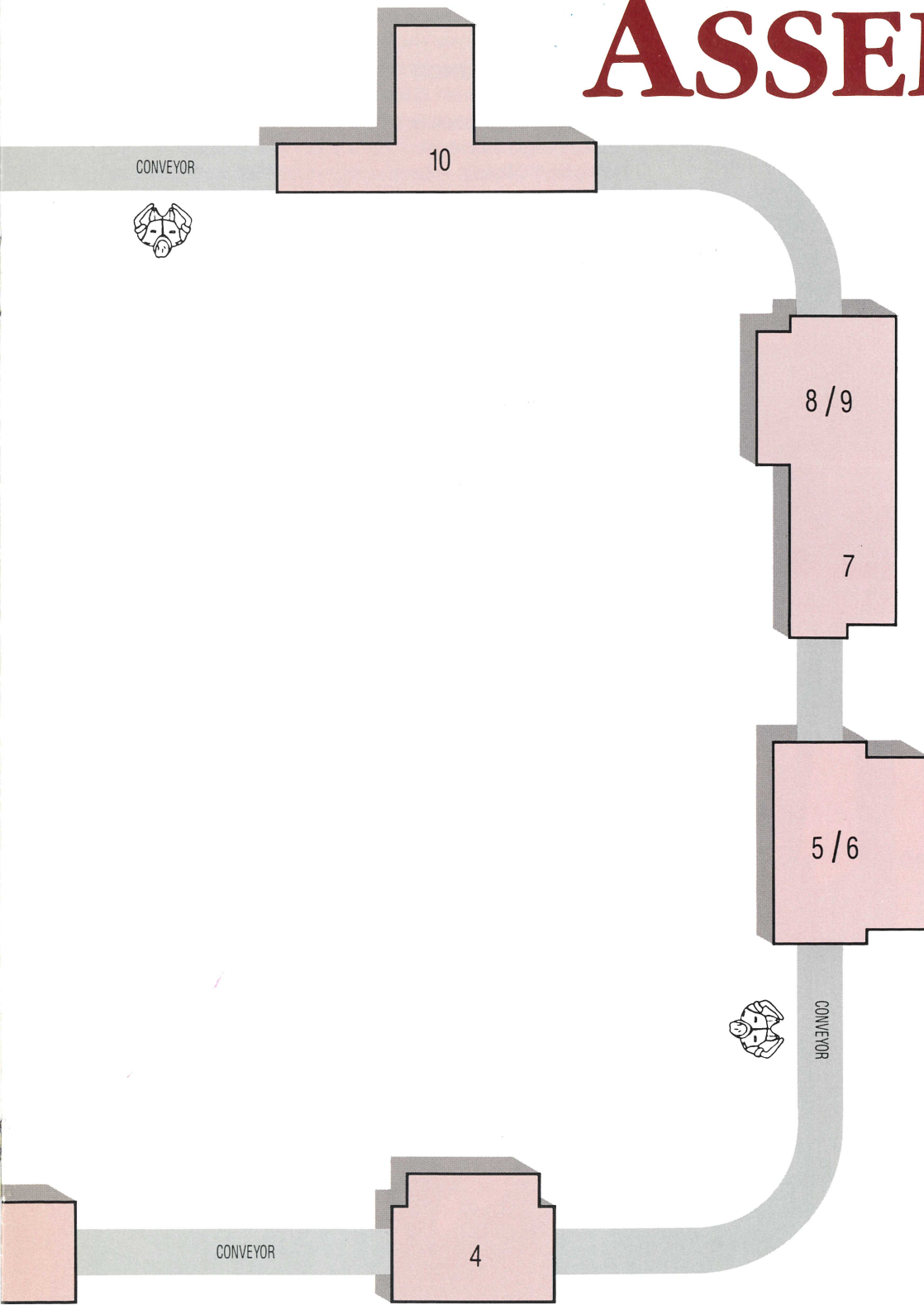


AUTOMATIC ASSEMBLY LINE



TIEGEL CASE PUNCH

THE TIEGEL CASE PUNCH consists of 5 integrated punches working simultaneously off a foot-activated air cylinder. This makes for a high speed operation, where production exceeds 6 batteries per minute. The height of the hole punch can be easily adjusted by fixed height stops, ensuring hole accuracy. A separate quick change head is required for each battery type. The operator places the battery on the head and activates the punch. Case punch stands are universally interchangeable for lower costs.

Other models include a 4D/8D combination punch. Call our sales department for specially designed case punches per your requirements.

TIEGEL CASE PUNCH

ENGLISH:

Air: .033 cu.ft./minute at 80-100 PSI

Floor space: 2.25 cu.ft.

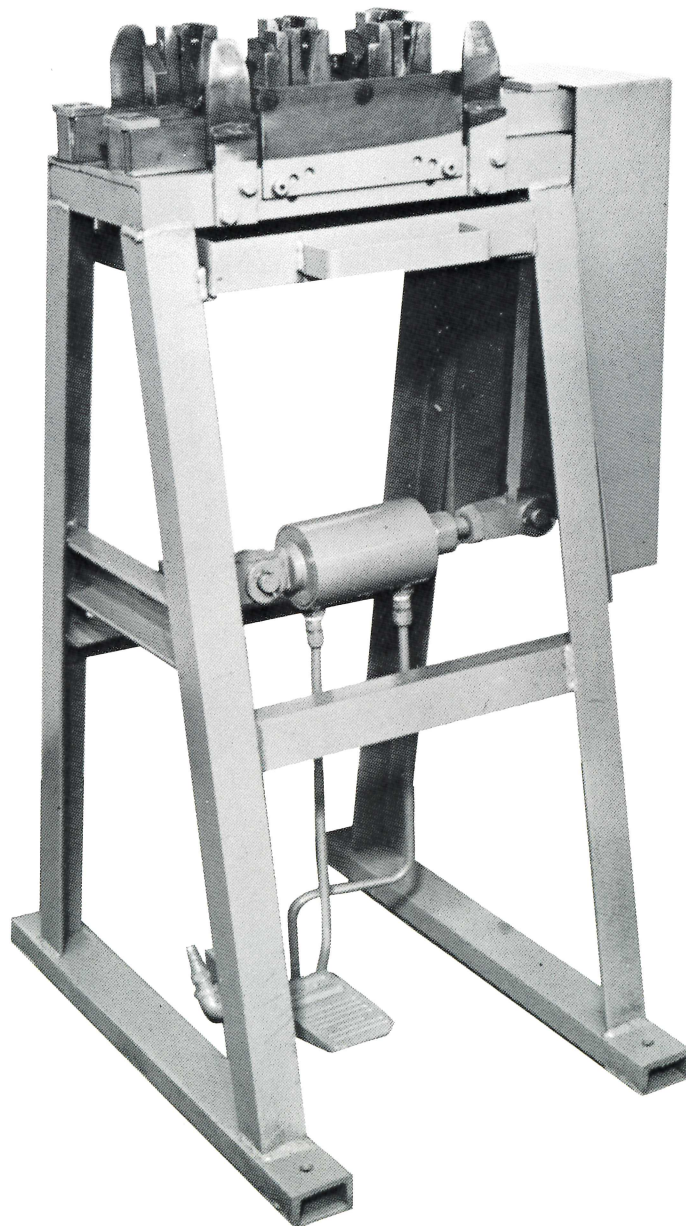
Weight: 110 lbs.

METRIC:

Air: .001 cu.m./minute at 6.9 ATM

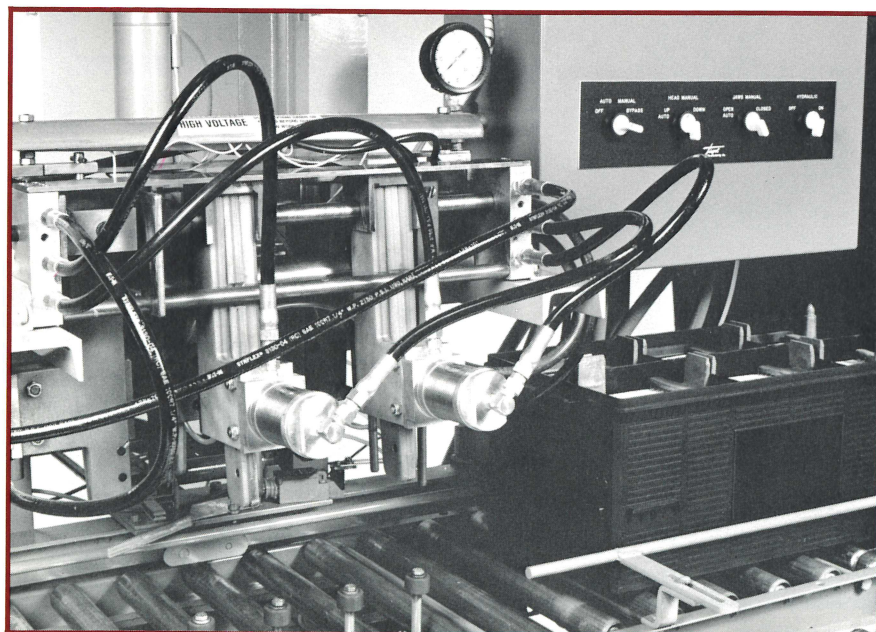
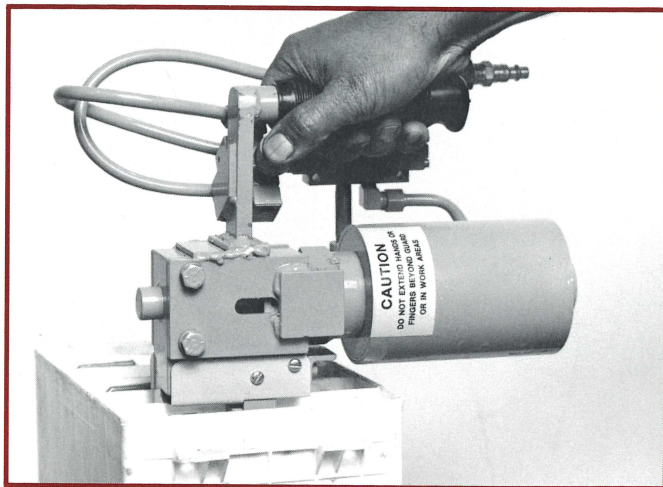
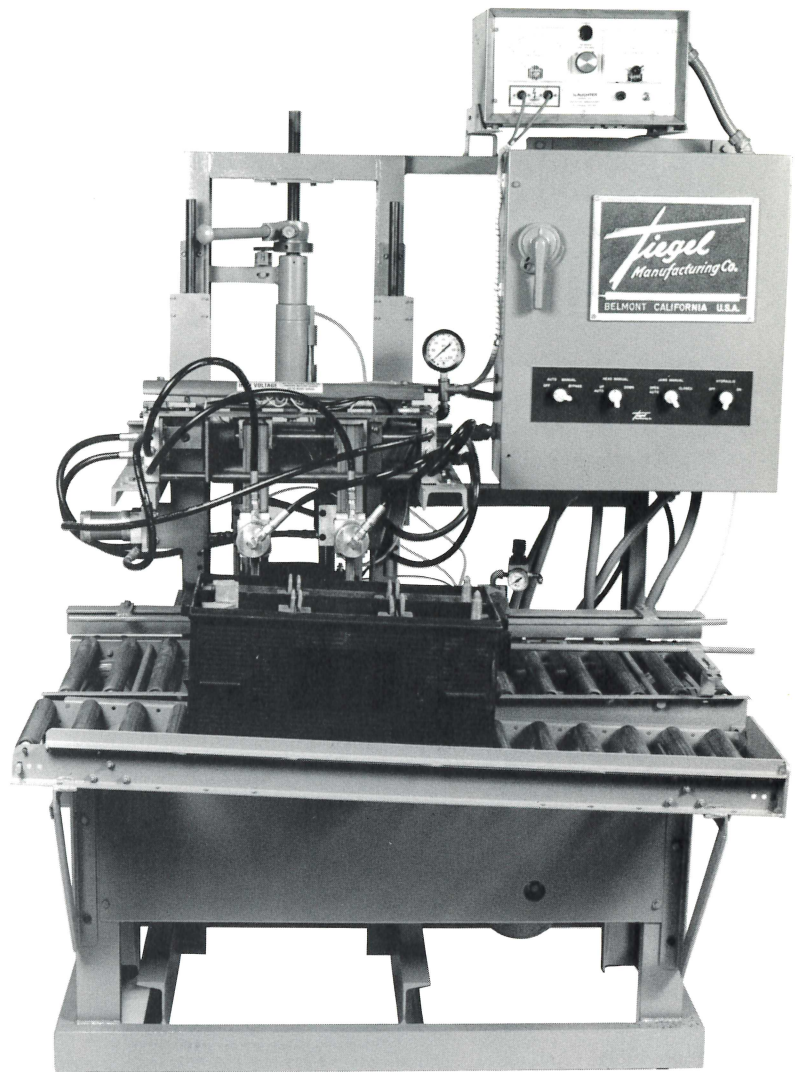
Floor space: .207 cu.m.

Weight: 50 kilograms



AUTOMATIC MODEL AWT-1A TESTER AND MANUAL SHEAR TESTER

To ensure quality control of the extrusion-fusion weld, we recommend the use of either the Manual Shear Tester or the Automatic Model AWT-1A Weld Quality Tester. The fully Automatic AWT-1A Tester is designed to automatically mechanically and electrically check welds made with our through-the-partition welders. The machine checks all the welds simultaneously as the head comes down into the battery. The machine is also available equipped with electrical testing to test for shorts and open cells. Changeover from one battery type to another takes less than 5 minutes. Batteries are fed and positioned into the machine automatically. The next battery is automatically fed in as one battery leaves the testing area. Batteries are checked at a rate exceeding six batteries per minute, and those which fail the test are automatically rejected from the line on to a 4 ft. reject storage line. The machine comes complete, ready to install and hook up to your utilities.



TIEGEL MANUAL WELD TESTER

ENGLISH:

Air: 0.416 cu.ft./minute at 80 PSI

Floor space: 1 cu.ft.

Weight: 12 lbs.

METRIC:

Air: .012 cu.m./minute at 6.9 ATM

Floor space: .09 cu.m.

Weight: 5.5 kilograms

TIEGEL AUTOMATIC WELD TESTER

ENGLISH:

Electrical: 1.1 KW

Air: 0.416 cu.ft./minute at 80 PSI

Floor space: 13.44 sq.ft.

Weight: 860 lbs.

METRIC:

Electrical: 1.1 KW

Air: .012 cu.m./minute at 6.9 ATM

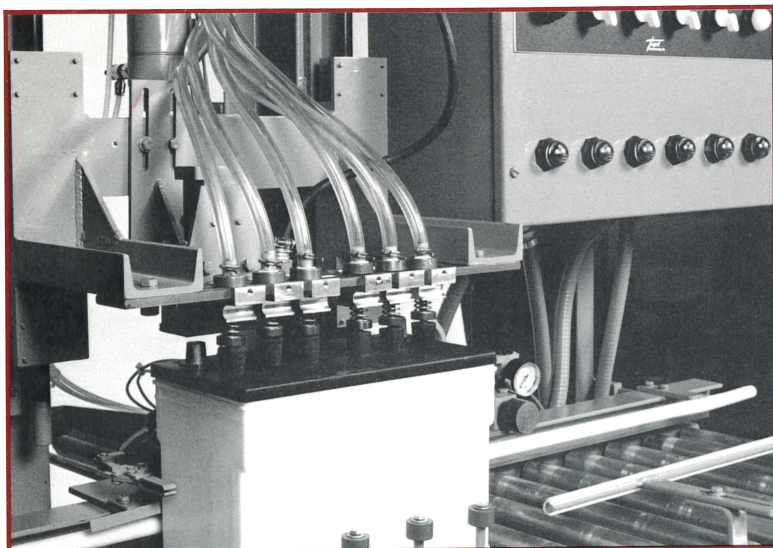
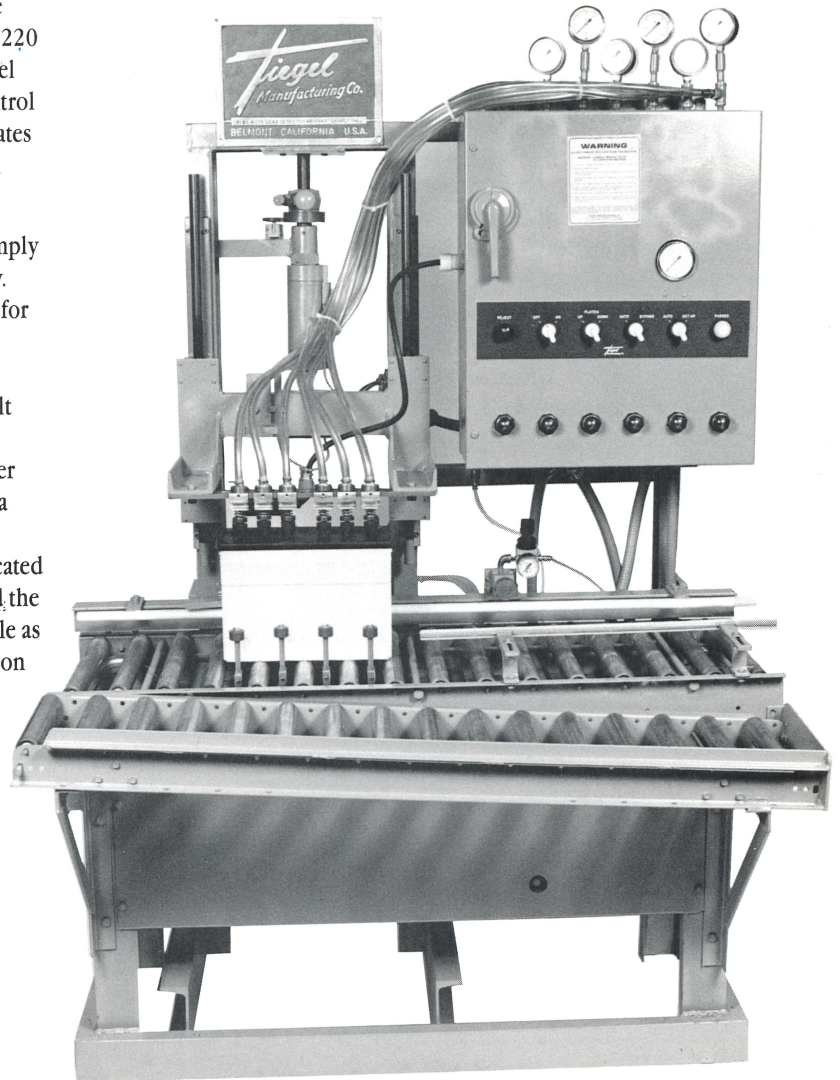
Floor space: 1.248 sq.m.

Weight: 363.6 kilograms

TIEGEL LEAK DETECTOR

The TIEGEL LEAK DETECTOR features rugged design, ease of operation and reliable sensitive testing. The unit comes complete ready to install into your assembly line. Utilities required are 110-220 volt control voltage and 5 to 80 PSI air pressure. The control panel consists of a power off-and-on switch, three or six green test control lamps which indicate a leaking cell, one white lamp which indicates no leaks, a red light which indicates a leak, a reset button, and an adjustable timer for setting the length of the test.

The operation of the detector is fully automatic. The operator simply places the three or six probe adjustable hand piece on the battery. The tester then pressurizes each alternate cell and analyzes them for leaks. The six probe handle analyzes a whole battery at once by testing alternate cells in an automatic sequence. The three probe handle must be shifted once to alternate cells when testing 12 volt batteries. Desired low test pressure, less than 3 PSI, and time are easily adjustable. The tester is sensitive down to a three inch water column pressure drop. During a two second test, this represents a leak rate of less than .07 cubic inches per second which can be detected. If a cell fails, a horn sounds and the leaking cell is indicated on the control panel. If all cells pass the test, a chime sounds and the white light indicates that all cells passed. This machine is available as a fully automatic Leak Detector or can be ordered as a Combination Post Burner/Leak Detector.



TIEGEL AUTOMATIC LEAK DETECTOR

ENGLISH:

Electrical: 1.1 KW
Air: 80 to 100 PSI
Floor space: 13.44 sq.ft.
Weight: 750 lbs.

METRIC:

Electrical: 1.1 KW
Air: 6.9 ATM
Floor space: 1.248 sq.m.
Weight: 340 kilograms

TIEGEL MANUAL LEAK DETECTOR

ENGLISH:

Electrical: 110 Volts
Air: 5 to 80 PSI
Floor space: 2 cu.ft.
Weight: 45 pounds

METRIC:

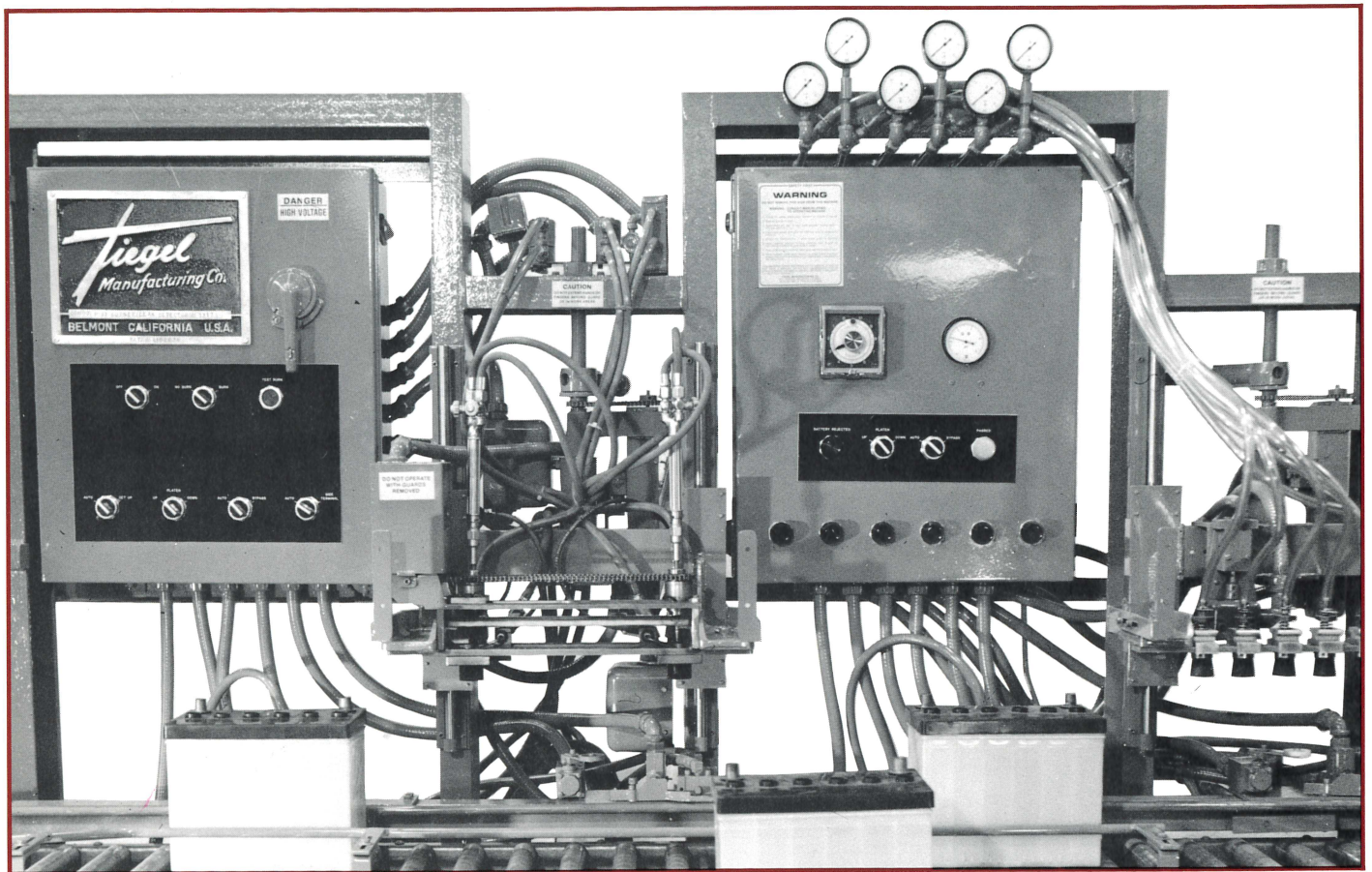
Electrical: 110 Volts
Air: 1 to 6.9 ATM
Floor space: .18 cu.m.
Weight: 20 kilograms

TIEGEL COMBINATION POST BURNER/ LEAK DETECTOR MODEL APB-LD

THE TIEGEL MODEL APB-LD COMBINATION POST BURNER/LEAK DETECTOR is designed to automatically burn high profile terminal bushings to the protruding terminal post. It is also capable of burning angle-type posts when molded into the cover. This machine automatically positions the battery, places a water cooled mold around the high profile bushing, and automatically welds the bushing to the terminal post through a patented orbital motion. After cooling the mold automatically retracts. This machine consistently gives good penetration and a polished finish. After burning the battery is passed on to the automatic leak detecting station. Here the battery is code dated and filled with air to a preset pressure which is adjustable according to your requirements. Cells one, three and five are tested

for a pressure drop and then vented. Then cells two, four and six are tested. The tester can detect intercell leaks and leaks to the exterior of the batteries. If a battery is rejected by the test unit, it is automatically rejected from the line on to a 4ft. reject storage line. The unit comes complete and ready to install into your existing conveyor line and hook up to the utilities. The production is matched to the balance of the line at the rate of 4 batteries per minute. The two stations can be ordered individually.

Options for this machine include the Seal Sensor, for increased leak sensitivity down to 5 cc per minute.



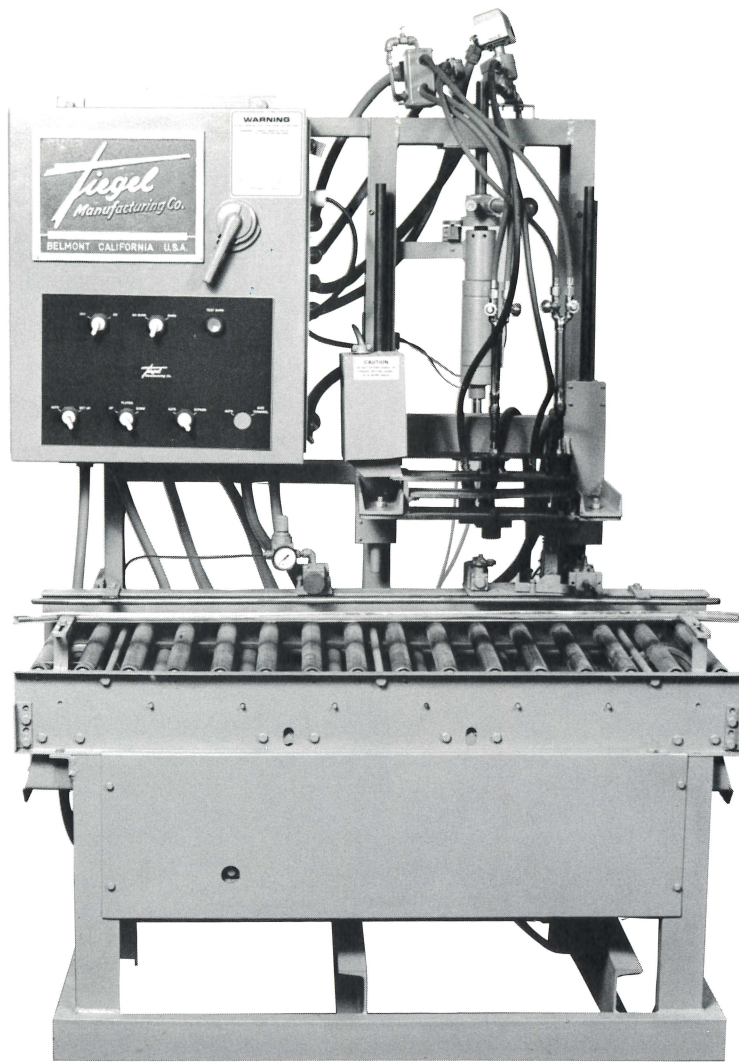
TIEGEL COMBINATION POST BURNER/ LEAK DETECTOR

ENGLISH:

Electrical: .05 KW
Air: .076 cu.ft./minute at 80-100 PSI
Water: 1 gallon/minute
Gas: 5 PSI pressure
Oxygen: 10 PSI pressure
Floor space: 23.22 sq.ft.
Weight: 1,250 Lbs.

METRIC:

Electrical: .05 KW
Air: .002 cu.m./minute at 6.9 ATM
Water: 4 liters/minute
Gas: .33 ATM pressure
Oxygen: .67 ATM pressure
Floor space: 2.16 sq.m.
Weight: 568 kilograms



TIEGEL AUTOMATIC POST BURNER

The Tiegel Automatic Post Burner utilizes a unique orbital burn, which allows for a deep penetrating burn between the terminal and the bushing of the cover. An advantage of this type of burning is that much less energy input is required because the terminal post is melted from the side and then fused with the bushing. Systems that burn straight down cannot get the same penetration because the lead from the terminal post melts down causing cold flows between the bushing and the terminal. After the burn, water is injected into the mold cooling the burn quickly so that the bushing does not overheat the plastic cover.

ADDITIONAL FEATURES:

- The post burner operates at a continuous four batteries per minute and is fully automatic.

- Because of the low gas velocity of the tips, lead does not spit back into the tip, causing the tips to plug. This feature makes the machine trouble free and very consistent in burn quality.
- The head of the machine is very flexible in that the post molds for the positive and negative terminals screw in and can be easily exchanged for reverse battery types. One burner is in a fixed position and the other burner can be easily moved for different battery types.
- Height adjustment is by a ratchet with numerical readout for easy operator set-up.

This machine is also available to burn low profile industrial bushings at a rate of two batteries per minute. We invite your inquiries for special production requirements.

TIEGEL AUTOMATIC POST BURNER

ENGLISH:

Electrical: .05 KW
 Air: 80 to 100 PSI
 Water: 1 gallon/minute
 Gas: 5 PSI
 Oxygen: 10 PSI
 Floor space: 13.44 sq.ft.
 Weight: 800 lbs

METRIC

Electrical: .05 KW
 Air: 6.9 ATM
 Water: 4 liters/minute
 Gas: .33 ATM
 Oxygen: .66 ATM
 Floor space: 1.25 sq.m.
 Weight: 348 kilograms

TIEGEL SLAUGHTER TESTER

The Slaughter High Voltage Leakage Tester is available as an option on our Automatic Weld Test Station Model AWT-1. This unit is specifically engineered for the testing of battery elements, and detects any potential shorts between the negative and positive plates by testing for misplaced or faulty separators, as well as runs, trees, and similar defects. The test is accomplished by placing a high

potential of 500 to 3000 volts on the groups, and measuring the current leakage in millamps. If it exceeds a pre-set current limit, an alarm goes off, and the battery is rejected. The standard Slaughter unit uses continuous voltage, however, in high humidity areas, we recommend a pulse type version to minimize false rejects.

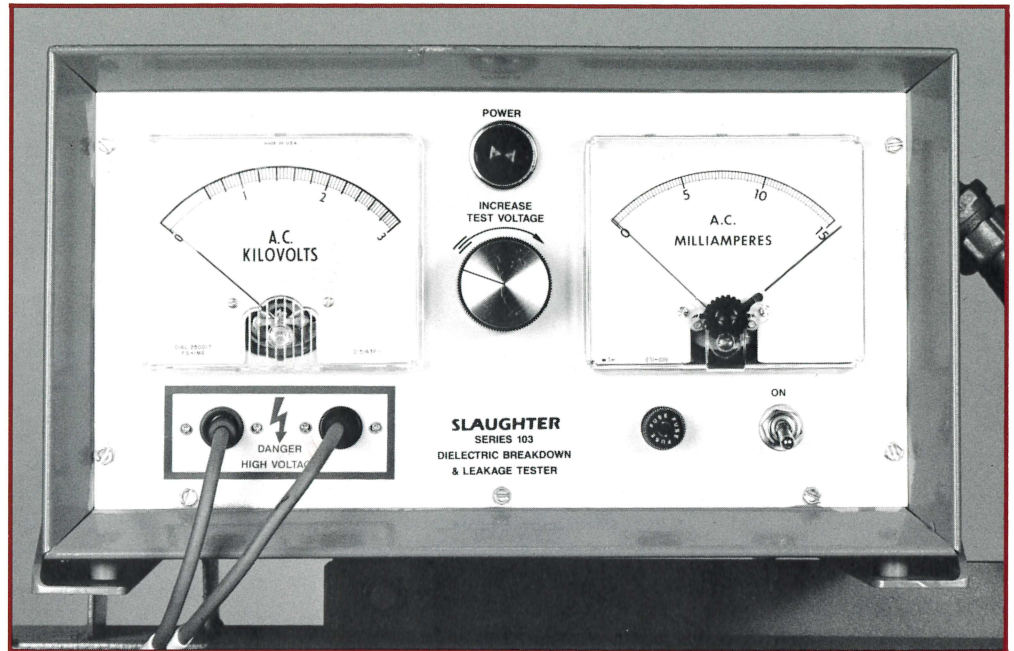
TIEGEL SLAUGHTER TESTER

ENGLISH:

Electrical: 110 Volts
Floor space: 2 cu.ft.
Weight: 45 lbs.

METRIC:

Electrical: 110 Volts
Floor space: .18 cu.m.
Weight: 20 kilograms



TIEGEL SEAL SENSOR

- Increased leak sensitivity down to 5cc per minute
- Senses a 5cc per minute leak rate for any battery at any pressure greater than 0.1 psi or more
- Easy retrofit/pre-wired and assembled to fit into your existing Tiegel Leak Detector
- Instantaneous leak rate measurement and read out
- The six channels plus one reference channel handle 6-12-24 volt batteries
- Direct leak rate read out
- Minimize fill time
- No adjustment needed for different battery sizes
- Sensitive enough for hot post leak test

The Tiegel Seal Sensor gives the Battery Manufacturers the opportunity to meet tougher leak standards. By referencing six leak rates to a standard leak rate reference, greater accuracy is achieved without the need for a precision pressure regulator. Simple front panel controls change the channel sequences between 6, 12, and 24 volt battery types. Channel sensitivity for reject levels are also conveniently set.

TIEGEL SEAL SENSOR

ENGLISH:

Electrical: 110 Volts
Air: 80 PSI
Floor space: 2 cu.ft
Weight: 45 lbs.

METRIC:

Electrical: 110 Volts
Air: 6.9 ATM
Floor space: .18 cu.m.
Weight: 20 kilograms



The Tiegel Automatic Battery Assembly Line

Give your customers the full benefit of the active materials in your battery, through substantially less resistance in the weld, while reducing your manufacturing costs through the use of Tiegel Automatic Extrusion-Fusion Line. By using less lead in the small parts, and no epoxy because of the heat sealing, your material costs can also be dramatically reduced, leading to increased profits.

One of the features of this line is that it has been planned using our extrusion-fusion weld connection process, which has the following benefits:

- **A double seal on every intercell wall.**
- **No interlocking parts have to be cast.**
- **A minimum of intercell post line-up**

Our automatic line is quickly and easily integrated into your existing manufacturing process, whether you use Group Burning or Cast-On systems. The following functions are performed as the battery progresses through the line:

1. **Case Punching**
2. **Group Dropping**
3. **Intercell Welding**
4. **Weld and short circuit checks**
5. **Cover placement**
6. **Cover heat sealing**
7. **Terminal building**
8. **Leak detection**
9. **Code date stamping**
10. **Acid filling**

Our master planned layout will make the most effective use of your assembly space while producing over four batteries per minute with improved quality and reliability. The line is fully automatic, requiring only minimal operators for observation. Labor is substantially reduced—typically, three operators will produce between 980 and 2880 batteries per eight-hour shift—which can cut your direct labor costs dramatically. This line is versatile as well, with added benefits in quick change-over time between battery types—less than 5 minutes per machine.

Low maintenance, durable construction, and reliability make our equipment the leader throughout the world. We welcome your inquiries concerning the special production requirements for your company.

