US005859509A

United States Patent [19]

Bienz et al.

[11] **Patent Number: 5,859,509**

[45] **Date of Patent: Jan. 12, 1999**

[54] **ADJUSTABLE SPEED CONTROL FOR CHILDREN'S RIDE-ON VEHICLE**

[75] Inventors: **Brian Bienz**, Orchard Park; **Patrice M. Neaves**, West Falls, both of N.Y.

[73] Assignee: **Mattel, Inc.**, El Segundo, Calif.

[21] Appl. No.: **777,629**

[22] Filed: **Dec. 31, 1996**

[51] **Int. Cl.**[6] **H02P 1/16**; A63H 29/24

[52] **U.S. Cl.** **318/139**; 318/261; 318/287; 388/851; 388/838; 388/840; 446/463; 446/448; 180/338

[58] **Field of Search** 446/465, 460, 446/462, 463, 466, 469, 448, 447; 180/338, 333, 6.5, 22; 318/139, 256, 261, 280, 442, 287, 288, 289; 388/851, 838, 839, 840

[56] **References Cited**

U.S. PATENT DOCUMENTS

3,665,502	5/1972	Means	318/17
4,246,521	1/1981	Soeda et al.	388/820
4,558,263	12/1985	Harris et al. .	
4,562,893	1/1986	Cunard	180/6.5
4,639,646	1/1987	Harris et al.	318/139
4,736,648	4/1988	Perego .	
5,229,703	7/1993	Harris	320/2
5,270,624	12/1993	Lautzenhiser .	
5,350,982	9/1994	Seib .	
5,497,056	3/1996	Kurland et al. .	

Primary Examiner—John W. Cabeca

Attorney, Agent, or Firm—Kolisch, Hartwell, Dickinson, McCormack & Heuser

[57] **ABSTRACT**

An adjustable speed control for use on a children's ride-on vehicle, where the speed control includes a switch assembly interposed between the battery and the motor of the vehicle. The switch assembly is selectively operable to connect the battery to the motor in one of a number of speed configurations, including a first speed configuration and a second speed configuration. An actuator is connected to the switch assembly and manipulable by a user to allow the user to operate the switch assembly to select a particular speed configuration from among the number of speed configurations. In one embodiment, a diode is disposed in series between the motor and battery in one of the speed configurations to provide a relatively current independent voltage drop between the motor and the battery. In an alternative embodiment, a childproof cover is disposed proximal to the actuator. The cover has a first configuration in which it substantially prevents a child from manipulating the actuator to operate the switch assembly to alter the selected particular speed configuration.

18 Claims, 3 Drawing Sheets

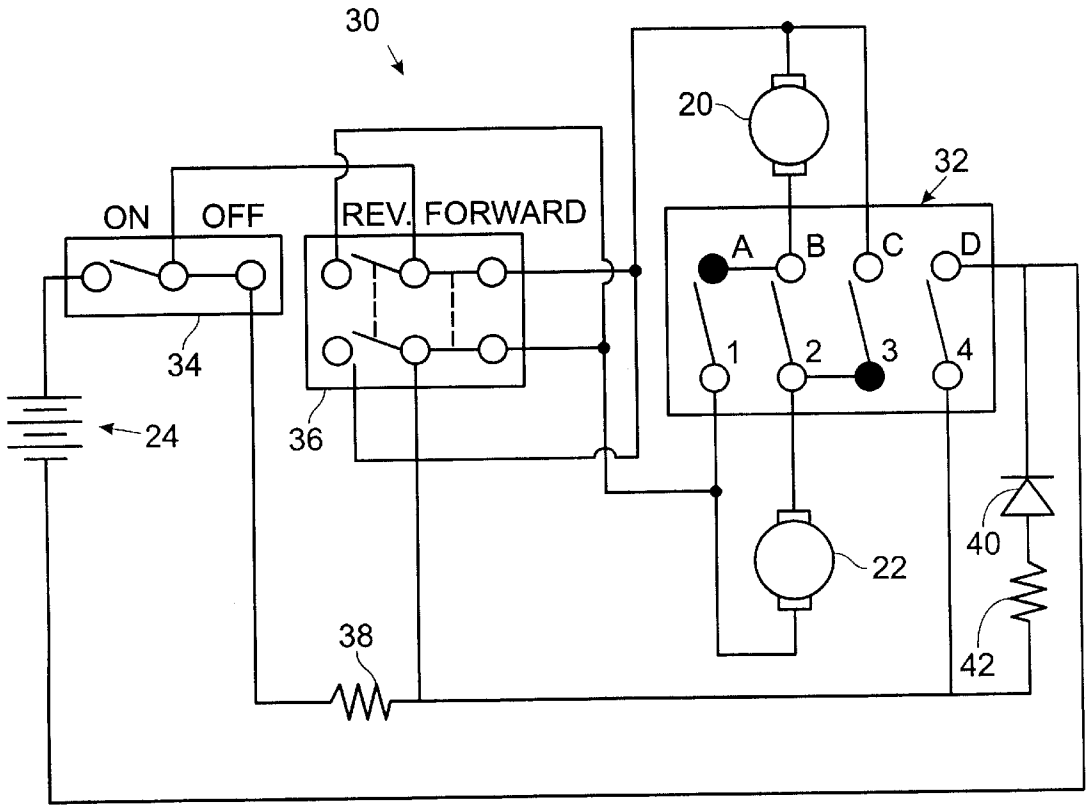


Fig. 2a

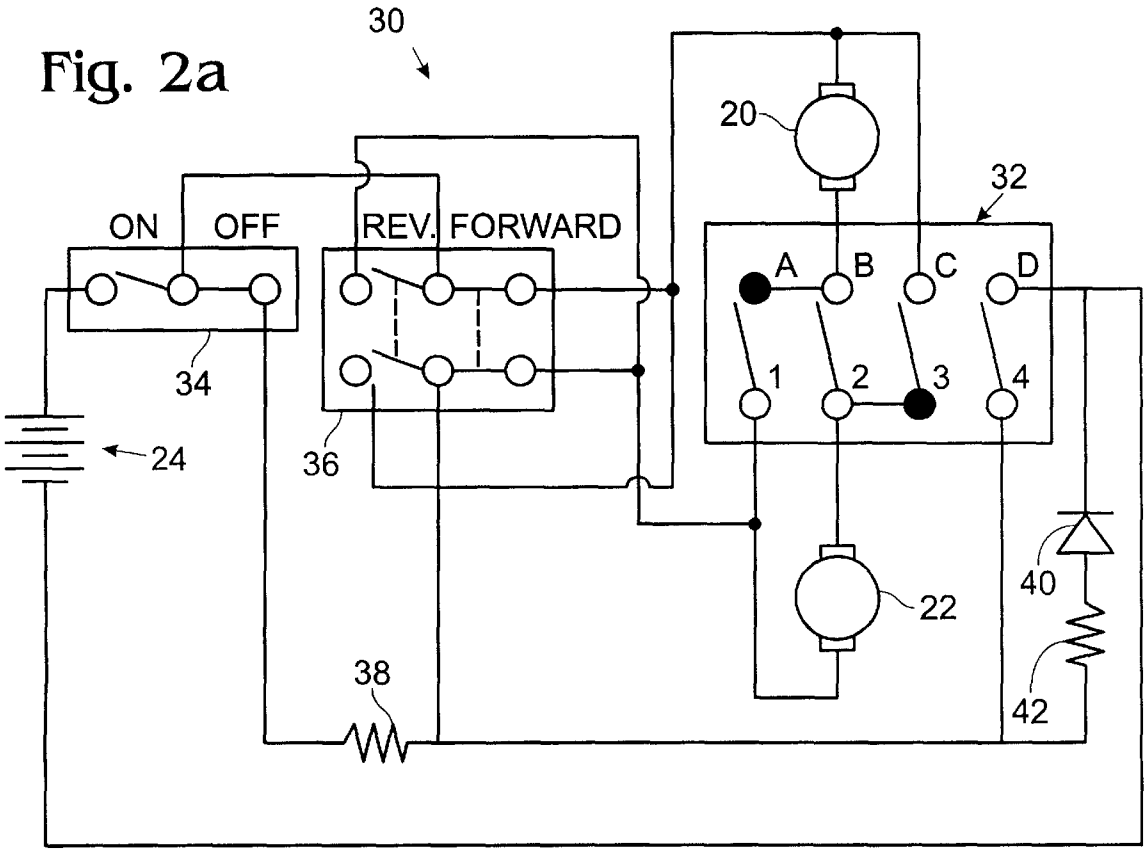


Fig. 2

ROTARY
SPEED
1-LOW
2-MED
3-HIGH

Fig. 1

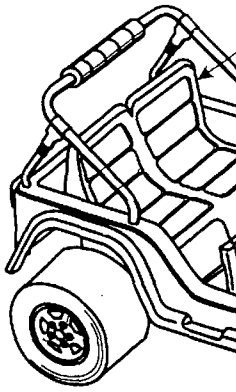


Fig. 5

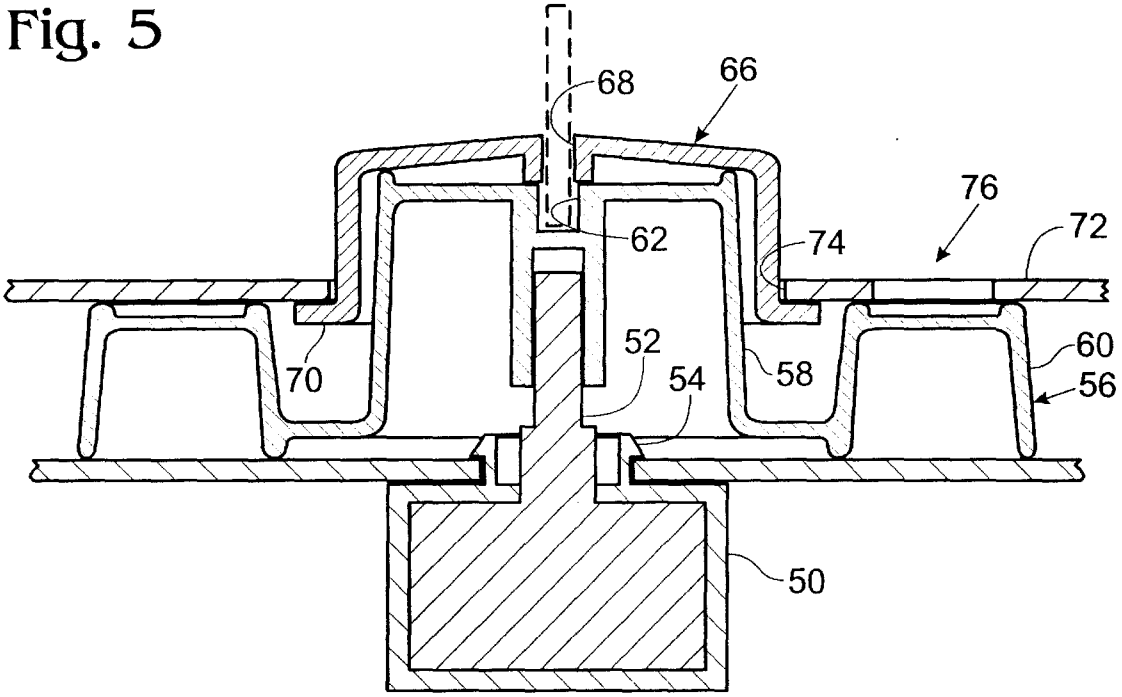


Fig. 3a

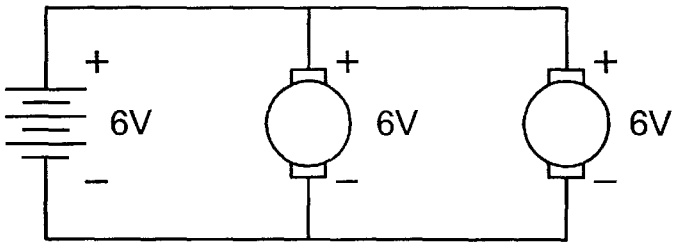


Fig. 3b

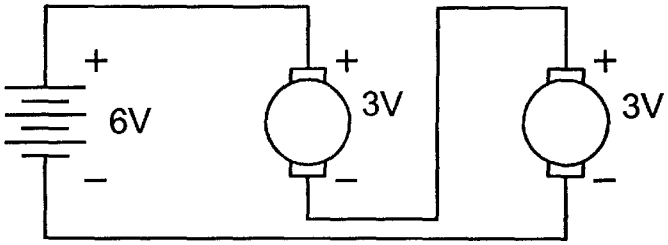


Fig. 3c

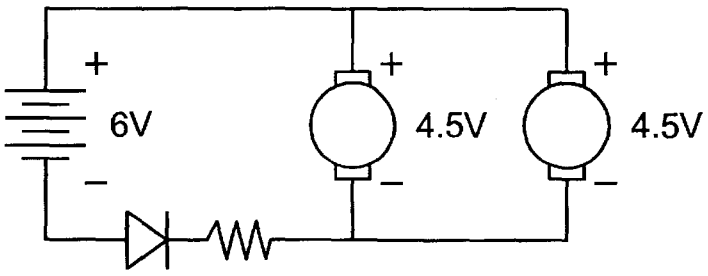
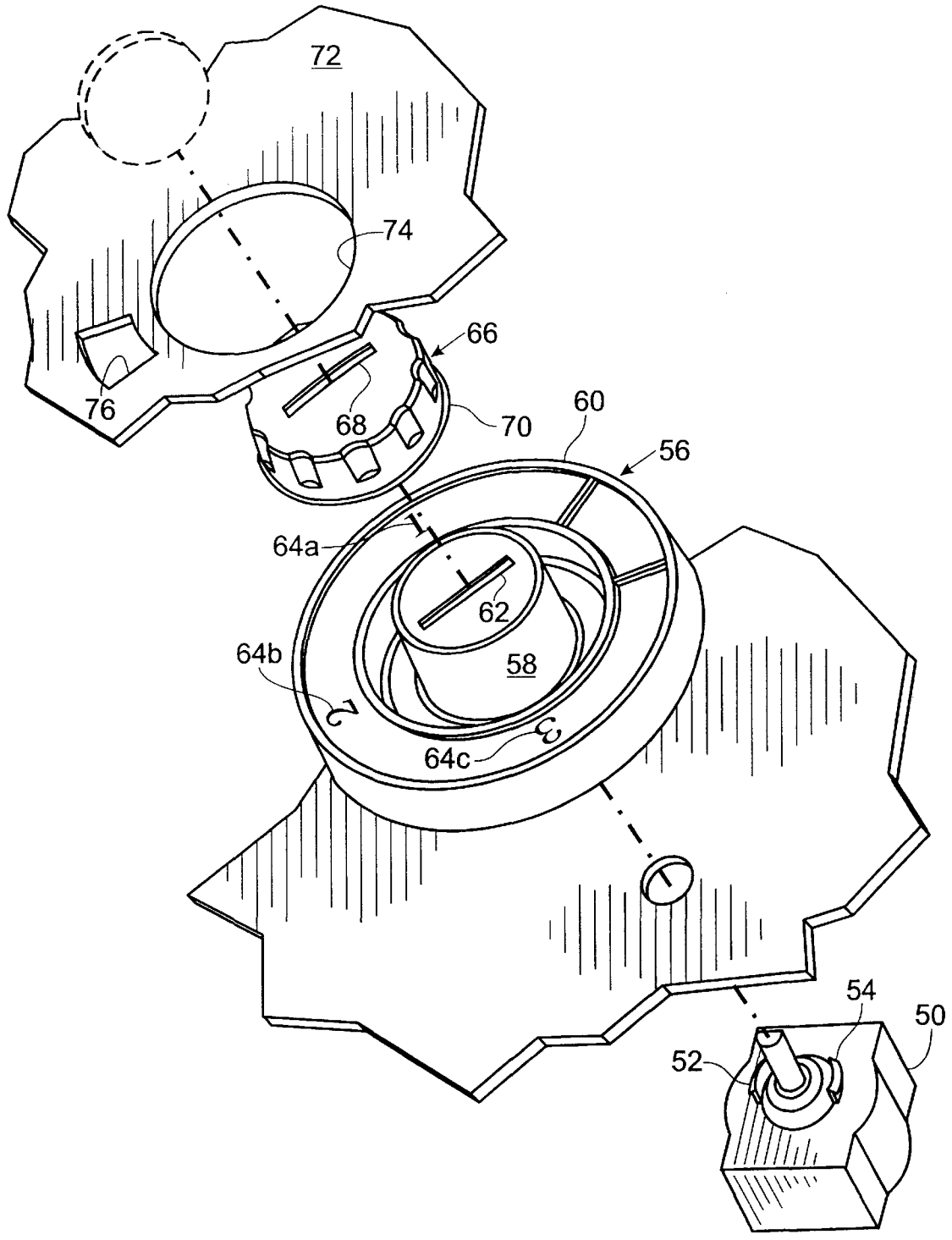


Fig. 4



ADJUSTABLE SPEED CONTROL FOR CHILDREN'S RIDE-ON VEHICLE

BACKGROUND AND SUMMARY OF THE INVENTION

The present invention relates to children's ride-on vehicles, and more particularly to an adjustable speed control for such a vehicle.

Children's ride-on vehicles typically utilize one or two small electric motors powered by a 6 or 12-volt battery. Depending on the power output capability of the motors and how they are connected to the battery, various speeds can be achieved by the vehicle. For instance, Power Wheels™ currently manufactures three different series vehicles: the Toddler series, which are suitable for children 1–3 years old and travel at a maximum of 1 mph; the Preschool series, which are suitable for children 1½–6 years old and have a maximum speed of 2.5–3.5 mph; and, the Advanced Series, which are suitable for children 3–7 years old and have speeds up to 5 mph.

In children's ride-on vehicles, the suitability for a child of a given age is primarily determined by the speed capability of the vehicle. With young children, slower vehicles are necessary for safe operation. As children mature and become more capable drivers, they are able to operate faster vehicles with safety and confidence. In fact, vehicles for older children must offer higher speeds to maintain the children's interest.

Due to their complexity, children's ride-on vehicles are a relatively expensive toy. It is therefore important for such a vehicle to offer the longest possible useful life. In the past, useful life has primarily been limited by the maximum speed of the vehicle. A high speed vehicle cannot be used by a toddler and a low speed vehicle is not sufficiently entertaining for an older child. Although ride-on vehicles have been produced with a high and a low speed and including a high speed lock-out capability, the lock out mechanism is rather cumbersome to use, and only two speeds are offered. Preferably, for maximum utility, a children's ride-on vehicle should have at least three selectable maximum speeds. Furthermore, it should be quick and easy for a parent to select the vehicles maximum speed.

With the above problems in mind, it is a general object of the present invention to provide an adjustable speed control for a children's ride-on vehicle which can selectively limit the maximum speed of the vehicle.

It is another object of the present invention to provide such an adjustable speed control which can only be operated by an adult.

One more object of the present invention is to provide an adjustable speed control that is simple to manufacture and reliable in operation.

An additional object is to provide an adjustable speed control which presents a voltage to the motor or motors that is relatively independent of current draw.

Another object of the present invention is to provide an adjustable speed control that offers three different speed configurations.

These and other objects are satisfied by providing an adjustable speed control for use on a children's ride-on vehicle, where the speed control includes a switch assembly interposed between the battery and the motor of the vehicle. The switch assembly is selectively operable to connect the battery to the motor in one of a number of speed configurations, including a first speed configuration and a second speed configuration. An actuator is connected to the switch assembly and manipulable by a user to allow the user to operate the switch assembly to select a particular speed configuration from among the number of speed configurations. In one embodiment of the invention, a diode is disposed in series between the motor and battery in one of the speed configurations to provide a relatively current independent voltage drop between the motor and the battery. In an alternative embodiment, a childproof cover is disposed proximal to the actuator. The cover has a first configuration in which it substantially prevents a child from manipulating the actuator to operate the switch assembly to alter the selected particular speed configuration.

Many other features, advantages and additional objects of the present invention will become manifest to those versed in the art upon making reference to the detailed description which follows and the accompanying sheets of drawings in which preferred embodiments incorporating the principles of this invention are disclosed as illustrative examples only.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of a ride-on vehicle constructed according to the present invention.

FIG. **2***a* is a schematic view of an adjustable speed control according to the present invention.

FIG. **2***b* is a table showing the contact pattern of a switch for use with the present invention.

FIGS. **3***a–c* show schematics of three different speed configurations according to the present invention.

FIG. **4** is an exploded view of an adjustable speed control.

FIG. **5** is a cross-sectional view of the speed control of FIG. **4** in an assembled state.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

A ride-on vehicle constructed according to the present invention is shown generally at **10** in FIG. **1**. Vehicle **10** includes a body **12**, wheels **14** and a seat **16**. The rear two wheels are each driven by a motor, illustrated schematically at **20**, **22** in FIG. **2**a. Motors **20**, **22** are powered by a 6 or 12 volt battery pack **24**, typically disposed under the hood of the vehicle, and illustrated schematically in FIG. **2***a*.

Mounted to body **12** is an adjustable speed control **30**, as shown schematically in FIG. **2***a*. Adjustable speed control **30** includes a switch assembly **32** disposed between motors **20**, **22** and battery pack **24**. Switch assembly **32** is designed to switch the connection between the battery and motor into one of three speed configurations. As illustrated in FIG. **2***a* with the speed control, a foot pedal switch **34** is the primary on/off control for the rider and is mounted in the vehicle to appear as a gas pedal. Switch **34** is simply an on/off switch and interrupts the current flow to stop the car. A direction control switch **36** is configured to switch the polarity of the voltage to the motors to provide a reverse for the vehicle. A resistor **38** is disposed in parallel with the motors to provide dynamic braking by offering a current path between the terminals of the motors when they are disconnected from the battery. This increases the resistance of the motors to free spinning and therefore slows the vehicle by braking the wheels.

In the first speed configuration of the adjustable speed control, shown in FIG. **3***a*, the motors are wired in parallel to the battery. This results in each battery receiving the full voltage from the battery and provides the highest speed for the vehicle. As illustrated in the contact table of FIG. **2***b*, the

DOCKET ALARM

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts

Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research

With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips

Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS
Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS
Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS
Sync your system to PACER to automate legal marketing.