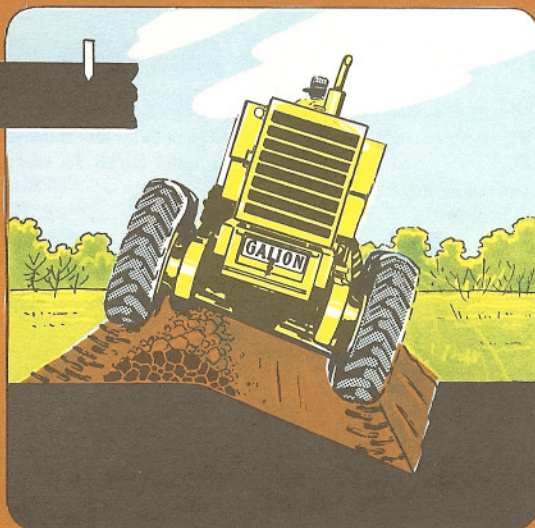


## ADDITIONAL PASSES

After the initial ditch line cut, make all remaining cuts count to the utmost! Apply as much pressure to the toe of the blade as the grader will smoothly handle in desired gear. Remember to keep the windrow either *inside* or *outside* the rear wheels.

### CASTING WINDROWS

After each heavy cut the material should be windrowed or spread toward the middle of the road — away from the ditching operation. Don't reduce traction efficiency and make uneven cuts by trying to operate over the soft, loose windrows of previous cuts. You will save time in the end by keeping all material from previous cuts well out of the way.

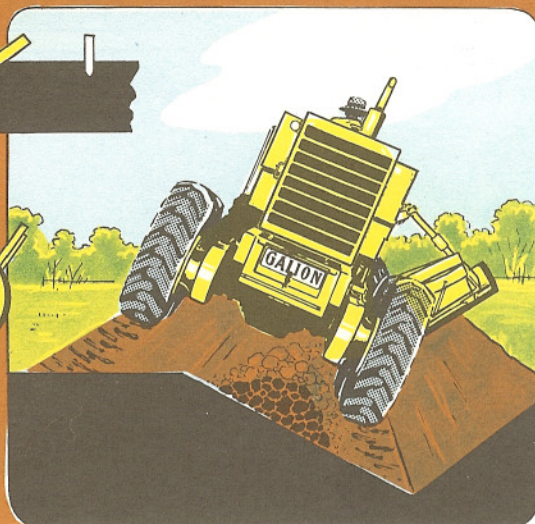
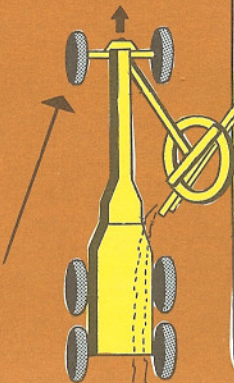


## BANK SLOPING

After the ditch is made, the bank should be given a sloping cut. Position the circle and blade with the heel resting at the bottom of slope, so that the material flows inside the rear right tandem wheels as illustrated.

The toe of the blade should be forward toward the right front wheel.

The tops of the front wheels should be leaned toward the bank (this is an exception to the usual rule).

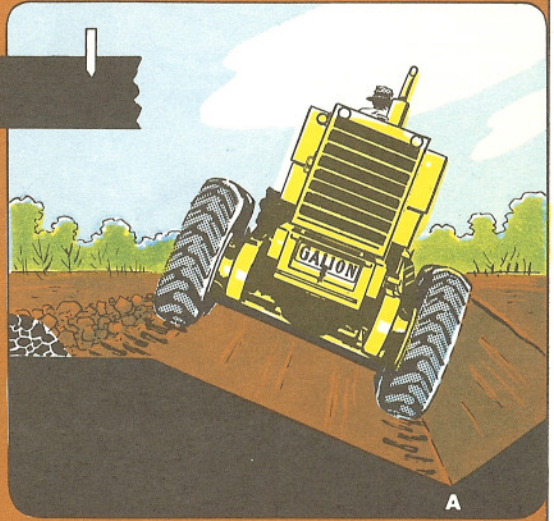
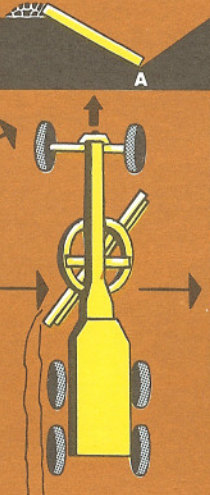


# DITCHING

## FINISHING THE INSIDE SLOPE

If the ditch is to have a plain "V" bottom (A) you now take a finishing pass on the inside slope to remove the material from the bank sloping operation.

If a flat bottom ditch is required, you proceed as follows



## CUTTING THE FLATBOTTOM

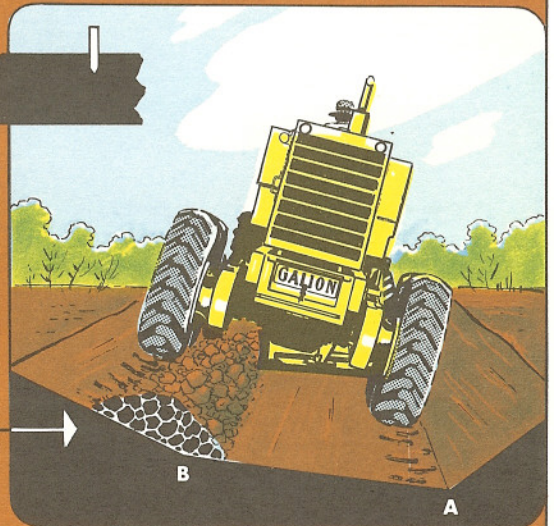
①



1. It is necessary to first cut another "V" ditch (B) on the inside slope — see cross section. The blade should be positioned to move the material out to the top of the road.

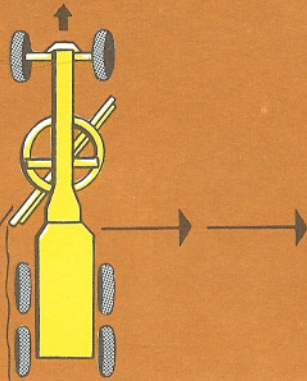
2. Next, the flat cut is made in the bottom of the ditch. For this operation the complete length of the blade is placed in the ditch — with the toe of the blade at the base of the bank slope and the heel at the base of the inside slope. This operation moves the dirt to the inside slope.

②



## MOVING WINDROW FROM SHOULDER

One or two final passes, as required, are now made on the inside slope to move the dirt up onto the road and outside the rear wheels. The shoulder is now finished, with any remaining material being windrowed or spread toward the center of the road.

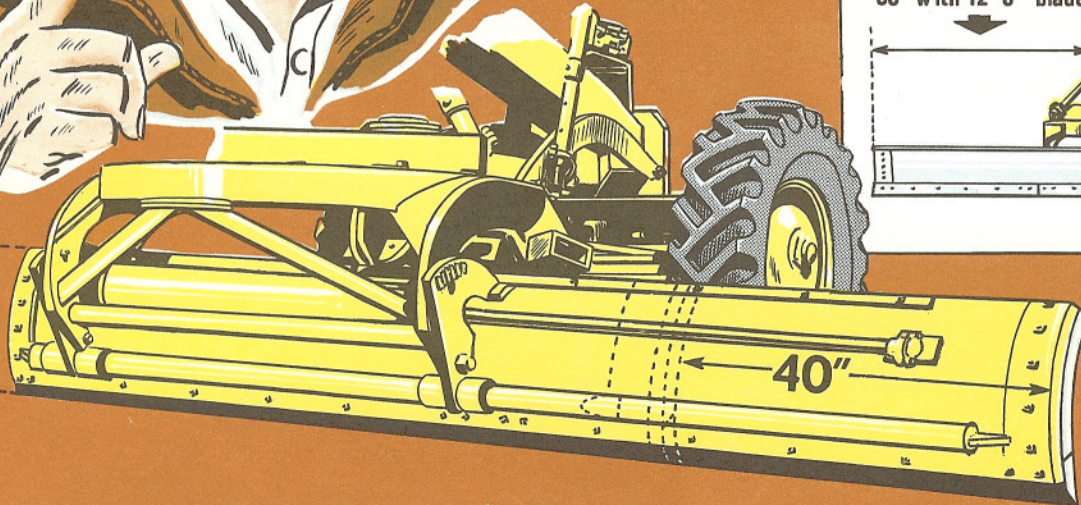
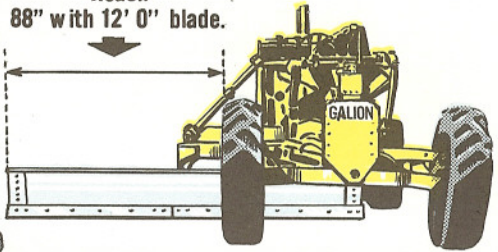


# HYDRAULIC SHIFTABLE MOLDBOARD

FOR A REAL "WORKING" ADVANTAGE--A WORKING ADVANTAGE THAT PAYS OFF ALL DAY LONG IN HUNDREDS OF OPERATIONS--YOU NEED THE GALION **HYDRAULIC SHIFTABLE MOLDBOARD**. TO SHOW HOW IT WORKS FOR YOU, I'LL DEMONSTRATE SOME SIMPLE OPERATIONS.



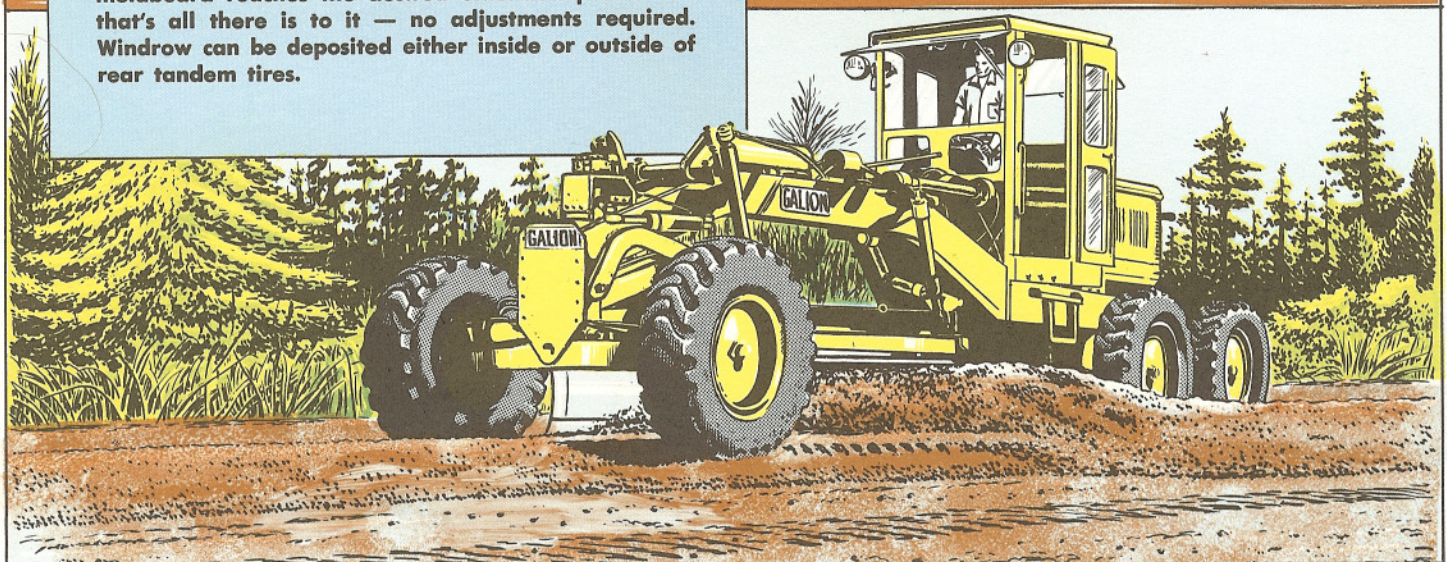
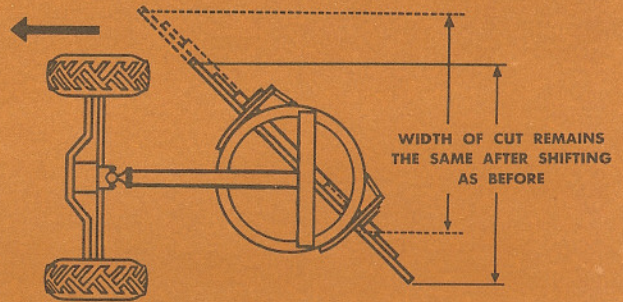
Reach  
88" with 12' 0" blade.



Hydraulically operated moldboard shift of 40" is controlled from the operator's platform.

## POSITIONING FOR WINDROWING

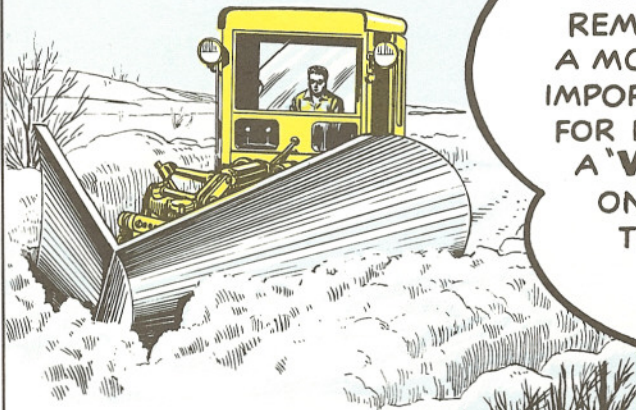
Suppose the operation calls for the toe of the blade to be placed forward and to the right of the front tire — simply turn the moldboard to the desired angle, then operate the moldboard shift control lever until the moldboard reaches the desired extended position — that's all there is to it — no adjustments required. Windrow can be deposited either inside or outside of rear tandem tires.



# SNOW REMOVAL



KNOWING HOW TO EFFICIENTLY REMOVE SNOW AND ICE WITH A MOTOR GRADER IS ANOTHER IMPORTANT JOB OF MOST OPERATORS. FOR EFFECTIVE SNOW REMOVAL WITH A 'V' PLOW ALLOW THE PLOW TO RIDE ON ITS RUNNERS AND OPERATE THE GRADER AT THE HIGHEST PRACTICABLE SPEED.



On fresh-fallen snow, the initial run should be made down the center of the road. From this opening path, further widening is done by working the snow back with one side of the plow. As in bank cutting, the front wheels should be leaned toward the snow bank for best results.

**RECOMMENDATION** — A method of "floating" the grader moldboard and blade is done by removing the two hang rod pins and placing them in the extreme top holes (male section). This permits the moldboard to float free in the hang rods so as to let it follow the contour of the road.

*This is a safety factor which helps prevent damage to the machine and injury to the operator.*



A further aid in clearing roads of snow is the use of a snow wing. Its use enables the grader to remain on the solid road surface and still clear the shoulders of snow piled up by the plow. Since its working height is adjustable over a wide range, the snow wing is especially effective in "pushing back" high drifts.



Weather and traffic conditions often result in a fall of snow being compacted into a layer of thick ice over the street. This is most easily removed by use of the regular grader blade — set at right angles to line of travel, pitching the moldboard well back so that the blade will be on a flatter plane for more "lifting" action.



# YOUR GALION MOTOR GRADER

IS THE MOST VERSATILE EARTH MOVING MACHINE BUILT. IT CAN ACTUALLY DO SCORES OF DIFFERENT JOBS AND VARIATIONS OF THE SAME JOBS. THE NUMBER OF USES TO WHICH YOU CAN PUT IT DEPENDS UPON HOW WELL YOU KNOW YOUR GRADER AND HOW EFFICIENT YOU CAN BECOME IN HANDLING IT. PRACTICE WILL MAKE YOU REALIZE HOW MANY DIFFICULT EARTH MOVING JOBS CAN BE **EASILY** DONE WITH YOUR GALION MOTOR GRADER.



## **Galion**

**DRESSER**

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