

CALIFORNIA

MASTER

MODEL PELLET MILL

OPERATING,
MAINTENANCE
and
PARTS
INFORMATION



CALIFORNIA PELLET MILL COMPANY

form 6741

FOREWARD

THIS BOOKLET CONTAINS OPERATING AND MAINTENANCE RECOMMENDATIONS WHICH WILL ENABLE YOU TO OBTAIN THE MOST SATISFACTORY PERFORMANCE FROM YOUR NEW CALIFORNIA MASTER MODEL PELLET MILL AND THE MINIMUM OPERATING COST.

CPM EQUIPMENT IS THE PRODUCT OF SKILLFUL ENGINEERING, PRECISION MANUFACTURING, AND THE HIGHEST QUALITY MATERIALS. THE DIRECTIONS GIVEN HEREIN ARE EXTRACTED FROM THE EXPERIENCES OF MANY OPERATORS. IT IS ONLY POSSIBLE TO BUILD EQUIPMENT CAPABLE OF GOOD PERFORMANCE. IN ORDER TO DELIVER THAT PERFORMANCE, ANY MACHINE NEEDS THE CO-OPERATION AND ATTENTION OF ALL THOSE WHO ARE RESPONSIBLE FOR ITS OPERATION.

WHILE THE LUBRICATION REQUIREMENTS GENERALLY ASSOCIATED WITH PELLET MILLS HAVE BEEN MINIMIZED, IT IS STILL IMPERATIVE THAT THE SIMPLE LUBRICATION INSTRUCTIONS FURNISHED BE FOLLOWED TO THE LETTER.

YOUR CALIFORNIA PELLET MILL WAS CAREFULLY INSPECTED BEFORE LEAVING THE FACTORY. HOWEVER, BEFORE PUTTING IT INTO OPERATION, CERTAIN PRELIMINARY CHECKS SHOULD BE CARRIED OUT TO ENSURE THAT THE OPERATION GETS OFF TO A GOOD START. READ THE OPERATING INSTRUCTIONS CAREFULLY BEFORE STARTING UP YOUR NEW PELLET MILL. BECOME FAMILIAR WITH THEM.

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MARCH 3, 1974

PARTS ORDERING INFORMATION**EF2181.5**

To order spare parts for your CPM equipment, please contact your CPM Sales Representative or our Customer Service Representatives at the CPM Company Sales offices as listed below.

When ordering parts, please include the following information:

1. Serial Number and Model Number of the Equipment for which parts are being ordered. The Serial Number is stamped on the Serial Number Nameplate located on your machine.
2. The Part Number(s) and Part Description(s) of the parts as furnished in this book.

CALIFORNIA PELLET MILL COMPANY SALES OFFICES**NORTH AND SOUTH AMERICAN HEADQUARTERS****U.S. and Canada Sales Office & Latin American Sales Office**

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Crawfordsville, Indiana 47933
Toll-free: 1 (800) 428-0846
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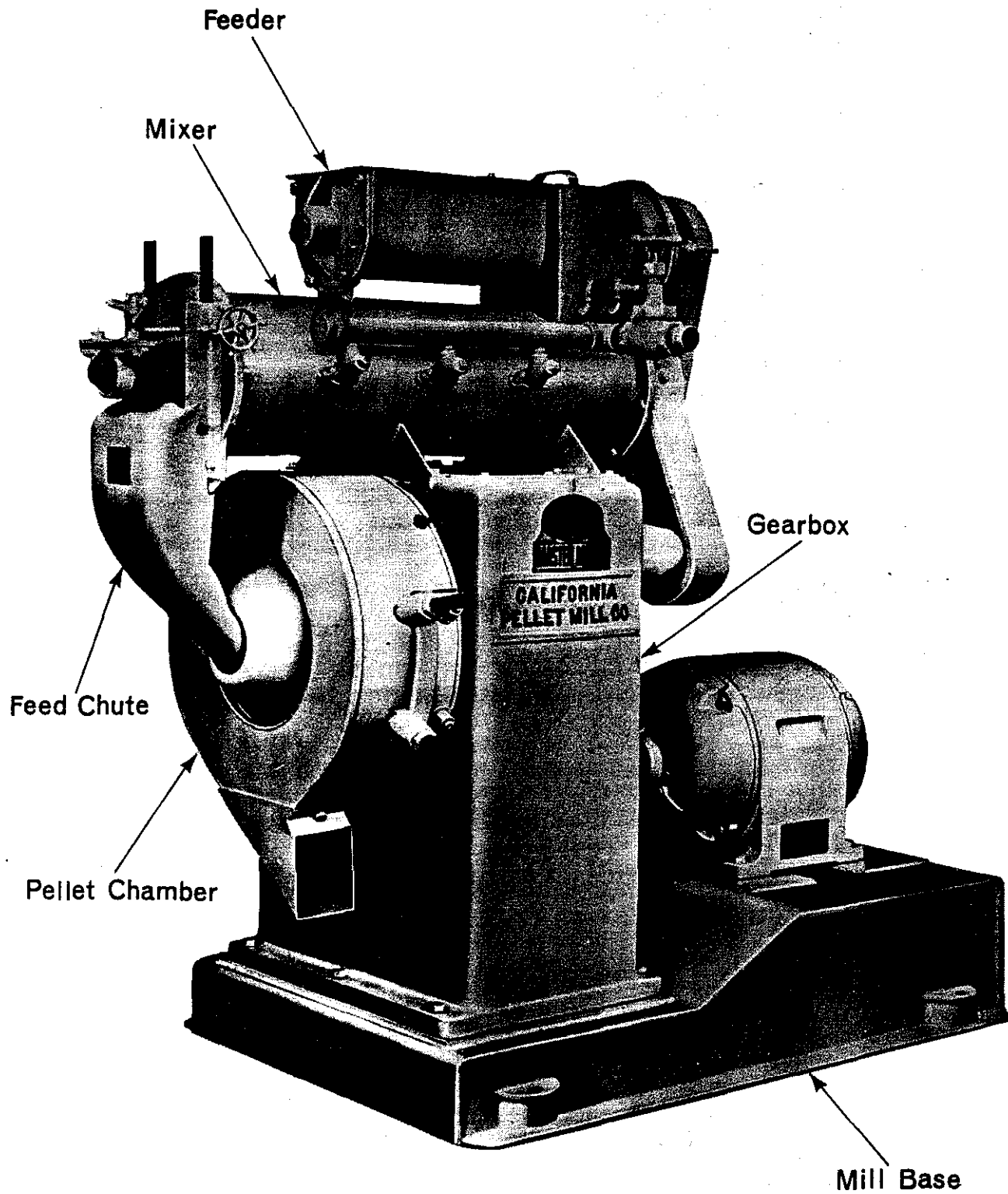
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*The operation in Germany is handled through German representatives and served directly through Amsterdam. Direct dialing is available at the Amsterdam location.



CALIFORNIA MASTER MODEL PELLET MILL

GENERAL INFORMATION

ELECTRICAL EQUIPMENT

ONLY FIRST QUALITY ELECTRICAL EQUIPMENT FROM NATIONALLY KNOWN MANUFACTURERS IS SUPPLIED WITH CALIFORNIA PELLET MILLS. THESE MANUFACTURERS FULLY GUARANTEE THEIR EQUIPMENT AND BACK IT UP WITH NATION-WIDE SERVICE AND REPAIR FACILITIES.

NOTICE - AT THE TIME OF INSTALLATION OF THE ELECTRICAL EQUIPMENT GREAT CARE SHOULD BE TAKEN TO BE SURE THAT ALL PUSH BUTTONS ARE LOCATED IN SUCH A POSITION THAT THE OPERATOR STARTING THE EQUIPMENT CAN SEE THE MACHINE AND THAT THE SWINGING DOOR, SPOUTS, ETC. ARE IN THEIR PROPER POSITION. THE PUSH BUTTON SHOULD ALSO BE LOCATED SO THAT ANYONE WORKING ON THE MACHINE CAN SEE THE PUSH BUTTON AND THUS REDUCE THE DANGER OF IT BEING STARTED IF ADJUSTMENTS ARE BEING MADE. THERE ARE READILY AVAILABLE ON THE MARKET PUSH BUTTON SWITCHES WHICH ARE EQUIPPED WITH A LOCKING DEVICE WHICH VERY ADEQUATELY CAN PREVENT ACCIDENTAL START-UPS AND INJURY.

ALL PUSH BUTTON STARTERS IN A FEED MILL SHOULD BE LOCATED WITH THESE PRECAUTIONS IN MIND.

CAPACITY AND DIE SELECTION

WHEN YOUR NEW DIE HAS BEEN RUN IN, CHECK THE CAPACITY AND THE PELLET QUALITY. IF EITHER IS NOT UP TO STANDARD AND ALL OTHER OPERATIONAL FACTORS ARE CORRECT, YOU MAY HAVE THE WRONG DIE FOR YOUR PRODUCT.

IF THIS IS THE CASE, IT WILL BE NECESSARY TO RE-EVALUATE YOUR DIE SPECIFICATIONS OR FORMULATION. NO SINGLE DIE DESIGN CAN GIVE MAXIMUM EFFICIENCY AND THE BEST QUALITY PELLET ON ALL PRODUCTS. IN ADDITION TO DIE BLANK THICKNESS, IT IS NECESSARY TO CONSIDER HOLE SPECIFICATIONS, SUCH AS ENTRY TAPER, DEPTH OF TAPER, ANGLE OF TAPER, LENGTH OF PELLETING HOLE, ANGLE AND DEPTH OF RELIEF TAPER.

THE ADDITION OF MOISTURE AND HEAT (STEAM) TO MOST FEEDS HELPS PLASTICIZE OR GELATINIZE THE INGREDIENTS, PERMITTING HIGHER CAPACITY ON THINNER DIES. (SEE PAGE 4)

OFTEN THE PELLET HARDNESS CAN BE IMPROVED ON A GIVEN DIE BY REDUCING THE PARTICLE SIZE OF THE MATERIAL. (SEE PAGE 4) BE SURE THE DIE YOU ARE USING IS SUITED TO THE MATERIAL YOU ARE PELLETING. IF UNUSUAL DIFFICULTIES ARE ENCOUNTERED, CONSULT THE CALIFORNIA PELLET MILL COMPANY OR THE CPM SALES REPRESENTATIVE NEAREST YOU.

TAKE ADVANTAGE OF YOUR AUXILIARY EQUIPMENT

ALTHOUGH IT IS POSSIBLE TO PRODUCE A HARD, GLOSSY PELLET WITH MOST MATERIALS DIRECTLY OFF THE PELLET MILL, THIS IS A HIGHLY INEFFICIENT OPERATION. (THE LARGE MASSES INVOLVED IN RANGE CUBES (1/2" THROUGH 1-1/4"), HOWEVER, DO REQUIRE EXTREME DIE THICKNESSES RESULTING IN HARD, GLOSSY CUBE SURFACES). THE PROPER CONDITIONING OF THE PELLETS FROM THE PELLET MILL CAN GREATLY ENHANCE THE EFFICIENCY OF THE PELLETING INSTALLATION.

THE EFFECTS OF GRINDING BEFORE PELLETING

EXPERIENCE HAS SHOWN THAT THE PARTICLE SIZE OF FEED INGREDIENTS MUST BE REDUCED FOR EFFICIENT PELLETING. IF THIS IS NOT DONE EXTERNALLY, THE MILLING AND GRINDING ACTION ON THE FEED BY THE DIE AND THE ROLLERS WILL RESULT IN UNDUE DIE AND ROLLER WEAR, WILL CONSUME POWER AND REDUCE CAPACITY. GRINDING WITH A HAMMERMILL BEFORE PELLETING WILL REDUCE THE AMOUNT OF WORK THE PELLET MILL MUST DO. THIS MEANS GREATER CAPACITIES AND LESS OPERATING EXPENSE.

IT IS ALWAYS DESIRABLE TO GRIND ALL INGREDIENTS TO MAKE A COMBINATION OF MEDIUM AND FINE GRINDS, AVOIDING COARSE GRINDS. THIS INCREASES THE BULK DENSITY OF THE MIX, WHICH WILL INCREASE PELLET CAPACITY RATE. THE INCREASED NUMBER OF PARTICLES EXPOSED TO THE STEAM IN THE PELLET MILL MIXER WILL IMPROVE MEAL LUBRICATION, HEAT AND MOISTURE PENETRATION, AND BINDING QUALITIES OF THE MEAL FOR GREATER CAPACITY RATE, DURABLE PELLETS AND REDUCED WEAR ON THE DIE.

THE EFFECTS OF FORMULATION

SLIGHT VARIATIONS IN THE OIL CONTENT (EXPELLER MEAL VS. SOLVENT EXTRACTED, ETC.) CAN DRASTICALLY CHANGE THE PELLETABILITY OF A FORMULA AND FREE FATTY ACIDS OR ABRASIVE MATERIALS WILL SHORTEN DIE LIFE OUT OF ALL PROPORTION TO THE AMOUNT PELLETED. CAREFUL SELECTION OF INGREDIENTS AND SOMETIMES SMALL ADJUSTMENTS IN FORMULATION CAN PRODUCE GREAT DIVIDENDS IN REDUCED OPERATING COSTS.

THE EFFECTS OF MOISTURE

THERE ARE DEFINITE LIMITS TO THE AMOUNT OF MOISTURE WHICH CAN BE TOLERATED IN THE FEED AND STILL SUCCESSFULLY PELLET IT. IN THE GENERAL RUN OF MIXED FEEDS, PARTICULARLY THOSE COMPLETE LOW PROTEIN FEEDS WHOSE GRAIN COMPOSITION IS 50% OR MORE OF THE MIX, TOTAL MOISTURE CAN RUN BETWEEN 16% AND 17%. IN CERTAIN HIGH FIBER FEEDS OR HIGH NATURAL PROTEIN SUPPLEMENTS OR CONCENTRATES, MOISTURE TOLERANCE IS LOWER AND IS RESTRICTED TO 13% OR 14%.

THE EFFECTS OF HEAT

THE ADDITION OF HEAT TO THE PELLETING MATERIAL HAS PROVEN TO BE VERY ADVANTAGEOUS WITH MOST PRODUCTS, AND INJECTING STEAM DIRECTLY INTO THE MATERIAL IS THE MOST EFFICIENT METHOD OF DOING THIS. THIS IS THE METHOD WE HIGHLY RECOMMEND. CAUTION: HIGH UREA (OR HIGH UREA-MOLASSES) FORMULAE (UREA PERCENTAGES OF 5% TO 30%) OR HEAT SENSITIVE ADDITIVES SUCH AS SUGARS, DRY MILK POWDER OR WHEY, CANNOT TOLERATE NORMAL STEAM ADDITIONS.

IT SHOULD BE BORNE IN MIND ALSO THAT EACH POUND OF STEAM CONDENSED (OR 1,000 BTU ADDED TO THE FEED) ALSO ADDS ONE POUND OF WATER, SO FOR MATERIAL WITH AN INITIALLY HIGH MOISTURE CONTENT THE TOTAL ALLOWABLE MOISTURE CONTENT WILL BE EXCEEDED BEFORE SUFFICIENT HEAT IS ADDED TO PRODUCE THE MAXIMUM BENEFIT.

FURTHERMORE, IT IS ONLY POSSIBLE TO UTILIZE OPTIMUM CONDITIONING (HIGH HEAT AND MOISTURE) WITH RELATIVELY THIN DIES, SINCE THE MATERIAL IS NOW PLASTIC ENOUGH TO SQUEEZE OUT FROM UNDER THE ROLLERS RATHER THAN THROUGH THE HOLES IN A THICK DIE.

THE EFFECTS OF COOLING

TO PREVENT SPOILAGE OR DETERIORATION IN STORAGE, IT IS NECESSARY TO COOL AND DRY THE PELLETS AFTER LEAVING THE PELLET MILL. A COOLER OF REQUIRED SIZE, MAINTAINED AT PEAK OPERATING EFFICIENCY, CAN BRING THE PELLET TEMPERATURE FROM THE 150° - 200° AT WHICH THEY LEAVE THE PELLET MILL TO WITHIN A FEW DEGREES OF THE AMBIENT AIR TEMPERATURE. PART OF THIS COOLING IS ACCOMPLISHED BY THE EVAPORATION OF MOISTURE OFF THE SURFACE OF THE PELLET, HENCE DRYING IS ALSO ACCOMPLISHED. THE PELLETING PROCESS, THEREFORE, IS NOT COMPLETE UNTIL THE PELLETS HAVE PASSED THROUGH THE COOLER. ADJUST THE PELLET MILL SO THAT THE PRODUCT YOU WANT IS THE ONE YOU GET OFF THE COOLER.

ROUGH HANDLING OF THE PELLETS BETWEEN THE PELLET MILL AND THE COOLER (ELEVATORS, SCREW CONVEYORS, ETC.) SHOULD BE AVOIDED SINCE THIS WILL PRODUCE EXCESS FINES AND, THEREFORE, LOWER PRODUCTION RATE AND INCREASED COST OF OPERATION PER TON OF PELLETS.

CALIFORNIA MASTER MODEL PELLET MILL

START UP INSTRUCTIONS

BEFORE STARTING A NEW PELLET MILL:

REMOVE FEED CHUTE, PELLET CHAMBER AND FEED CONE, SET KNIVES OR BREAKER BAR AWAY FROM DIE BY THE LENGTH OF PELLET DESIRED. (THE KNIVES ARE ADJUSTED AS DESCRIBED UNDER "CUTTING KNIVES.") INSPECT THE MIXER, FEEDER AND THE DIE CAVITY TO SEE THAT NO SCRAP IRON OR FOREIGN MATERIAL HAS ACCUMULATED THERE. CHECK DIE CLAMP CAP SCREWS TO SEE THAT THEY ARE TIGHT (50 FT. LBS. TORQUE). TURN THE MACHINE BY HAND TO INSURE THAT IT IS NOT JAMMED. SET THE FEEDER DRIVE CONTROL AT "STOP" AND CLOSE THE MIXER DISCHARGE GATE.

NOW START THE MAIN DRIVE MOTOR:

CHECK ROTATION OF DIE. IT MUST ROTATE IN A CLOCKWISE DIRECTION WHEN VIEWED FROM THE FRONT. ADJUST ROLLERS ACCORDING TO INSTRUCTIONS UNDER "ROLLERS." BOTH ROLLERS SHOULD TURN, BEING DRIVEN BY A LIGHT CONTACT WITH THE SURFACE OF THE ROTATING DIE. BE SURE THAT ALL PARTS OF PELLET MILL RUN FREELY. SHUT OFF MOTOR. DO NOT PERMIT MILL TO RUN UNNECESSARILY WITHOUT FEED. TO DO SO WILL CAUSE EXCESSIVE WEAR ON DIE AND ROLLERS BECAUSE OF METAL TO METAL CONTACT.

REINSTALL FEED CONE AND PELLET CHAMBER. BE SURE THERE IS AMPLE FEED IN THE BIN ABOVE THE FEEDER AND THAT ITS FLOW WILL BE EVEN AND CONTINUOUS. DRAIN ANY CONDENSATION FROM THE STEAM LINE SO THAT NO SLUGS OF WATER WILL ENTER THE MIXER. BEFORE REINSTALLING THE FEED CHUTE, RUN A REASONABLE QUANTITY OF FEED THROUGH THE SYSTEM TO CLEAN OUT ANY SCRAP IRON THAT MIGHT HAVE ACCUMULATED DURING INSTALLATION. TRAMP METAL IN THE FEED IS VERY INJURIOUS TO THE DIE AND ROLLERS AS WELL AS THE PELLET MILL IN GENERAL.

YOU ARE NOW READY TO START PELLETING:

THE FOLLOWING STEPS WILL AID THE OPERATOR IN STARTING A NEW PELLET MILL OR A PELLET MILL ON WHICH A NEW DIE HAS JUST BEEN MOUNTED.

OPEN MIXER DISCHARGE GATE HALF WAY. THIS PERMITS THE MIXER TO OPERATE PARTIALLY FULL AND DISCHARGE MORE UNIFORMLY. START MOTOR. OPEN FEEDER DRIVE CONTROL TO FIVE OR TEN GRADUATIONS. THE FEEDER SCREW WILL TURN INTERMITTENTLY TO PERMIT A SLOW FEED OF MATERIAL INTO THE MIXER. WHEN THE LEVEL OF THE MATERIAL REACHES THE TOP OF THE DISCHARGE GATE, IT WILL FLOW EVENLY INTO THE FEED CONE AND DIE.

IF A DIE WITH HOLES SMALLER THAN 3/16" IS BEING STARTED, DO NOT ADD WATER OR STEAM AT THIS POINT, BUT LET THE DRY MATERIAL FLOW INTO THE DIE SLOWLY UNTIL THE HOLES ARE FILLED. INCREASE THE RATE OF FEED A FEW GRADUATIONS, DEPENDING ON HOW THE DIE IS TAKING THE FEED. WATCH THE LOAD INDICATOR (AMMETER). AT THIS POINT, THE NEEDLE SHOULD BE APPROACHING NORMAL LOAD. IF NOT, INCREASE THE FEED GRADUALLY UNTIL IT DOES. OPEN THE STEAM VALVE SLIGHTLY UNTIL THE NEEDLE ON THE AMMETER INDICATES A DROP IN LOAD. BEAR IN MIND THAT THE ADDED STEAM WILL NOT IMMEDIATELY AFFECT THE AMMETER SINCE IT WILL BE SEVERAL SECONDS BEFORE THE CONDITIONED FEED IS DELIVERED TO THE DIE.

INCREASE THE FEED UNTIL THE NEEDLE ON THE AMMETER AGAIN SHOWS NORMAL LOAD, THEN ONCE AGAIN INCREASE THE AMOUNT OF STEAM BEING INTRODUCED INTO THE FEED. PROCEED IN THIS MANNER UNTIL THE PELLETS, WHEN ROLLED BETWEEN THUMB AND FOREFINGER, HAVE THE CONSISTENCY OF GUM OR PUTTY. UNTIL THE STEAM SYSTEM AND CONDITIONER ARE THOROUGHLY WARMED UP, EXCESSIVE CONDENSATION MAY CAUSE THE FEED TO GET TOO WET BEFORE THE DESIRED TEMPERATURE IS REACHED.

IF TOO MUCH MOISTURE IS ADDED TO THE FEED, OR THE DIE IS TOO THICK FOR THE FORMULA, THE MATERIAL WILL SQUEEZE OUT FROM UNDER THE ROLLERS INSTEAD OF THROUGH THE HOLES AND "CHOKE UP." IF THIS HAPPENS, SHUT OFF THE STEAM AND THE PELLET MILL, CLEAN OUT THE DIE CAVITY AND START OVER AGAIN WITH DRY FEED. REMEMBER THE FINAL SETTING ON THE STEAM VALVE AND FEEDER DRIVE CONTROL FOR SUBSEQUENT OPERATION. THESE SETTINGS WILL VARY GREATLY FOR DIFFERENT FEEDS. INITIAL MOISTURE, OIL AND FIBER CONTENT WILL ALL AFFECT THE SETTINGS ON THE FEEDER DRIVE, AS WELL AS THE AMOUNT OF STEAM WHICH CAN BE USED.

WHEN STARTING A PELLET MILL AFTER A SHUT-DOWN, ONE SHOULD NOT ATTEMPT TO IMMEDIATELY START THE PELLET MILL AT THE SAME SETTING AT WHICH IT WAS OPERATING WHEN IT WAS SHUT DOWN. AS THE PELLETS COOL IN THE DIE, THEY BECOME TIGHTLY BONDED IN THE HOLES. CONSIDERABLE PRESSURE IS REQUIRED TO ONCE AGAIN GET THE MATERIAL IN MOTION THROUGH THE DIE. THE MILL SHOULD ALWAYS BE STARTED WITH A RELATIVELY LOW FEED. THE FEED AND STEAM CAN BE INCREASED AS RAPIDLY AS INDICATED BY THE AMMETER. THERE IS NO SUBSTITUTE FOR EXPERIENCE IN OPERATING A PELLET MILL. AN EXPERIENCED OPERATOR CAN GET HIS PELLET MILL UP TO MAXIMUM CAPACITY IN A MATTER OF A FEW MINUTES AND WITH VERY LITTLE EFFORT.

DO NOT CROWD A NEW DIE. GIVE IT A CHANCE TO WARM UP AND WEAR IN BEFORE TRYING TO OBTAIN FULL CAPACITY.

YOUR CALIFORNIA PELLET MILL DIE HAS BEEN CAREFULLY MACHINED AND HIGHLY POLISHED AT THE FACTORY. HOWEVER, ACTUAL USE WITH MOST FEEDS WILL PRODUCE AN EVEN HIGHER POLISH THAN IS POSSIBLE IN THE MANUFACTURING PROCESS. FOR THIS REASON, MAXIMUM PRODUCTION WILL USUALLY NOT BE OBTAINED FROM A DIE UNTIL IT HAS HAD SEVERAL HOURS OF OPERATION.

IF A DIE WITH HOLES 3/16" OR LARGER IS BEING STARTED, USE AN EXCESS OF STEAM. IT IS EASIER TO FILL THE HOLES WITH MOIST MASH. THE FIRST PELLETS WILL BE TOO SOFT AND MUSHY. THIS IS CORRECTED BY SLOWLY INCREASING THE AMOUNT OF DRY MATERIALS UNTIL THE PELLETS BECOME FIRM. DO NOT RUSH THIS OPERATION. THE DIE MUST HAVE TIME TO WARM UP AND IF THE MATERIAL IS DRIED DOWN TOO QUICKLY THE HOLES IN THE DIE MAY BECOME PLUGGED.

AFTER THE DIE IS WARMED AND THE PELLETS ARE FIRM, INCREASE THE OUTPUT OF PELLETS IN THE SAME MANNER AS DESCRIBED ABOVE FOR SMALL HOLE DIES.

WITH SOME MATERIALS, WHEN STARTING A LARGE HOLE DIE (1/2" OR LARGER), IT IS SOMETIMES

DIFFICULT, EVEN WITH EXTREMELY WET MASH, TO FILL THE DIE UP AND START PELLETING. IN THIS CASE, TIME AND EFFORT CAN BE SAVED BY WRAPPING THE OUTSIDE OF THE DIE WITH SEVERAL TURNS OF GUMMED TAPE, OR EVEN A LAYER OF HEAVY PAPER BOUND WITH WIRE. THIS WILL CAUSE THE HOLES TO IMMEDIATELY BE FILLED WITH COMPRESSED MATERIAL. AS SOON AS THE PELLETS START FORMING, THE PAPER WILL BE TORN AWAY AND MAY BE RECOVERED AT THE PELLET DISCHARGE. IN THE EVENT THAT WIRE IS USED, IT MAY BE NECESSARY TO STOP THE MACHINE TO REMOVE THE WIRE.

AGAIN, AFTER THE DIE IS WARMED AND THE PELLETS ARE FIRM, INCREASE THE OUTPUT OF PELLETS IN THE SAME MANNER AS DESCRIBED ABOVE FOR SMALL HOLE DIES.

THE ABOVE OUTLINED PROCEDURE WILL GUIDE THE OPERATOR THROUGH HIS FIRST START UP. AS HE BECOMES FAMILIAR WITH THE PELLET MILL, HE WILL DISCOVER VARIOUS TRICKS OF THE TRADE. THESE WILL VARY WITH CONDITIONS OF OPERATION, TYPE OF FEED BEING HANDLED AND TYPE OF PELLETS DEMANDED BY THE CUSTOMER. A LITTLE EXPERIMENTATION WILL ASSIST HIM IN QUICKLY ARRIVING AT A HIGH HOURLY OUTPUT OF TOP QUALITY PELLETS. ONLY ONE BIT OF CAUTION IS NEEDED: DO NOT OVERLOAD THE PELLET MILL AS A SUBSTITUTE FOR THE CORRECT DIE OR PROPER CONDITIONING OF THE FEED. THIS IS THE EXPENSIVE WAY TO GET MORE PRODUCTION.

THE AMMETER OR LOAD INDICATOR IS PROVIDED FOR YOUR PROTECTION. IT INDICATES THE CORRECT LOAD FOR MAXIMUM SERVICE AT THE MAXIMUM CAPACITY FOR WHICH THE PELLET MILL WAS DESIGNED. THIS SERVICE AND CAPACITY WILL BE OBTAINED ONLY WITH CORRECT MAINTENANCE, LUBRICATION AND ADHERENCE TO INSTRUCTIONS REGARDING THE AMMETER.

TERMINATING PELLET MILL OPERATION

WHEN THE RUN IS FINISHED, SHUT OFF THE STEAM AND SLOWLY OPEN THE MIXER GATE TO ALLOW THE MIXER TO EMPTY. SHUT OFF THE FEEDER, THEN STOP AND START THE PELLET MILL SEVERAL TIMES TO CLEAN OUT THE DIE CAVITY. IF THE PELLET MILL IS TO BE SHUT DOWN FOR THE DAY OR THE DIE IS TO BE REMOVED, FILL THE DIE WITH OILY MATERIAL AS DESCRIBED UNDER "PRESERVING THE DIE," PAGE 18.

IT IS GOOD PRACTICE TO LUBRICATE THE ROLLERS AT THIS TIME TO FLUSH OUT ANY MOISTURE OR CONTAMINATION AND PRECLUDE ANY BEING "SUCKED" IN AS THE ROLLERS COOL.

TROUBLE SHOOTING

THE FOLLOWING ARE POINTS TO CHECK WHEN PELLET MILL PERFORMANCE FALLS BELOW NORMAL OR PELLET PRODUCTION CEASES:

A - IF MATERIAL IS NOT REACHING THE DIE, CHECK FOR:

- 1 - BIN OR CONVEYING SYSTEM BLOCKAGE
- 2 - FEEDER DRIVE FAILURE OR PLUGGING OF FEED SCREW
- 3 - MIXER DRIVE FAILURE
- 4 - STOPPAGE IN MIXER
- 5 - STOPPAGE IN FEED CHUTE

B - IF MATERIAL IS REACHING THE DIE, BUT IS NOT BEING PELLETED, CHECK FOR:

- 1 - PROPER ADJUSTMENT OF ROLLS (TOO LOOSE)
- 2 - BLOCKAGE OF MATERIAL IN DIE HOLES
 - (A) DIE TOO THICK
 - (B) CHANGE OF MATERIAL (FORMULA) BEING PELLETED. (SEE "CAPACITY AND DIE SELECTION.")
- 3 - PROPER MOISTURE CONTENT OF MATERIAL. NOT ENOUGH OR TOO MUCH MOISTURE CAN CAUSE PROBLEMS.

C - IF LOAD ON PELLET MILL MAIN DRIVE MOTOR IS NOT REASONABLY CONSTANT AND/OR PELLET QUALITY IS NOT UNIFORM, CHECK FOR:

- 1 - INADEQUATE SUPPLY OF DRY STEAM TO MANIFOLDS. (EXTREME CHANGES IN PRESSURE OR SLUGS OF WATER FROM CONDENSATION IN STEAM LINES OR CARRY OVER FROM BOILER.)
- 2 - ERRATIC FLOW OF MATERIAL TO PELLET MILL. (BRIDGING IN THE BIN OR NON-UNIFORM RETURN OF FINES TO THE PELLET MILL.)
- 3 - BENT FLIGHTS OR MATERIAL BUILD UP ON FEEDER SCREW RESULTING IN PULSATING DELIVERY OF FEED.
- 4 - DAMAGE OR WEAR OF MIXER SHAFT.

LUBRICATION

GEARBOX

IN GENERAL, THE CALIFORNIA MASTER MODEL PELLET MILL USES AN ENCLOSED GEARBOX IN WHICH LUBRICANT IS SPLASH-FED TO THE BEARINGS AND GEARS.

THE ANTI-FRICTION BEARINGS WHICH ARE USED IN THIS PELLET MILL CAN DELIVER THEIR EXPECTED PERFORMANCE ONLY WHEN THEY ARE PROPERLY LUBRICATED. A COMMON CAUSE OF TROUBLE HAS BEEN ADDITIVES IN THE LUBRICANT WHICH ATTACK THE BRONZE SEPARATORS IN THE BEARINGS OR REACT WITH COPPER ALLOY METALS IN THE GEARBOX TO FORM SLUDGE OR ACIDS. ANOTHER SERIOUS PROBLEM IS THE CORROSION ATTACK OF THE BEARING RACES BY WATER EMULSIFIED INTO THE LUBRICANT. ACTIVE SULPHUR IN THE LUBRICANT CAN ACCELERATE HARDENING OF THE ELASTOMERS COMMONLY USED IN OIL SEALS, CAUSING SEAL FAILURE, LOSS OF LUBRICANT AND/OR ENTRY OF FOREIGN MATERIAL.

OUR GENERAL LUBRICANT SPECIFICATIONS REQUIRE AN OIL THAT HAS HIGH OXIDATION STABILITY, RUST INHIBITED, FOAM INHIBITED, CONTAINS AN ANTI-WEAR ADDITIVE (NOT EP), HIGH DEMULSIBILITY (I.E., SEPARATE FROM WATER IMMEDIATELY UPON SETTLING AND NOT PRODUCE AN EMULSION) AND NOT ATTACK OR BE CATALYZED BY COPPER OR COPPER BEARING ALLOYS. A HIGH VISCOSITY INDEX (85 OR BETTER) IS DESIRABLE AND UNDER NORMAL OPERATING CONDITIONS A VISCOSITY EQUIVALENT TO SAE 50 GRADE OIL (OR AGMA NUMBER 5) IS REQUIRED. THESE REQUIREMENTS ARE BEST MET BY A PREMIUM GRADE INHIBITED TURBINE OR HYDRAULIC OIL.

OUR SPECIFIC LUBRICANT RECOMMENDATIONS ARE AN ATTEMPT TO IDENTIFY COMMERCIALY AVAILABLE PRODUCTS WHICH HAVE ALL OF THE DESIRABLE PROPERTIES AND NONE OF THE UNDESIRABLE. A REPRESENTATIVE LIST OF OILS AND GREASES WHICH HAVE BEEN USED SUCCESSFULLY IN CALIFORNIA PELLET MILLS APPEARS ON PAGE 13. UNDOUBTEDLY, THERE ARE OTHER ACCEPTABLE PRODUCTS NOT LISTED HEREIN. HOWEVER, UNLESS YOU KNOW THEY ARE SATISFACTORY BY PAST EXPERIENCE OR ARE SURE THEY COMPLY WITH THE FOREGOING SPECIFICATIONS, DO NOT SUBSTITUTE.

AN OIL MEETING THE ABOVE SPECIFICATIONS SHOULD BE SUITABLE FOR USE IN THE GEARBOX OF ALL CALIFORNIA PELLET MILLS FOR A PERIOD OF AT LEAST 2,000 HOURS. TO GIVE THIS ANTICIPATED SERVICE, THE OIL MUST BE KEPT CLEAN AND FREE FROM CONTAMINANTS. DRAIN ACCUMULATED WATER FROM GEARBOX WEEKLY.

A VISUAL OIL LEVEL GAUGE IS LOCATED AT THE REAR OF THE GEARBOX. THE OIL LEVEL MUST BE MAINTAINED BETWEEN THE TWO RED LINES ON THE GAUGE. THIS OIL LEVEL MUST BE CHECKED DAILY. TO ADD OIL, REMOVE THE INSPECTION HOLE COVER ON THE TOP OF THE GEARBOX. CLEAN COVER AND GEARBOX TO PREVENT THE ENTRANCE OF FOREIGN MATERIAL.

ROLLERS AND MAINSHAFT BEARING

ON THE CALIFORNIA MASTER MODEL PELLET MILL, THE ROLLER ASSEMBLIES AND MAINSHAFT BEARING ARE GREASE LUBRICATED THROUGH THE MAINSHAFT FROM THE REAR. IT SHOULD BE NOTED AT THIS POINT THAT THE SPENT GREASE FROM THE MAINSHAFT BEARING IS VENTED INTO THE GEARBOX AND EXCESSIVE LUBRICATION OF THE BEARING WILL CONTAMINATE THE GEARBOX LUBRICANT. FOR SPECIFIC INSTRUCTIONS ON LUBRICATING THESE BEARINGS, SEE PAGES 15 AND 20.

ROLLER LUBRICANT SHOULD BE A GUN GREASE, NLGI GRADE 1 (WORKED PENETRATION 300/340), SHOULD BE SUITABLE FOR OPERATION AT TEMPERATURES TO 250° F., WORK WELL IN THE PRESENCE OF MOISTURE, PASS A TIMKEN O.K. LOAD TEST OF 50 LBS. FOR 10 MINUTES, BE MADE WITH AN OIL HAVING A MINIMUM VISCOSITY OF 75 SUS AT 210° F., AND MUST NOT CONTAIN EP ADDITIVES COMPRISING ACTIVE SULPHUR, LEAD, CHLORINATED NAPHTHALENE OR ANY MATERIAL WHICH WOULD BE DELETERIOUS TO THE MATERIAL BEING PELLETED, SINCE LEAKAGE FROM THE ROLLERS IS DIRECTLY INTO THE PRODUCT.

THE ROLLERS ARE SEALED AGAINST INCOMING DIRT AND LOSS OF LUBRICANT BY PISTON RING SEALS. THE FLOW OF FRESH GREASE IS FED THROUGH THE ROLLER SHAFT INTO THE BEARINGS TO FLUSH OUT THE SPENT GREASE.

MIXER AND FEEDER

ROLLER LUBRICANT IS SATISFACTORY FOR ALL MISCELLANEOUS GREASE FITTINGS ON THE PELLET MILL. GOOD JUDGMENT SHOULD BE USED WHEN GREASING THE MIXER AND FEEDER FLANGE BEARINGS, SINCE MORE HARM CAN BE DONE BY OVERGREASING AND FORCING THE SEALS OUT THAN BY NEGLECT.

GEARBOX LUBE OIL IS SATISFACTORY FOR CPM 510 DRIVES AND REEVES DRIVE GEAR REDUCERS.

KEEP LUBRICANT CONTAINERS AND SERVICING EQUIPMENT INDOORS AND CLEAN. ALWAYS WIPE GREASE FITTINGS AND GREASE GUN ENGAGING NIPPLE BEFORE SERVICING BEARINGS.

RECOMMENDED LUBRICANTS FOR CALIFORNIA PELLET MILL GEARBOXES:

STANDARD OIL OF CALIFORNIA	CHEVRON INDUSTRIAL OIL 220X
STANDARD OIL OF KENTUCKY	CHEVRON INDUSTRIAL OIL 220X
STANDARD OIL OF BRITISH COLUMBIA	CHEVRON INDUSTRIAL OIL 220X
CALIFORNIA OIL COMPANY	CHEVRON INDUSTRIAL OIL 220X
EXXON COMPANY U.S.A.	TERESSTIC N-75
GULF OIL CORPORATION	GULF HARMONY 88
SHELL OIL COMPANY	SHELL DELIMA OIL 72

RECOMMENDED LUBRICANTS FOR CALIFORNIA PELLET MILL ROLLER ASSEMBLIES:

CONTINENTAL OIL COMPANY	CONOCO CONOPLEX NUMBER 1
SINCLAIR REFINING COMPANY	CALDRON 1-EP
EXXON COMPANY U.S.A.	NEBULA EP-1
STANDARD OIL COMPANY	CHEVRON MULTI-MOTIVE #1
SHELL OIL COMPANY	DARINA EP GREASE 1
GULF OIL COMPANY	GULF HIGH TEMP GREASE 1

DESCRIPTION AND MAINTENANCE INSTRUCTIONS FOR THE FOLLOWING:

FEEDER

THE PURPOSE OF THE FEEDER IS TO DELIVER A REGULATED CONTINUOUS FLOW OF MATERIAL TO THE PELLET MILL. A SURGE BIN OF SUFFICIENT SIZE TO HOLD A COMPLETE CHARGE FROM THE BATCH MIXER, THEREBY INSURING AN UNINTERRUPTED SUPPLY OF FEED, MUST BE FITTED TO THE INLET HOPPER. THIS BIN SHOULD HAVE TWO VERTICAL SIDES AND THE OTHERS AS STEEP AS POSSIBLE (65° FROM THE HORIZONTAL MINIMUM) TO PREVENT ARCHING. CONSIDERATION SHOULD BE GIVEN TO FITTING A SWITCH (BINDICATOR, BINATROL, ETC.) TO SOUND AN ALARM IN THE EVENT THE BIN ARCHES OR RUNS EMPTY. THIS CIRCUIT CAN ALSO BE ARRANGED TO AUTOMATICALLY SHUT DOWN THE PELLET MILL AND THE ADDITIVES TO THE MIXER.

LUBRICATION: CHECK OIL LEVEL IN 510-A DRIVE EVERY WEEK. GREASE BUSHING AT FRONT END OF FEEDER SCREW DAILY.

MIXER

THE MIXER UNIT SERVES TO BLEND STEAM, MOLASSES, FISH SOLUBLES, FATS, ETC., INTO THE PRODUCT BEFORE PELLETING. TWO TYPES OF MIXERS ARE MANUFACTURED FOR THE CALIFORNIA MASTER MODEL PELLET MILL TO MEET DIFFERENT REQUIREMENTS. THE "AMT" (HIGH SPEED) ARRANGEMENT IS USUALLY FITTED IF HIGH PERCENTAGES OF MOLASSES OR OTHER LIQUIDS ARE TO BE ADDED AT THE PELLET MILL.

THE MIXER SHAFT IS OF PADDLE-TYPE CONSTRUCTION AND IS MOUNTED ON BALL BEARINGS. STEAM IS INTRODUCED BY MEANS OF A STEAM MANIFOLD. A SUPPLY OF CONSTANT PRESSURE DRY STEAM MUST BE CONNECTED TO THE FLOW CONTROL VALVE.

A PROPER STEAM SUPPLY IS VITAL TO THE SUCCESSFUL OPERATION OF THE PELLET MILL. A MOISTURE SEPARATOR, PRESSURE REGULATING VALVE AND ACCURATE FLOW CONTROL VALVE ARE THE PRINCIPAL COMPONENTS OF THE STEAM SYSTEM.

THE MOISTURE SEPARATOR SERVES TO INTERCEPT CONDENSATION FROM THE SUPPLY LINE OR CARRY-OVER FROM THE BOILER. THE PRESSURE REGULATOR ASSURES A CONSTANT PRESSURE TO THE FLOW CONTROL VALVE SO THAT NORMAL VARIATIONS IN STEAM SUPPLY PRESSURE WILL NOT AFFECT THE CONSTANT FLOW OF STEAM TO THE MIXER. A LOW PRESSURE AT THE FLOW CONTROL VALVE GIVES A LARGER VOLUME OF STEAM, HENCE IS EASIER TO REGULATE. A LARGE PRESSURE DROP ACROSS THE REGULATOR HAS A DRYING EFFECT ON THE STEAM, MAKING POSSIBLE MORE HEATING EFFECT FOR A GIVEN AMOUNT OF MOISTURE ADDITION.

A CLEAN-OUT PANEL IS LOCATED ON THE SIDE OF THE MIXER TO PERMIT INSPECTION AND CLEANING OF THE MIXER WITHOUT REMOVING THE MIXER SHAFT.

LUBRICATION: GREASE THE BALL BEARINGS AT EACH END OF THE MIXER MONTHLY.

FEED CHUTE

THE FEED CHUTE CONDUCTS THE FEED FROM THE MIXER TO THE PELLET MILL. TO DO THIS JOB EFFICIENTLY, IT MUST BE KEPT CLEAN AND FREE OF DENTS OR DISTORTION. THE MIXER GATE MUST BE CLOSED BEFORE REMOVING THE FEED CHUTE.

DEFLECTOR

THE PURPOSE OF THE DEFLECTOR IS TO MAINTAIN A CLEAN SURFACE ON THE CONE AND ASSURE UNIFORM DISTRIBUTION OF THE FEED TO THE DIE. KEEP CLEAR OF CAKED-ON MATERIAL WHICH WILL IMPEDE FLOW AND REPLACE WHEN WORN TO THE POINT WHERE IT CANNOT FUNCTION EFFICIENTLY.

CUTTING KNIVES

THE KNIVES ARE FASTENED TO KNIFE POSTS WHICH, IN TURN, ARE POSITIONED BY KEYS IN THE KNIFE POST HOLDER. ADJUSTMENT FOR DISTANCE FROM THE DIE IS MADE BY MEANS OF THE JAM NUTS ON THE KNIFE POST. KNIVES CAN BE SET UP CLOSE TO THE DIE (ALLOW THICKNESS OF A SHIPPING TAG FOR CLEARANCE) FOR CLOSE CUTTING OR MAY BE SET AWAY FROM THE DIE A DISTANCE EQUAL TO THE LENGTH OF PELLET DESIRED. THE KNIVES ARE TIPPED WITH TUNGSTEN CARBIDE TO ASSURE MAXIMUM WEARABILITY, BUT THE INSERT CAN BE CHIPPED OR BROKEN OUT BY ROUGH HANDLING.

A BREAKER BAR IS USED FOR LONG LARGE PELLETS. SET THE BAR AWAY FROM THE DIE BY THE LENGTH OF PELLET DESIRED.

MAINSHAFT BEARING

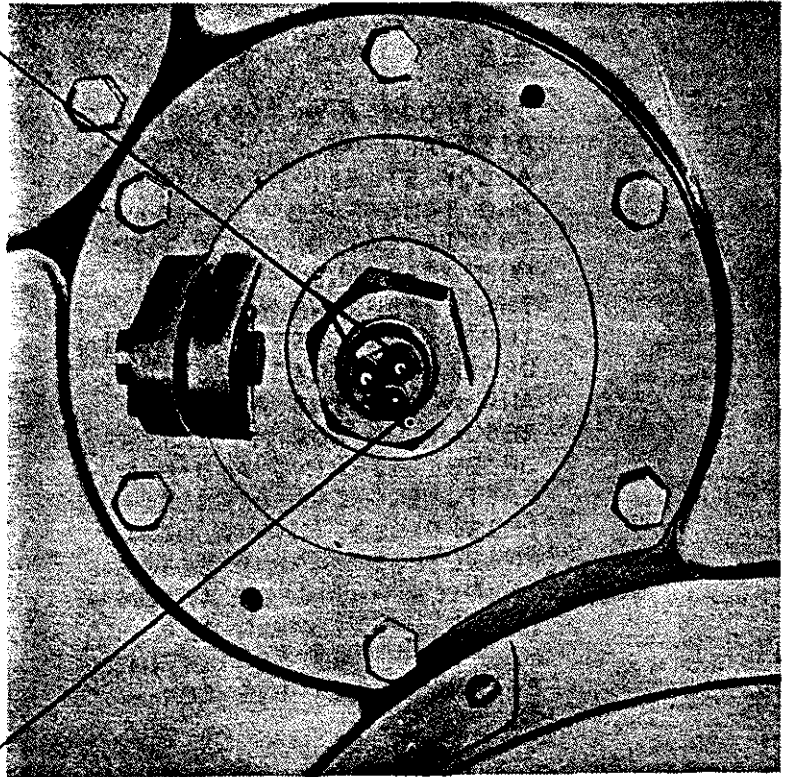
THIS HIGH CAPACITY, SEPARABLE CYLINDRICAL ROLLER BEARING IS LOCATED INSIDE THE QUILL AT THE FRONT END OF THE MAINSHAFT. SINCE IT IS REMOTE FROM THE GEARBOX LUBRICANT, A SEPARATE GREASE SYSTEM IS FITTED TO INSURE ITS LUBRICATION. GREASE IS ADDED THROUGH THE FITTING AT THE REAR OF THE MAINSHAFT (SEE ILLUSTRATION PAGE 16), PASSES THROUGH THE BEARING AND VENTS INTO THE GEARBOX. BARRING LEAKAGE THROUGH THE MAINSHAFT SEAL, ONE APPLICATION OF AN OUNCE OF GREASE SHOULD BE SUFFICIENT FOR EIGHT HOURS OF OPERATION.

LUBRICATION SUMMARY - MASTER MODEL PELLET MILL

- 1 - LUBRICATE ROLLERS AT LEAST ONCE EVERY FOUR HOURS OF CONTINUOUS RUNNING. SMALLER AMOUNTS EVERY ONE HOUR ARE ALSO RECOMMENDED.
- 2 - LUBRICATE MAINSHAFT BEARING EVERY EIGHT HOURS.
- 3 - CHANGE GEARBOX LUBRICANT EVERY 2,000 HOURS. (SEE PAGE 11 FOR EXACT SPECIFICATIONS).
- 4 - CHECK OIL LEVEL IN REEVES DRIVE OR 510 DRIVE WEEKLY AND OIL ROLLER CHAIN DRIVE SPARINGLY. GREASE BUSHING AT FRONT END OF FEEDER SCREW DAILY.
- 5 - LUBRICATE MIXER SHAFT BEARINGS MONTHLY.

SEE "LUBRICATION" SECTION FOR ADDITIONAL INFORMATION.

ROLLER LUBRICATION FITTINGS



MAINSHAFT LUBRICATION FITTING

SHEAR PIN ASSEMBLY

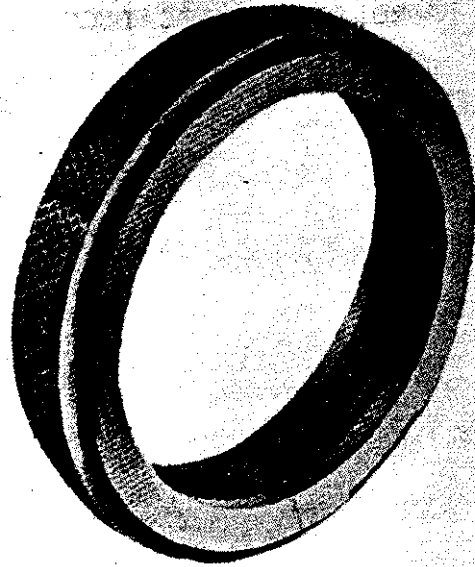
THE SHEAR PIN ASSEMBLY IS COMPOSED OF THE SHEAR PIN FLANGE, FLANGE HOUSING, BRASS BUSHING, FLANGE PACKING, TWO SHEAR PIN BUSHINGS AND A SHEAR PIN.

THE PURPOSE OF THIS ASSEMBLY IS TO PROTECT THE PELLET MILL AND DIE IN CASE TRAMP METAL ENTERS THE MACHINE AND WEDGES BETWEEN THE ROLLERS AND DIE. WHEN THIS OCCURS, THE SHEAR PIN BREAKS, PERMITTING THE MAINSHAFT TO ROTATE AND THUS ALLOWING THE ROLLERS AND DIE TO ROTATE TOGETHER. THE SHEAR PIN IS DESIGNED TO BREAK AT A LOAD BELOW THAT WHICH WILL DAMAGE THE PELLET MILL. DO NOT SUBSTITUTE A BOLT OR PIECE OF ROD FOR IT. A SUPPLY OF SPARE SHEAR PINS SHOULD BE KEPT ON HAND.

THE SHEAR PIN FITS INTO A PAIR OF HARDENED AND GROUND BUSHINGS. WHEN REPLACING SHEAR PINS, BE SURE THAT THE BUSHINGS ARE NOT DRIVEN OUT OF POSITION. THE FIT BETWEEN SHEAR PIN, BUSHINGS AND THEIR HOUSINGS SHOULD BE SNUG.

DIE

CALIFORNIA PELLET MILL DIES ARE MADE OF HIGH ALLOY STEEL, HEAT-TREATED AND TOUGHENED TO RIGID SPECIFICATIONS FOR MAXIMUM WEAR AND STRENGTH. THE EXCLUSIVE MANUFACTURING PROCESSES USED IN DRILLING, HEAT-TREATING AND POLISHING ARE THE RESULT OF OUR MANY YEARS OF ENGINEERING AND MANUFACTURING EXPERIENCE IN THIS FIELD. INVALUABLE KNOWLEDGE IN THE DESIGN OF DIES HAS BEEN ACCUMULATED BY STUDYING OUR MACHINES UNDER MANY DIFFERENT OPERATING CONDITIONS.



THE DIE REVOLVES IN A CLOCKWISE DIRECTION.

BY FOLLOWING A FEW SIMPLE RULES, YOUR DIE LIFE WILL BE PROLONGED AND YOU WILL REALIZE THE GREATEST PRODUCTION FROM YOUR DIE.

NEVER ABUSE THE DIE BY STRIKING IT WITH A HAMMER. IF TAPPING IS NECESSARY TO INSTALL THE DIE, USE A LEAD OR PLASTIC Mallet OR WOOD DRIFT. THE DIE IS KEYED TO THE DIE DRIVING RIM AND HELD IN PLACE BY THE DIE CLAMP. CARE SHOULD BE TAKEN TO HAVE A CLEAN MATING SURFACE ON BOTH THE DIE AND THE DEMOUNTABLE DIE DRIVING RIM WHEN CHANGING THE DIE.

THE DIE MUST BE SECURELY HELD BY THE DIE CLAMP AT ALL TIMES. A WORN OUT DIE CLAMP OR DIE DRIVING RIM WILL MAKE PROPER FIT AND OPERATION IMPOSSIBLE. A LOOSE FIT AT THIS POINT WILL CAUSE FLEXING AND EXCESSIVE STRESS ON THE DIE, ROLLERS AND THROUGHOUT THE MACHINE.

THE DEMOUNTABLE DIE DRIVING RIM TO WHICH THE DIE IS KEYED SHOULD BE REPLACED IF THE SHOULDER BECOMES WORN. WHEN MOUNTING A REPLACEMENT DIE, IT IS ADVISABLE TO CHECK THE DIE CLAMP WITH THE GAUGE WHICH IS SHIPPED WITH THE REPLACEMENT DIE. INSTRUCTIONS FOR ITS USE ARE PRINTED ON IT.

MAGNETS, FEED CLEANERS AND OTHER PROTECTIVE DEVICES SHOULD BE CHECKED FREQUENTLY TO BE CERTAIN THAT THEY ARE OPERATING AT THEIR HIGHEST EFFICIENCY. HARD FOREIGN MATERIAL MUST NOT REACH THE DIE. PERIODIC INSPECTION OF THE DIE FOR PRESENCE OF FOREIGN MATERIAL IS ADVISABLE. PIECES OF TRAMP METAL WHICH HAVE BECOME EMBEDDED IN THE DIE SHOULD BE REMOVED BY PUNCHING OR DRILLING FROM THE OUTSIDE END OF THE HOLE.

NEVER, UNDER ANY CIRCUMSTANCES, SHOULD THE DIE BE SUBJECTED TO ANY WELDING PROCESS.

CAPACITY AND PRODUCT QUALITY

BOTH CAPACITY AND PRODUCT QUALITY ARE GREATLY AFFECTED BY DIE DESIGN. THICKNESS AND HOLE DESIGN MUST BE SUITED TO THE PARTICULAR MATERIAL BEING PELLETED. IF PELLETS ARE TOO SOFT OR TOO HARD, YOU MAY HAVE THE WRONG DIE FOR YOUR PRODUCT. IF THIS IS THE CASE, PLEASE ADVISE US IMMEDIATELY. NO SINGLE DIE DESIGN CAN GIVE THE MAXIMUM EFFICIENCY AND THE BEST QUALITY PELLET ON EVERY PRODUCT.

PRESERVING THE DIE

THE CARE OF THE DIE IS SIMILAR TO THAT OF A RIFLE BORE. THE HOLES IN THE DIE ARE CAREFULLY MACHINED AND HIGHLY POLISHED AT THE FACTORY. THIS POLISH MUST BE PRESERVED IF MAXIMUM PELLET CAPACITY IS TO BE MAINTAINED.

UPON COMPLETION OF A RUN, WHETHER THE PELLET MILL IS TO BE SHUT DOWN FOR THE NIGHT OR FOR A DIE CHANGE, THE DIE SHOULD BE FILLED WITH AN OILY, NON-CORROSIVE MIXTURE. THIS MIXTURE MAY BE SAWDUST WELL MIXED WITH ENGINE OIL OR SIMILAR MATERIAL. THE FOLLOWING PROCEDURE SHOULD BECOME STANDARD PRACTICE WHEN SHUTTING DOWN THE PELLET MILL.

- 1 - SHUT OFF FEEDER, EMPTY MIXER AND REMOVE FEED CHUTE.
- 2 - DIVERT FLOW OF PELLETS INTO A PAN OR SACK.
- 3 - SLOWLY POUR FOR OR FIVE LARGE SCOOPS OF OILY MATERIAL INTO FEED CONE AND CONTINUE UNTIL NORMAL PELLETS ARE FORCED OUT OF THE DIE AND OILY ONES APPEAR. YOUR DIE IS NOW PROTECTED AGAINST RUST AND CORROSION.
- 4 - START AND STOP THE MACHINE TWO OR THREE TIMES SO THAT NEW MATERIAL ON THE SURFACE OF THE DIE IS ROLLED DOWN INTO THE HOLES. THIS MAKES SUBSEQUENT STARTING OF THE MACHINE MUCH EASIER.

WHEN A DIE IS REMOVED FROM THE PELLET MILL, IT SHOULD BE STORED IN A DRY PLACE.

UPON STARTING THE MILL IN THE MORNING, THE OILY PELLETS CAN BE COLLECTED IN A PAN. WHEN NORMAL PELLETS START COMING THROUGH, DIVERT THE FLOW OF PELLETS BACK TO THE SYSTEM. THE OILY PELLETS MAY BE USED OVER AGAIN AND AGAIN BY ADDING OIL FROM TIME TO TIME TO OFFSET THE DRY MATERIAL PICKED UP IN THE OPERATION.

TO REMOVE A DIE:

- 1 - MAKE CERTAIN THE DIE HAS BEEN FILLED WITH OILY MATERIAL AS OUTLINED UNDER "PRESERVING THE DIE."
- 2 - REMOVE PELLET CHAMBER AND FEED CONE.
- 3 - RELIEVE PRESSURE OF ROLLS AGAINST DIE. SEE "ROLLER ADJUSTMENT," PAGE 20.
- 4 - LOOSEN LOCK NUTS ON KNIFE POST AND BACK KNIVES AWAY FROM THE DIE.
- 5 - REMOVE DIE CLAMP.
- 6 - THE DIE CAN THEN BE REMOVED BY DRAWING AWAY FROM THE MILL. IF IT DOES NOT COME LOOSE EASILY, USE A PRYBAR IN THE SLOTS BETWEEN THE DIE AND THE DRIVING RIM.
- 7 - STORE THE DIE IN A DRY PLACE.

ROLLERS

ROLLERS ARE MOUNTED INSIDE OF THE DIE CAVITY ON ECCENTRIC SHAFTS SO THEIR OUTER FACES CAN BE ADJUSTED TO CONTACT THE INNER SURFACE OF THE DIE. THIS IS THE MOST IMPORTANT ADJUSTMENT ON YOUR PELLET MILL. CORRECT ADJUSTMENT WILL RESULT IN MAXIMUM CAPACITY, MINIMUM WEAR ON BOTH ROLLERS AND DIE, AND ELIMINATE UNDUE STRESSES IN THE PELLET MILL. WHEN PROPERLY ADJUSTED, THE ROLLERS WILL CONTACT THE DIE JUST ENOUGH TO CAUSE THEM TO ROTATE.

DAMAGE CAN BE DONE BY EXCESSIVELY TIGHTENING THE ROLLS.

ROLLER ADJUSTMENTS SHOULD BE MADE WHENEVER REQUIRED. THE DIE SHOULD NOT BE RUN WITHOUT FEED ANY MORE THAN IS ABSOLUTELY NECESSARY. OPERATING THE PELLET MILL WITH ROLLS TOO TIGHT WILL RESULT IN PEENING CLOSED THE ENTRANCE TO THE HOLES IN THE DIE AND EXCESSIVE WEAR OF THE DIE AND ROLLS. SEE BELOW FOR PROPER ROLLER ADJUSTMENT PROCEDURE. INSTRUCTIONS FOR CHANGING DIE AND ROLLER ASSEMBLIES ARE FOUND ON PAGES 19 AND 22, RESPECTIVELY.

DIFFERENT TYPES OF ROLLER SHELL SURFACES ARE AVAILABLE TO MEET VARIED CONDITIONS EXPERIENCED IN PELLETING DIFFERENT MATERIAL. BEFORE ORDERING, DISCUSS WITH YOUR CPM REPRESENTATIVE.

WARNING

1. DO NOT ADJUST ROLLERS WHILE DIE IS TURNING.
2. PELLET MILL START SWITCH SHOULD BE LOCKED OUT BEFORE ADJUSTING ROLLERS.
3. ADJUSTING ANY MACHINE WHILE PARTS ARE IN MOTION IS EXTREMELY HAZARDOUS AND FAILURE TO COMPLY WITH THIS WARNING MAY RESULT IN PERSONAL INJURY.

ROLLER ADJUSTMENT

ALWAYS ADJUST ROLLERS IN THE FOLLOWING MANNER:

NOTE: WHEN ADJUSTING ROLLERS, CARE SHOULD BE TAKEN TO PREVENT KINKING THE LUBRICATING TUBES (WHEN FURNISHED), PREFERABLY BY DISCONNECTING THEM.

- A. CLEAN OFF DIE AND ROLLERS.
- B. LOOSEN ONE OF THE ROLLER ADJUSTING SCREWS ON EACH ROLLER TO ALLOW ROLLER ADJUSTING GEAR TO BE ROTATED IN THE DIRECTION SHOWN IN THE UPPER ILLUSTRATION ON PAGE 21A.

- C. TO ADJUST ROLLER CLOSER TO DIE, TURN OTHER ADJUSTING SCREW ON EACH ROLLER SO IT MOVES THE ADJUSTING GEAR IN THE DIRECTION OF THE ARROWS. IF THIS ADJUSTMENT CANNOT BE MADE IN THE DIRECTION INDICATED, THEN THE ROLLERS HAVE BEEN INCORRECTLY INSTALLED AND MUST BE PROPERLY REINSTALLED, AS DESCRIBED ON PAGE 22 OF THIS BOOK.
- D. PROPERLY ADJUSTED ROLLERS JUST CLEAR THE DIE SURFACE.
- E. IF THE END OF THE ADJUSTING GEAR ADJUSTMENT IS REACHED, BACK OFF ADJUSTING SCREW TURNED IN STEP "C" ALL THE WAY, REMOVE THE ADJUSTING GEAR, AND REINSTALL IT IN THE POSITION SHOWN ON THE RIGHT SIDE OF THE UPPER ILLUSTRATION ON PAGE 21A.
- F. AFTER ADJUSTING ROLLER POSITION, LOCK ADJUSTING GEAR IN PLACE BY TIGHTENING REMAINING ADJUSTING SCREW AGAINST ADJUSTING GEAR.

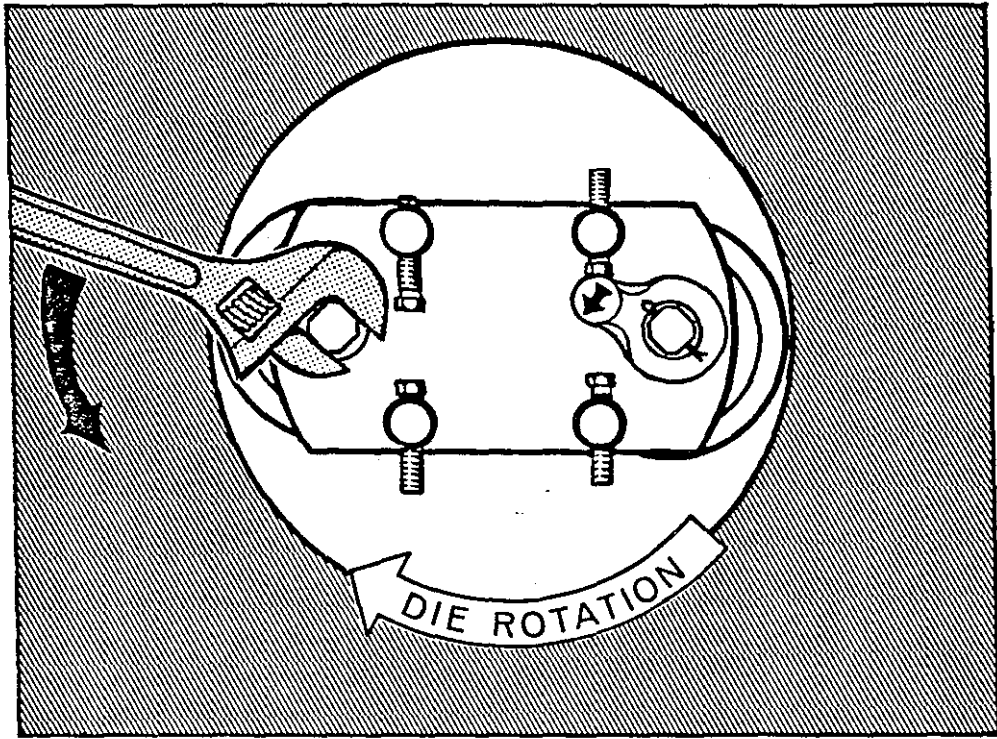
COMMENTS

- 1. ROLLERS MUST BE MOVED AWAY FROM THE DIE SURFACE BEFORE CHANGING DIES. USE WRENCH AS SHOWN ON LEFT SIDE OF UPPER ILLUSTRATION ON PAGE 21A, TO RAPIDLY ROTATE THE ROLLERS TO THEIR FULL-BACK POSITION.
- 2. WEAR OCCURS ON SURFACE OF DIE AND ROLLERS AS THE PELLETS ARE PRODUCED. CHECK THESE SURFACES PERIODICALLY FOR WEAR AND ADJUST ROLLERS AS PER THE ABOVE INSTRUCTIONS WHEN NECESSARY. (SEE ALSO: "DEFLECTORS", PAGE 15.)

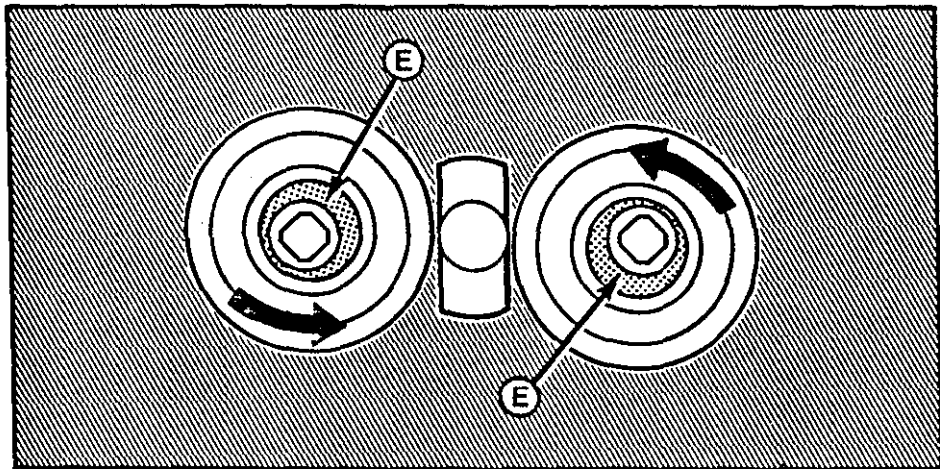
ROLLER LUBRICATION: (SEE ALSO PAGES 12 AND 13)

THE ROLLERS AND THE ROLLER BEARINGS ARE SOME OF THE MOST HIGHLY STRESSED PARTS OF THE PELLET MILL. THEY OPERATE IN A HOT AND "DIRTY" ENVIRONMENT, HENCE PROPER LUBRICATION HERE IS VITAL. FITTINGS ARE PROVIDED AT THE REAR OF THE MAINSHAFT (SEE PAGE 16), CONNECTING WITH THE ROLLERS THROUGH THE MAINSHAFT AND LUBE TUBES (WHEN FURNISHED), SO THAT THE ROLLERS CAN BE LUBRICATED WHILE THE PELLET MILL IS RUNNING. SOME ROLLER ASSEMBLIES, HOWEVER, ARE OF THE PACKED TYPED AND MUST BE LUBRICATED ONLY WHEN THE PELLET MILL IS NOT RUNNING. A SPECIAL LUBE FITTING ADAPTER ASSEMBLY IS FURNISHED WITH THIS TYPE OF ROLLER ASSEMBLY TO FACILITATE LUBRICATION. FREQUENT ADDITION OF SMALL AMOUNTS OF GREASE (ONCE EVERY HOUR) IS PREFERRED TO ONE LARGE APPLICATION AT INFREQUENT INTERVALS.

CAUTION: SHOULD LUBE TUBES BE BROKEN OR WORN THROUGH, LUBE CAN BE PUT INTO THE FEED INSTEAD OF THE ROLLER. CHECK THESE TUBES EVERY TIME YOU "DIG OUT" THE DIE CAVITY OR ADJUST THE ROLLERS.



ROLLER ADJUSTMENT



ROLLER INSTALLATION

ENGRG. FORM.

INSTALLATION OF NEW ROLLER ASSEMBLIES

NOTE: CHECK THE JOURNALS ON THE ROLLER SHAFTS AND THE HOLES IN THE MAINSHAFT DISC AND OUTER ROLLER SUPPORT FOR DENTS OR BURRS WHICH WILL CAUSE INTERFERENCE OR GALLING WHEN THE ROLLERS ARE INSTALLED.

- A - INSTALL ROLLERS IN POSITION AS SHOWN IN LOWER ILLUSTRATION ON PAGE 21A, BEING CERTAIN THAT ECCENTRIC SHAFTS INDICATED BY ARROWS "E" ARE IN THE POSITION SHOWN. (QUARTER MOON SEGMENT UP ON LEFT ROLL AND DOWN ON RIGHT ROLL.) LOST TIME CAN RESULT AT THIS POINT.
- B - INSTALL OUTER ROLLER SUPPORT. REPLACE AND TIGHTEN OUTER ROLLER SUPPORT LOCK NUT. USE SPECIAL ROLLER SUPPORT WRENCH PROVIDED (SEE TOOL LIST).
- C - BRING EACH ROLLER IN CONTACT WITH THE DIE BY ROTATING SHAFT IN THE DIRECTION SHOWN IN LOWER ILLUSTRATION ON PAGE 21A. SERIOUS DAMAGE CAN RESULT FROM IGNORING THIS POINT. USE WRENCH TO TURN ROLLER SHAFT, AS SHOWN ON LEFT SIDE OF UPPER ILLUSTRATION ON PAGE 21A.
- D - INSTALL ROLLER ADJUSTING GEARS SO THAT THE LUGS ARE POSITIONED TO GIVE MAXIMUM ADJUSTMENT, AS SHOWN ON RIGHT SIDE OF UPPER ILLUSTRATION ON PAGE 21A.
- E - INSTALL COTTER PINS.
- F - MAKE ADJUSTMENT BY FOLLOWING THE INSTRUCTIONS UNDER "ROLLER ADJUSTMENT", PAGE 20.
- G - INSTALL ROLLER LUBRICATING TUBES (WHEN REQUIRED).

AMMETERS FOR CALIFORNIA PELLET MILLS

NOTICE TO OPERATOR

An ammeter with socket is available for each California Pellet Mill for indicating motor load. A current transformer is required to reduce the motor current to that ratio required to operate the ammeter.

The purpose of the ammeter is to let the pellet mill operator know under what load the pellet mill is operating. The nameplate on the motor gives the full load ampere rating of the motor for specified voltages. If the ammeter needle is to the left of the full load rating then the pellet mill motor is operating at less than full load. If the needle is to the right of the full load rating then the motor is being overloaded. Do not permit overloading of the pellet mill motor for more than a few minutes. The optimum operating load is not necessarily at maximum motor load, but varies with the product, the die and the quality of pellet desired.

NOTICE TO ELECTRICIAN

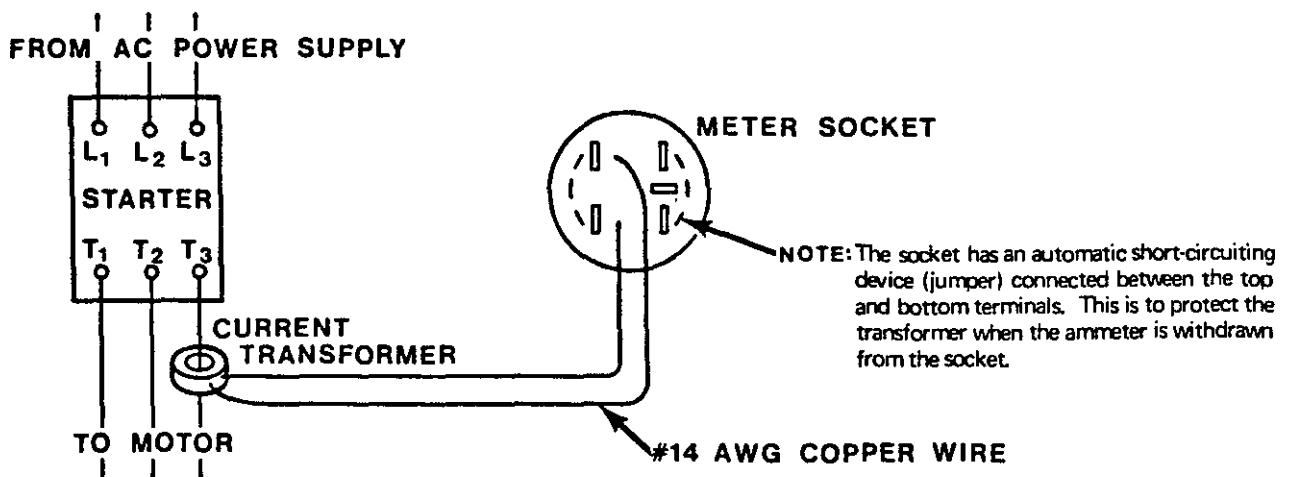
To install the ammeter, observe the following:

Choose a location for the ammeter where it can be seen by the pellet mill operator while the pellet mill is being started and also while operating.

Before installing the ammeter, make sure that the ammeter has the proper scale range for the pellet mill motor. Then make sure that the transformer has the same ampere ratio as does the ammeter (e.g., if the ammeter has a 300 ampere dial, then the transformer must have a 300/5 ratio).

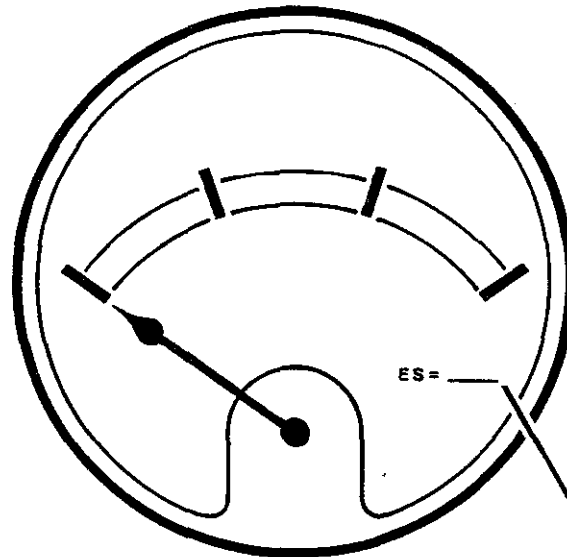
While facing the front of the ammeter socket, connect one wire from the current transformer to the top left terminal of the socket; connect the other wire to the lower left terminal of the socket. (NOTE: The current coil in the ammeter is across the two left terminals when facing the front of the instrument. The right terminals are not used on the ammeter.)

Run one of the wires that goes from the starter to the motor through the hole in the transformer, as shown in diagram.



AMMETER INSTALLATION INSTRUCTIONS

(SUPPLEMENT TO ENGRG. FORM 1081)



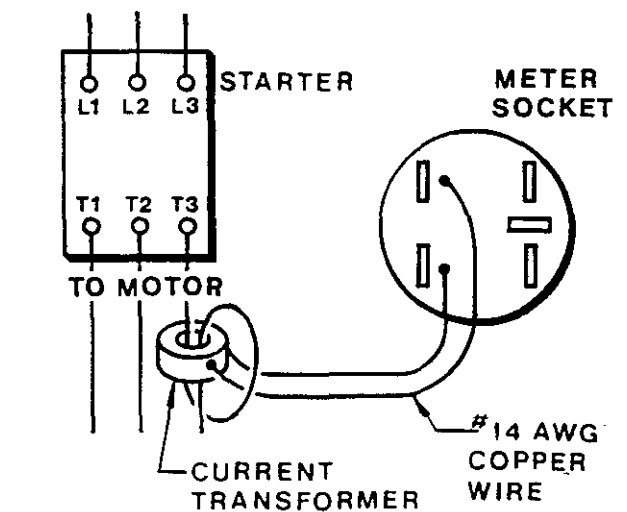
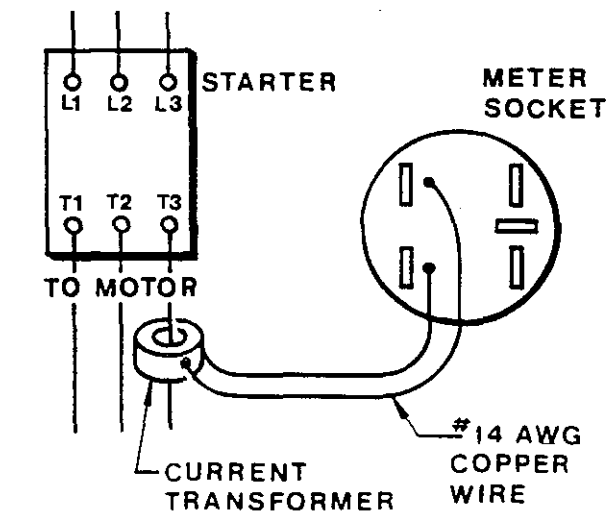
INSPECT
METER
FOR ES
MARKING

ES=5

ES=10

FROM AC
POWER SUPPLY

FROM AC
POWER SUPPLY



CONNECTION DIAGRAMS

NOTE: METER ES MARKING DETERMINES HOW CURRENT
TRANSFORMER MUST BE INSTALLED.

