BACKGROUND AND HISTORY:

Bowden Industries, an engineering and manufacturing company, has developed "new technology" for industrial parts cleaning applications. With Bowden parts washing systems, high industrial cleaning standards can be met without the use of hazardous chemicals.

THE BOWDEN PARTS WASHERS

Bowden systems use a bio-degradable, non-toxic detergent in an immersion tank. This basic concept has been developed into a wide range of single and multi-stage systems.

The heart of Bowden cleaning systems is the interaction of the "LIQUID TURBO-CHARGER™" and Bowden's proprietary cleaning products. Bowden's "new technology" solves the three basic problems of using water base immersion cleaning systems: 1) oil on the surface, 2) rapid fluid deterioration and 3) inadequate cleaning.

The "LIQUID TURBO-CHARGER™" vigorously agitates the cleaning fluid to accelerate and enhance the detergent action and to prevent oil contamination of the fluid surface. The powerfully agitated fluid "scrubs" all surfaces of the parts to remove oil and chips quickly and thoroughly. The detergent action keeps contaminants suspended in the fluid until it passes through the calm fluid section of the tank. In this section, the oil rises to the surface where it accumulates until it is removed by the tramp oil skimmer. As a result of this interaction of the patented "LIQUID TURBO-CHARGER™" and the proprietary cleaning fluid, the surface of the fluid remains "clean" and the parts emerge from the fluid without being recontaminated. Skimming the oil from the fluid prolongs the viable cleaning power of the detergent. The machine "Automatically Cleans the Cleaning Fluid While the Cleaning Fluid Cleans the Parts".

Bowden Systems Advantages

> Meets high industry cleaning standards
> Eliminates the use of hazardous chemicals.
> Removes chips from blind holes.
Prevents parts from mixing in washer.
May reduce manpower requirements.
May reduce parts cleaning costs.
Provides process control and automation.
Does not leave film on parts.
Does not tarnish.
Does not leave spots.
Does not damage parts.

SYSTEMS AVAILABLE

Bowden's parts washers are available in single and multiple stage systems. Single stage units are used when removal of contaminates is required, but a detergent film can be tolerated for the next operation. Multiple stage systems are used where dry, film free and spot free parts are required. Multiple stage systems include tanks for washing such as wash, rinse, rust inhibit treatment, rust removal, phosphatizing and brightening. Stage selection allows different materials to be cleaned in one cleaning system.

Options available for each tank include: 1) automatic fluid recharge, 2) automatic Water Refill, 3) automatic or manual rinse purge systems and 4) chip remover/filter systems.

Single stage units include the Parts Cleaner (PC) line, the Rotating Basket (RB) line, and the Lift Oscillator, (LOA) line.

Multi stage systems include the Multiple Lift Oscillator, Automatic (MLOA), the Hoist-operated Rotating Basket (HRB), the Programmable Hoist-operated Rotating Basket (PHRB), the Chain Conveyor Rotating Basket (CCRB), and the Belt Washer Line (BW).

SYSTEM APPLICATIONS

Parts Cleaners (PC's) can be used to clean parts that can tolerate a detergent film for their next operation. PC's are also useful for cleaning parts which have no blind holes or chip removal problems and which are self draining.

Lift Oscillators, Automatic (LOA's) are designed to accomplish the same cleaning requirements as the PC, but also provide automatic processing of the parts into and out of the tank. LOA's facilitate handling heavy and/or delicate parts that might be damaged from tumbling. LOA's provide a gentle, controlled, jostling of the parts while immersed. This action improves the cleaning of some parts.

Multi stage LOA's are also available. MLOA's can include a wash, rinse, rust inhibit, brightening, or other
stages. A dryer blow off can also be added as the final stage. Multiple stage systems give the additional advantages of providing film free, spot free and dry parts ready for final shipment or use. These systems can be completely automatic and provide process control for consistent cleaning to meet the user's quality requirements.

Rotating Basket (RB) models thoroughly clean parts that require chip removal from blind holes and have delicate surfaces (o.d. threads or ground surfaces) which might be damaged by tumbling. The RB cleans the parts by rotating a rack which holds 4 or 6 parts baskets while the turbo-charger directs the cleaning fluid over the parts. Rotation exposes all surfaces of the parts to the cleaning fluid and removes chips from blind holes. Continued rotation while the baskets are above the fluid minimizes fluid carry out by completely draining the blind holes. RB's provide automatic programmable cycle timing for both the wash and drain cycles.

Multi stage Hoist-operated Rotating Basket (HRB) systems can include stages such as rinse, rust inhibit, phosphatize, and brighten. They also include a final stage for heated or ambient air drying of the parts. These multi stage systems are offered in manual (HRB) or programmable (PHRB) hoist capability. PHRB's can provide process control for consistent cleaning to meet the users quality requirements.

Bowden's most advanced system is the Chain Conveyor Rotating Basket (CCRB) System. Completely automated, the CCRB is designed for high volume production. The CCRB provides multi-stage continuous cleaning and finishing. It can include any combination tanks for washing, rinsing, rust inhibit treatment, phosphatizing, brightening, etc. It is available with either manual or automatic load/unload capability. Variable process selection can be provided by using by-pass tanks. Allows cleaning of different materials with the same system.

Bowden cleaning systems can be used to clean metallic parts or plastic parts. Examples include cast iron, steel, copper, aluminum, brass, etc.

DESCRIPTIONS FOR STANDARD PRODUCT LINE SYSTEMS:

THE PARTS CLEANER (PC) LINE

The PC models are work-station washers. Parts to be cleaned are processed in baskets which can be handled manually for the smaller table top version or by hoist devices for the larger models with heavy loads. Larger parts may be loaded directly into the tank. The baskets are lowered into the agitated cleaning fluid which removes
lubricants, coolants and various soils from the parts. PC units are designed to clean self draining parts which do not have blind holes or a chip removal problem. Standard PC models consist of a single insulated tank, turbo-charger, skimmer and an integral electrical control panel.

**Advantages**

- Minimum installation cost.
- Small space required.
- One man manual operation.
- Can handle large castings with the addition of a hoist.
- Can be used for multiple stage operations

**Limitations**

- Not suitable for cleaning small blind holes.
- Limited capability for removing chips from blind holes.
- Not for automatic operations.
- Single stage washer will not provide a spot free finish.
- May require a dryer to prevent rust and other problems.

THE LIFT OSCILLATOR, AUTOMATIC (LOA) LINE

The LOA models are automatic batch process cleaning systems designed for use in manufacturing and job shop environments. These parts cleaners have a lift platform to lower and raise parts into and out of the tank fluid. The systems clean self-draining parts that do not have blind holes or a chip removal problem. Lift Oscillator systems can clean heavy parts or delicate parts that might be damaged by tumbling. Cleaning time is automatically controlled in an LOA.

The LOA parts handling device is designed for two functions: (1) To facilitate movement of parts into the tank smoothly and easily; and (2) To jostle the parts up and down while immersed in the cleaning fluid. This action increases the cleaning effectiveness of certain parts.

**Advantages**

- May be used in multi stage operations.
- Cleans heavy, hard to handle, parts.
- Small space requirements.
- Cleans delicate parts.
- Minimum installation cost.
- One man operation.
Limitations

- Limited capability for removing chips from blind holes.
- Dryer may be required to prevent spots and rust.
- Rinse stage required if a soap film cannot be tolerated.
- Single stage washer does not provide spot free finish.

THE PROGRAMMABLE MULTIPLE LIFT OSCILLATOR, AUTOMATIC (PMLOA) LINE

The PMLOA is designed to clean up to twelve 12" X 18" X 6" baskets of parts that do not have chips in blind holes and are self draining. The PMLOA may provide a full wash, rinse, rust inhibit, phosphatize and dry system using the LOA parts washer line. It provides fully automatic loading and unloading and automatically shuttles parts between tanks and other stages. The PMLOA consists of two or more LOA's placed side by side, an automatic powered load and unload station, a powered interstage shuttle, a dryer blow off stage and an automatic powered entrance and unload conveyor.

Advantages

- Automatic operation
- Clean parts that require oscillation during immersion.
- Clean, rinsed, rust inhibited, dry, spot free parts ready for shipment.
- Increase production and improve quality.
- Clean a variety of parts from delicate to large and bulky in the same system.
- Provides process control capability to give consistent quality of cleaned parts.

Limitations

- Limited capability for removing chips from blind holes
- Heavy fluid carry-over for parts that are not self draining.

THE ROTATING BASKET (RB) LINE

RB's are designed to solve the difficult problem of cleaning chips from blind holes or for parts that do not self drain. These systems are particularly useful in cleaning parts which cannot be tumbled freely without damaging the parts. The RB models are parts cleaners which have an integrated rotating rack mechanism. Delicate parts which have blind holes and require chip removal can be effectively cleaned in Bowden Industries' RB without risk of
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damage. Baskets of parts to be cleaned are loaded manually into the rotating rack. These baskets can hold the parts securely to prevent them from tumbling freely. The baskets are locked into a rack which rotates as it is immersed in a tank of turbulent fluid for washing. The rack is automatically lowered into the agitated cleaning fluid and is rotated during the programmed wash cycle. During the wash cycle the turbo-charger directs the cleaning fluid over the parts for maximum cleaning. Rotation exposes all surfaces of the parts to the cleaning fluid and empties chips from blind holes. The rack is then automatically lifted from the fluid and rotated for a programmed time to thoroughly drain the parts. Continued rotation empties chips from blind holes. This single stage system does not provide a film free finish and the part emerges wet.

Advantages

- Removes chips from blind holes.
- Thoroughly cleans and drains.
- Cleans delicate parts safely.
- Protects O.D. threads.
- Protects ground surfaces.
- Automatic operation.
- Minimum installation cost.
- Small space required
- One man operation

Limitations

- Single stage washer will not provide a film free finish.
- Dryer may be required to prevent spots and rust.

HOIST ROTATING BASKET (HRB)

HRB's are designed to clean parts that require cleaning chips from blind holes or for parts that do not self drain and may require rinsing, rust inhibiting, or drying. These systems are particularly useful in cleaning parts which cannot be tumbled freely without risk of damage. HRB's are similar to RB's in that they rotate the parts to remove chips from blind holes and provide protection for delicate parts. However, they use multiple tanks and share a single rotating rack mechanism. Usually these systems include a final heated dryer stage. Multiple stage cleaning systems are required for spot free, film free cleaning and for application of special cleaning or treatment. A manually operated hoist-trolley is used to move the rotating rack mechanism, which contains baskets of parts, through the series of tanks and the dryer. Baskets may be loaded either manually or automatically.
Advantages, HRB's

- One man manual loading and unloading operation with wash, drain (to minimize carryover), rinse, drain, dry, etc. cycles.
- Provides a dry, spot free finish.
- Flexible multiple stage operation.
- Ideal for cleaning, treating and drying blind holes.
- Removes chips and fines.
- Cleans delicate parts.

PROGRAMMABLE HOIST ROTATING BASKET (PHRB)

PHRB's clean parts that require cleaning chips from blind holes or do not self drain and may require rinsing, rust inhibiting, or drying. In addition these parts may require automatic control for control to ensure consistent quality with minimum parts damage. PHRB's are similar to HRB's, but the hoist/trolley and rotating basket is programmable on the PHRB. The parts are transported through the various processes defined for the system (wash, rinse, etc.) in baskets which hold the parts securely to prevent them from tumbling freely. The baskets are locked into a rack which rotates as it is lifted and advanced by a programmable hoist. As it advances, the rack is immersed in tanks of turbulent fluid for washing, rinsing, etc. While immersed in the fluids, the rack rotates continuously to assure that all surfaces of the parts within the baskets are thoroughly exposed to the effects of the fluids. Rotation continues as the baskets emerge from the tanks for maximum draining. Wash drain and dry times are fully programmable and are selected by the operator. Baskets may be loaded either manually or automatically. The fully automatic features of the PHRB enable it to perform at a higher production rate and to provide excellent process control in cleaning the parts. PHRB's typically provide four cleaning cycles per hour. A PHRB 300 can clean 24 baskets per hour; a PHRB-160 can clean 8 baskets per hour.

Advantages, PHRB's

- One man manual loading and unloading operation with wash, drain (to minimize carryover), rinse, drain, dry, etc. cycles.
- Provides a dry, spot free finish.
- Flexible multiple stage operation.
- Ideal for cleaning, treating and drying blind holes.
- Removes chips.
- Cleans delicate parts.
- Either manual or automatic load/unload operation and fully automatic wash, rinse, drain, dry cycles.
- Can be programmed for selective processing of different materials.
> Process control to ensure consistent quality with minimum parts damage.
> Reduces manpower.

THE CHAIN CONVEYOR ROTATING BASKET (CCRB) LINE

This system is designed to clean and dry delicate parts that have blind holes and require draining. CCRB models are multiple tank systems with a heated blower dryer. Rotating racks, suspended between dual chain conveyors, transport baskets of parts through different stages, such as, a wash tank, a rinse, a selective brightening, a rinse, selective rust inhibit and heated dryer. Program controlled operation and automatic loading and unloading of the rotating racks allow up to 40 racks per hour to move through the system. The resulting parts are clean, unblemished, chip-free and dry. Baskets of parts to be cleaned are loaded, either manually or automatically. Tanks equipped with a hydraulic lift allow bypassing tanks for special operations.

Advantages

> High volume.
> Provides a spot free finish.
> Flexible multiple stage operation.
> Can be programmed for selective processing of different materials.
> Ideal for cleaning, treating and drying blind holes.
> Fully automatic. (Automatic load and unload optional).