The Dockery Process

Patented electrical current balancing for network-wide loss reduction

The Dockery Process is a patented three-phase **Electrical Current Balancing System** that reduces power losses across the entire electrical network through coordinated, dynamic optimization and continuous measurement. Unlike point solutions (e.g., standalone capacitor banks), it actively balances and tunes all three phases at multiple nodes to cut I^2R and reactive losses system-wide.

The Problem the Patent Addresses

Most facilities treat power quality and loss reduction locally. Conventional approaches focus on single points (one panel, one capacitor bank), assume balanced loads, and accept line losses as a "fixed" percentage of load. That leaves significant, compounding inefficiencies untouched, especially in real-world, imbalanced, non-ideal networks.

What Makes the Dockery Process Unique

- **Network-wide, not point-based**: Installed at multiple points and coordinated across all three phases to minimize phase-to-voltage lag and reduce upstream current.
- **Active, adaptive control:** Adjusts filtering response to match real-time load, avoiding added current draw and maintaining optimal conditions.
- **Comprehensive power-quality management:** Integrated components address power factor, harmonics, and imbalance simultaneously.
- **Built-in measurement & verification (M&V):** Bi-directional meters and data servers provide real-time and historical visibility for auditable results.
- **Patented innovation:** Protected under US 12,375,324 B2, enabling system-wide coordination and tuning not found in traditional methods.

How It Works

1. **Map & instrument:** Identify and trace circuits from main switchgear, instrument with bi-directional metering, and deploy integrated rack system on an independent breaker.
2. **Balance all three phases:** Install parallel balancing systems per phase for active management and coordination.
3. **Optimize continuously:** Load controllers and filters adapt in real time to maintain minimal current-voltage lag and reduce upstream losses.

4. **Verify results:** Aggregate meter data to demonstrate total network kW loss reduction and improved power quality.

Why It Outperforms Traditional Approaches

Traditional PFC / Filters	The Dockery Process
Single point, static correction	Multi-point, dynamic control across all three phases
Localized effect	Cascading, system-wide loss reduction
Limited visibility	End-to-end metering and data collection
Assumes balance/ideal conditions	Explicitly addresses imbalance and harmonics

Proof Points You Can Measure

The patent indicates the system tracks improvements through:

- kW loss reduction at the whole-network level (input vs. output).
- Power factor improvement and harmonic reduction at monitored points.
- Reduced upstream current demonstrating lower I^2R conductor losses and improved transformer performance.

The Dockery Process delivers measurable kW loss reductions across the **entire electrical network**, not just at individual components.

Detailed Technical Approach

(U.S. Patent 12,375,324 B2)

Core System Architecture

The 'Dockery Process' patent describes an **Electrical Current Balancing System** with multiple interconnected components working in concert:

Primary Components (as shown in Figures 1–2):

- Line/Power Filter (102/202): Filters and conditions the incoming power
- Switch Gear Booster (104/204): Enhances switching capabilities at the main gear
- Load Controller (108/208): Manages and optimizes load distribution
- Voltage Shunt Device (209): Appears in Figure 2, providing voltage regulation
- Bi-directional Meter (110/210): Monitors power flow in both directions

- Independent Breaker (116/216): Provides isolated circuit protection
- Gateway (112/212) and Data Server (114/214): Enable monitoring and data collection

Rack System Configuration (106/206)

The housing/mounting system that integrates all components into a coordinated unit.

Three-Phase Implementation Strategy (Figure 3)

- Multiple Balancing Systems (302a, 302b… 302N): Each phase gets its own complete balancing system
- Individual Load Management (304a, 304b… 304N): Each phase load is independently monitored and balanced
- Coordinated Ground References (306a, 306b… 306N): Proper grounding for each phase

This parallel deployment is crucial—it's not just adding capacitors to one phase, but actively balancing ALL phases simultaneously.

The Process Flow (Figure 4)

1. Identify circuits at main switch level (402)
2. Trace first circuit (404)
3. Perform measurement of power quality condition (406)
4. Install line/power filter and transmit filter signal (408)
5. Install switch gear booster (410)
6. Install rack system (412)
7. Install load controller (414)
8. Install bi-directional meter (416)
9. Connect electrical current balancing system to independent breaker and turn on (418)

Key Technical Innovations: Dynamic Response Capability

The system can adjust respective filtering capabilities based on a current load of the electrical network and adjust up or down to not add additional current load to the electrical network' (Claim 19). This is dynamic optimization, not static correction.

Comprehensive Monitoring

- Real-time power quality monitoring
- Historical data tracking with 'full scale reporting functions'
- Cost-savings verification through EM and V tracking

Multiple Operating Frequencies

- 50 Hz systems (Claim 4)

- 60 Hz systems (Claim 5)
- Both 50 Hz and 60 Hz signals (Claim 2)
- Narrow-band tuning capability (Claim 20)

The ‘Multiplicative Effect’ Explained

1. At the Load: The load controller reduces reactive current demand
2. In the Conductors: Lower current means reduced I^2R losses throughout
3. At the Switchgear: The booster and filter reduce connection losses and improve switching efficiency
4. At Transformers: Better power factor and reduced harmonics mean lower core and eddy current losses
5. System-Wide: Improvements compound—each percentage reduction in current creates a squared reduction in resistive losses

This patent reframes the network as an integrated system where improvements at multiple points create synergistic benefits that exceed the sum of individual improvements, effectively a ‘whole network optimization’ rather than a ‘point solution’.

Source: U.S. Patent 12,375,324 B2: The Dockery Process.
