Minster *Hummingbird*® press averages 1200 spm on laminations at Gale Products...

runs beautifully at 1600 spm.

When the people from Gale Products, Galesburg, Illinois, saw the introductory demonstrations of Minster's ultra-high speed Hummingbird press at the 1972 Machine Tool Show they started a study of its potential productive value in their operations. Ten months later they placed an order for one of the first 60 ton capacity "birds." Today they are in production at 1200 spm and heading for full capacity speed of 1600 spm.

Gale Products is a division of Outboard Marine Corporation, makers of Lawn-Boy lawn mowers, Evinrude and Johnson outboard engines and snowmobiles, Cushman vehicles, Pioneer chain saws and Ryan Turf equipment. The Gale Products division produces the Lawn-Boy lawnmower line and manufactures components and metal stamping for the engines and assemblies of the other well-known OMC products. The 1600 stroke per minute, HB2-60 Hummingbird press is being used to blank and punch millions of laminations used in electrical systems of the wide variety of gasoline engines which power the Outboard Marine and other brands of products. Their largest quantities are laminations for magnetos which go into alternator flywheels of the engines, coil yokes and cores, charging, lighting, drive coils, etc. The ranges of part sizes, quantities and configurations is broad.

DECISION TO PURCHASE HUMMINGBIRD BASED ON ECONOMICS AND QUALITY

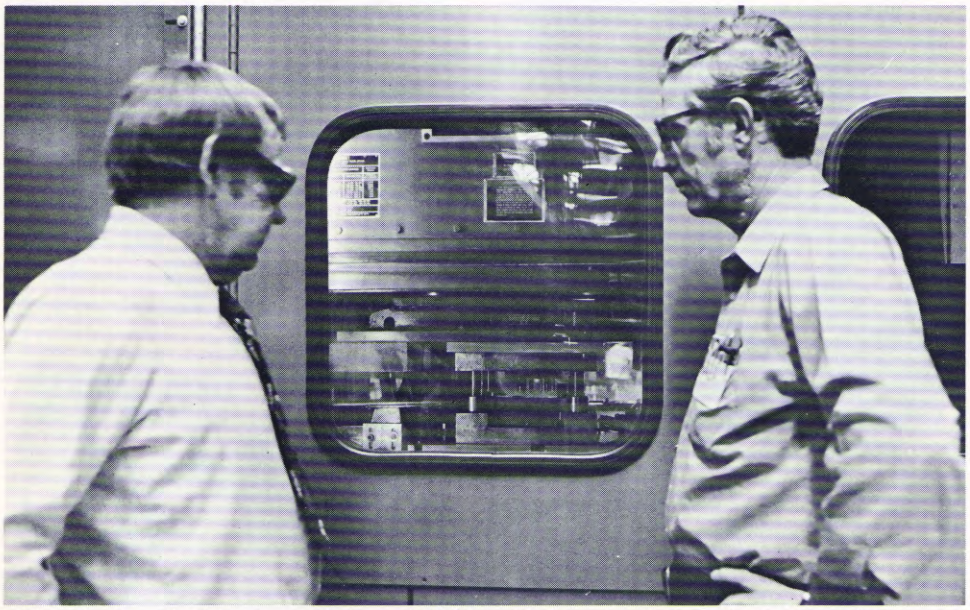
The basic reason for purchasing the Minster Hummingbird press was the desire to obtain more productivity. The "bird" replaces two automatic straightside presses and has the productive capacity of about *five times* that of those two presses combined.

Mr. Alden Becker, Tool Engineer said, "As far as cost of the press is concerned, it was a bargain when you figure price vs. productive capability. Naturally, too, we wanted Minster quality."

CHECKOUT AND START-UP

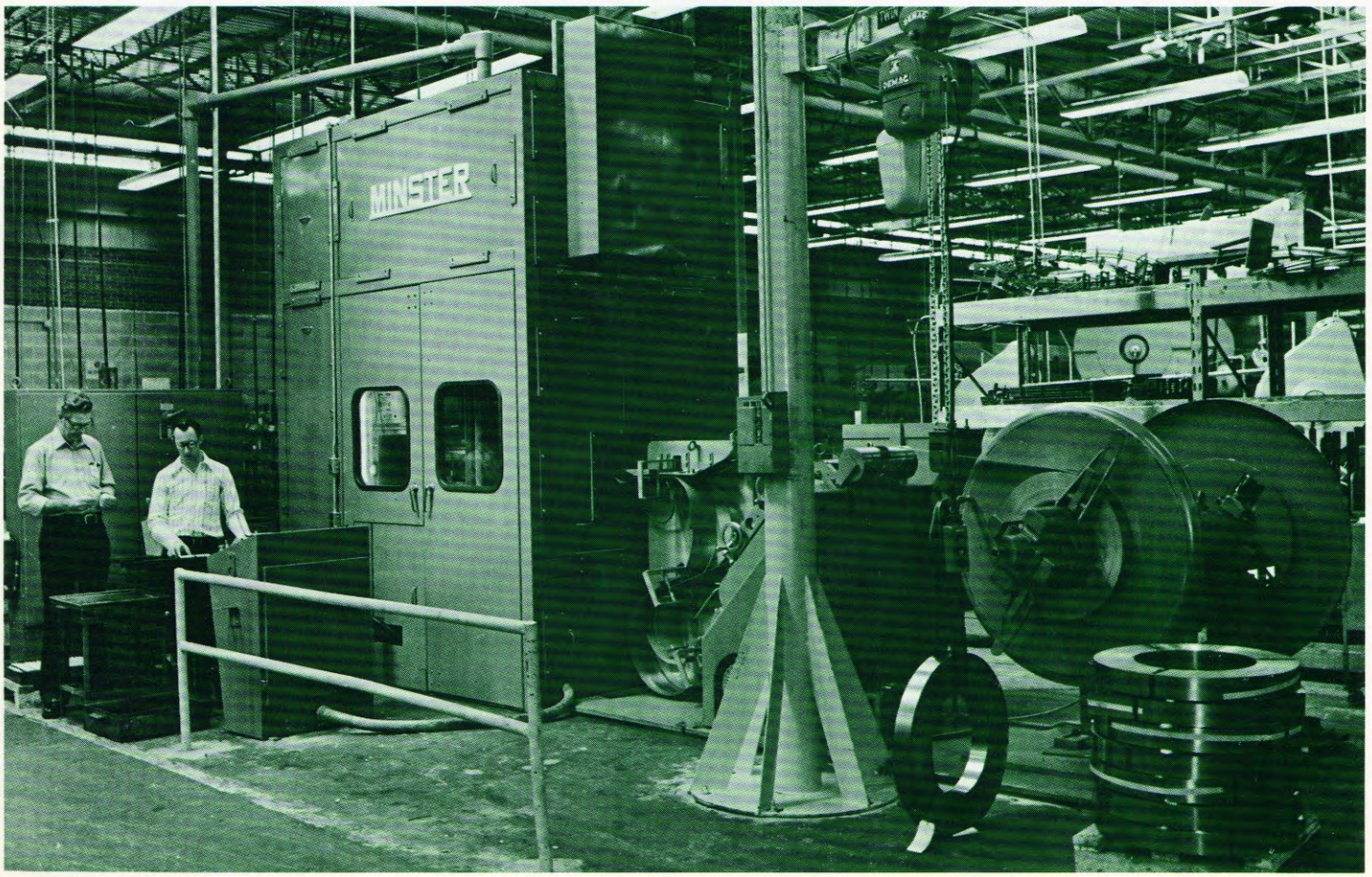
The Minster Hummingbird installation at Gale Products was made late last year and the machine was checked out and started up by a Minster Service Engineer. The first die was set on the press, checked and a production run started. The start-up was described by Eddie Smith, Die Engineer, "Your Service Engineer started the press at 1000 spm . . . ran it for 15 minutes . . . took it up to 1600 spm and it ran beautifully." The system went into production in January.

Hummingbird press produces laminations used in wide variety of Outboard Marine Corporation products.



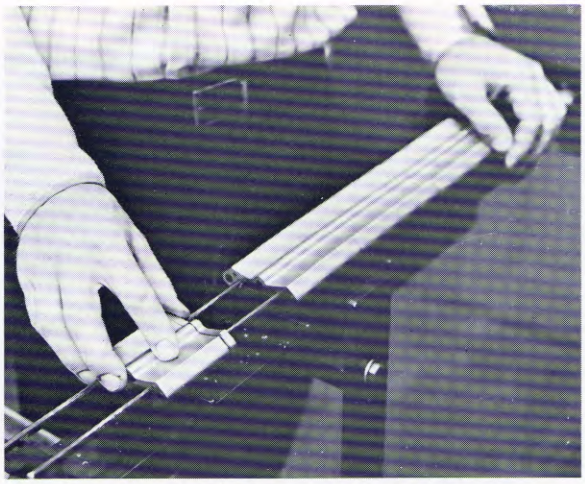
Alden Becker, Tool Engineer, left, and William H. Atwater Sr. watch start-up of Hummingbird press run through window on sound enclosure door.

Overall view of Hummingbird stamping system at Gale Products shows coil reel, stock straightener, electronic loop control. Press is within sound enclosure. Coil is loaded on reel with column mounted jib crane.



PRE-PLANNING FOR GREATLY INCREASED PRESS SPEED

Obviously, when going to a speed of 1600 spm, other operational factors such as dies and parts handling have to be considered. Gale Products did an effective job of planning for this installation. Anticipating the need for increased punch clearance of carbide progressive dies and different methods of handling parts, they met with their die and parts chutes source to work out the details. Total clearance was increased from .0004″ to .0007″ depending on die and part. The door of the sound enclosure was designed for easy access to die area and for variable parts chute configurations. Minster incorporated the door design into the enclosure engineering.



Close-up of laminations on stacking chute.

PRESS SPEED PRESENTLY GOVERNED BY PARTS HANDLING

At the present time, parts handling is the factor controlling speed of lamination parts runs. Most dies in use in the Hummingbird all run very well at 1600 spm. The press speed is set by the operator so he can pace the machine for efficient part removal and monitor the press. Parts are removed manually from stacking chutes and placed in parts pan by the operator. Production speed is about 1200 spm but this varies slightly with material thickness. Gale Products is currently developing equipment to mechanically handle laminations from chutes directly into assembly machines. It won't be too long before 1600 spm production speed is standard.

Wally Creek, press operator, left, and William H. Atwater Sr., Press Room Supervisor inspect laminations coming up part stacking chute in front of control console. The press operator removes parts from chute and places them in pan. Production speed 1200 spm.

DOUBLE DIE LIFE ANTICIPATED

Adding to the value of a Minster Hummingbird system is the distinct possibility of much longer die life. At Gale Products they look for 100% longer life. According to Mr. Becker and Mr. Smith, their experience indicates a probable 3 million hits per die grind compared to 1½ million on the same die but running at conventional speeds. Smith feels exceptionally higher speeds contribute to die life. "We had a situation the other day where the operator was running at 1100 spm and started getting burrs on the parts. He increased speed to 1200 spm and the burr completely disappeared. It would appear it was the effect of the speed increase. Past experience indicates that faster speeds

have improved parts and die life. I feel that this will be true on the Hummingbird even with its great speed increase."

Depending on end use of the laminations, dimensional tolerances are as close as ± .0005 up to .005". Most are .002". Increased parts per die grind on the Hummingbird is attributed to "rigidity and precision of the press and method of slide guiding and holding its own alignment."

NO PROBLEMS WITH DIE CHANGES

Gale Products sometimes changes dies on their Hummingbird 2 to 3 times a day. In their plant, the press operators now set their own dies. To start it took 2½ hrs. to make a complete die, sub-bolster plate, top filler plate and part chute changeover. This time is dropping as the learning factor takes place. The operator is estimating he may be able to peel off quite a bit of that beginning changeover time.

ENTHUSIASM IS HIGH

Eddie Smith is probably representative of all Gale Products people involved with the Hummingbird installation and he says. "It's going to be interesting. That's what I like about this press! Everything you do to it you're learning something. Makes your day for you. If it works out, it's beautiful! If it doesn't, then you've really got headaches which are part of the learn factor. It's a given learning curve that we're all in." With regard to the quality of the Minster equipment he added. "Your product is only as good as the workers producing it. If you have people who take pride in their work, they you are going to produce a good machine!"

HUMMINGBIRD DESIGN FEATURES ARE UNIQUE

The Minster Hummingbird is a packaged automated stamping system consisting of the press, the coil reel, stock straightener, electronic loop control and special Minster cam-operated single roll feed with accuracy of .001". Controls are mounted in a floor console. The Hummingbird is furnished with a sound enclosure.

Attainment of record speeds with precision and stability is based on the design features of this press which include:

- Patented, coupled, completely mechanical drive mechanism which is lubricated in a sealed, recirculating lubrication system with cooler.
- The slide is guided with a hydrostatic bearing system which eliminates free movement in a horizontal position.
- The press is 100% dynamically balanced for a given upper die weight.
- An interchangeable die mounting plate on the slide can be removed for using alternate drilling pattern arrangements.
- Minster Air Friction Clutch with separate caliper disc brake for quick stopping.
- Minster Recirculating Lubrication system.
- Power bed adjustment; bed moves up and down allowing a long range of shutheight adjustment. This keeps weight on slide to a minimum.

With enclosure doors open the slide, die area and Minster high speed roller cam feed can be seen. Note part chute coming out from under press bed.