Autonomous Refilling System For Industrial Agricultural Sprayers

Background
AGCO’s agricultural sprayers are already highly automated, but cannot refill themselves without human intervention. This limitation holds back the development of a completely autonomous sprayer.

Requirements
Autonomously:
- Detect and identify tender tank
- Create dripless connection between tender and sprayer tanks
- Pump fluid and disconnect when full

Solution
1. QR codes provide a unique funnel identifier which is used to track tank contents
2. Software monitors and controls the system, responds to changes to the system and the environment, and displays information on a realtime user interface
3. Reel lowers and raises male valve assembly into and out of funnel
4. Funnel guides male valve into alignment with female valve
5. Magnets align and connect valve assemblies
6. Linear actuation opens poppet valve; further actuation disconnects magnets
7. Poppet valve provides dripless seal between sprayer and tender tank

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