US006451409B1

(12) **United States Patent**
**Lassiter**

(10) **Patent No.: US 6,451,409 B1**
(45) **Date of Patent: *Sep. 17, 2002**

(54) **ROOFING MATERIAL WITH INTEGRALLY FORMED NAIL TABS**

(76) Inventor: **Robert F. Lassiter**, 141 S. Barton La., Levelland, TX (US) 79336

( * ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **08/561,816**

(22) Filed: **Nov. 22, 1995**

**Related U.S. Application Data**

(63) Continuation-in-part of application No. 08/544,300, filed on Oct. 17, 1995, now abandoned.

(51) **Int. Cl.**[7] ..... **E04B 7/00**

(52) **U.S. Cl.** ..... **428/147**; 428/195; 428/198; 428/196; 428/197; 428/200; 428/206; 428/207; 52/408; 52/410; 52/411; 52/413; 52/376; 52/364; 52/366

(58) **Field of Search** ..... 428/147, 195, 428/198, 196, 197, 200, 206, 207; 52/408, 410, 411, 413, 376, 364, 366

(56) **References Cited**

U.S. PATENT DOCUMENTS

| | | | | |
|---|---|---|---|---|
| 3,779,373 | A | 12/1973 | Maier | 206/56 DF |
| 3,841,474 | A | 10/1974 | Maier | 206/346 |
| 3,904,032 | A | 9/1975 | Maier | 206/347 |
| 4,033,499 | A | 7/1977 | Butler | 227/120 |
| 4,554,196 | A * | 11/1985 | Meeker | 428/67 |
| 4,624,721 | A | 11/1986 | Sadler et al. | 156/92 |
| 4,627,207 | A | 12/1986 | Young et al. | 52/361 |
| 4,641,472 | A | 2/1987 | Young et al. | 52/361 |
| 4,788,807 | A | 12/1988 | Whitman | 52/410 |
| 5,130,178 | A * | 7/1992 | Zerfass et al. | 428/198 |
| 5,309,685 | A * | 5/1994 | Rathgeber et al. | 52/58 |
| 5,365,709 | A | 11/1994 | Lassiter | 52/408 |
| 5,407,313 | A | 4/1995 | Bruins et al. | 411/544 |
| 5,415,511 | A | 5/1995 | Damron | 411/480 |
| 5,469,671 | A * | 11/1995 | Rathgeber et al. | 52/58 |

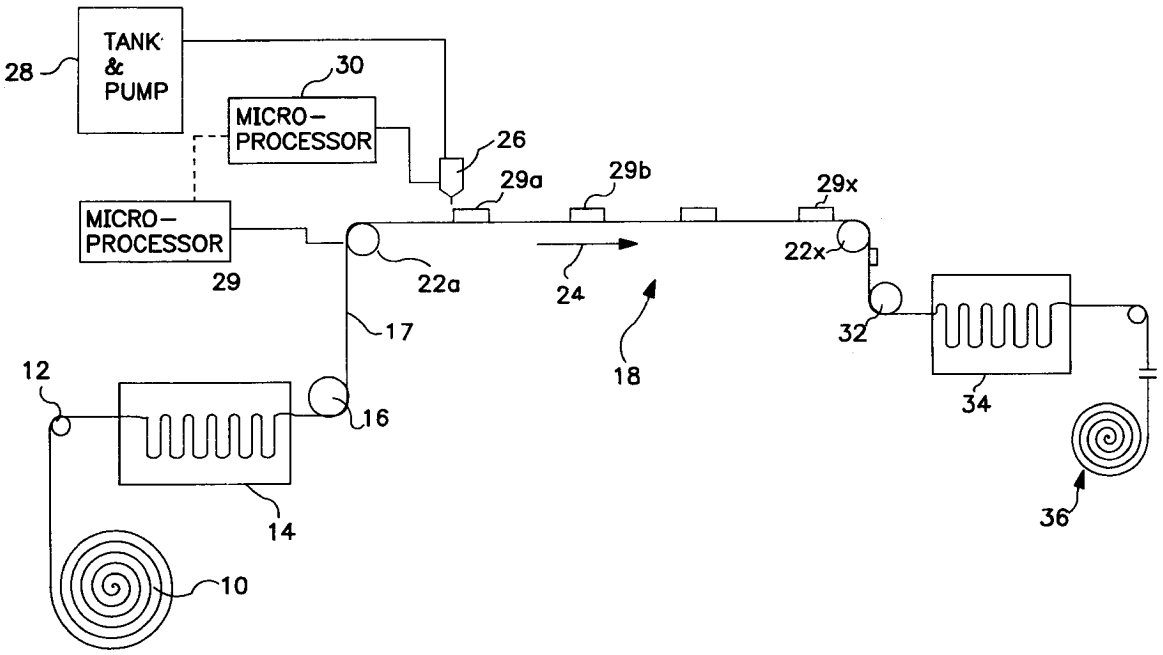
* cited by examiner

*Primary Examiner*—William P. Watkins, III

(57) **ABSTRACT**

A composite roofing material includes a final condition underlayment material having bonded thereto appropriate rows of nail tabs preferably made of thermoplastic-based material, such as low density polyethylene material, and of a contrasting color to the underlayment material. A process is used to make the nail tabs by conveying the saturated underlayment material in a continuous process past appropriate sets of nozzles that are coordinated with the speed of conveyance to deposit the tabs while in a liquid state and to form tabs of appropriate size and appropriately patterned across the underlayment surface. Each nozzle can include multiple orifices to control the width and thickness of the formed tabs. A similar process is disclosed for making other building cover materials having rows of nail tabs coinciding with standard stud spacing.

**8 Claims, 2 Drawing Sheets**



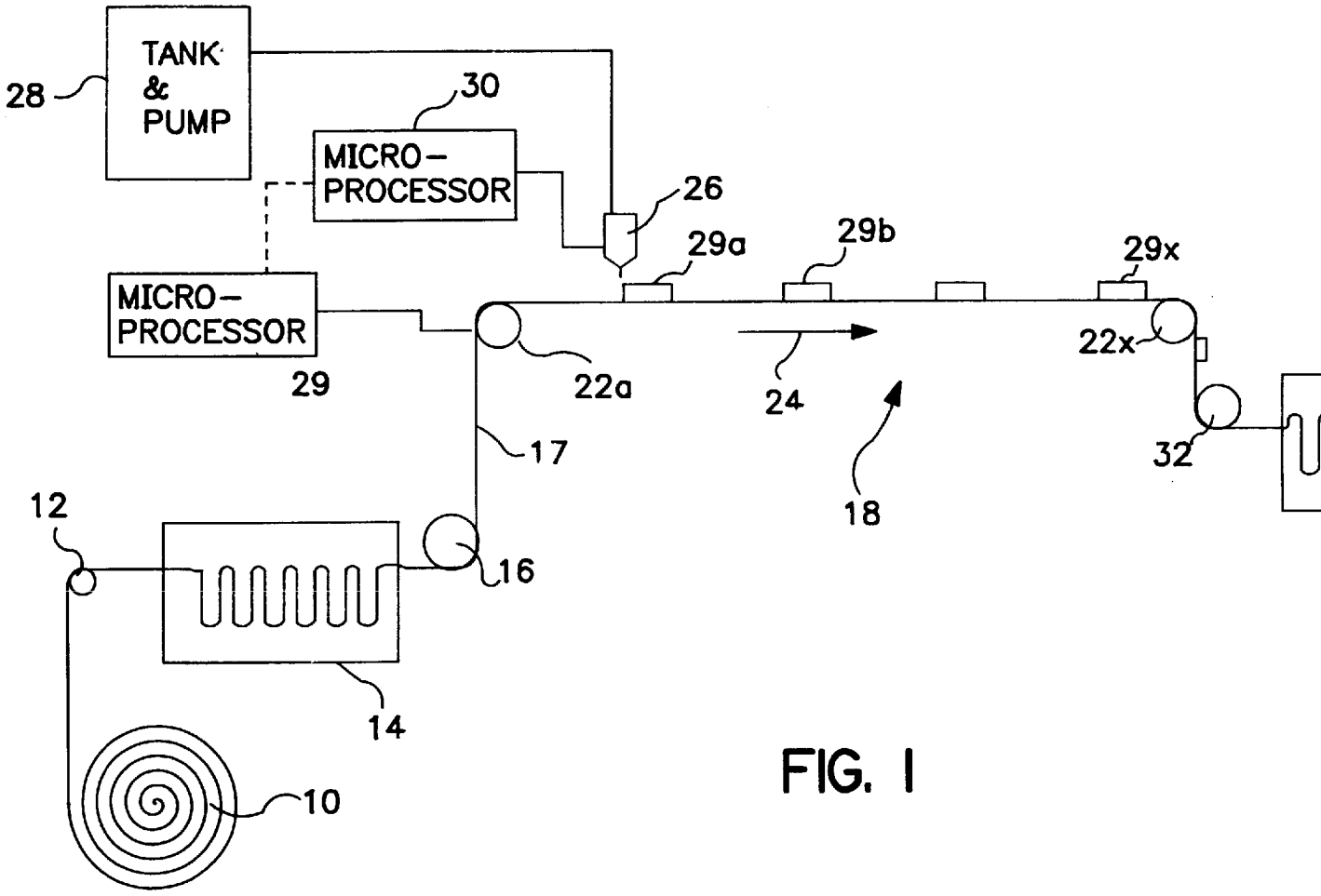



FIG. 1

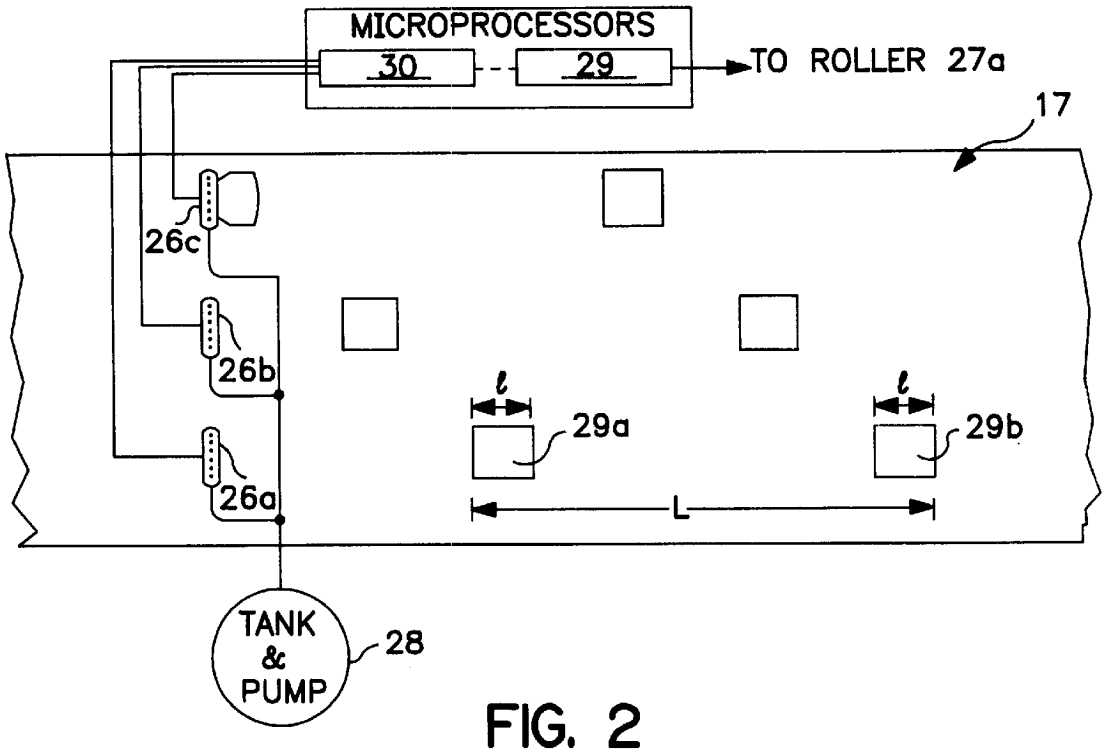



FIG. 2

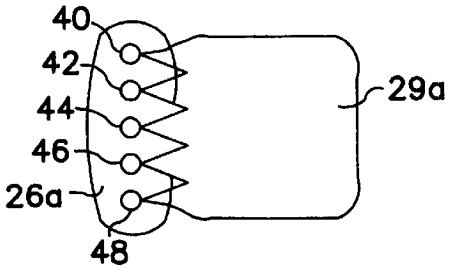



FIG. 3

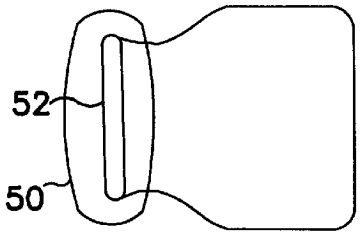



FIG. 4

# ROOFING MATERIAL WITH INTEGRALLY FORMED NAIL TABS

This application is a continuation-in-part of application Ser. No. 08/544,300, filed Oct. 17, 1995, now abandoned, entitled "Roofing Material With Integrally Formed Nail Tabs" by the same inventor.

## FIELD OF THE INVENTION

This invention pertains to roofing materials or other building materials normally employed as cover materials prior to the installation of roofing shingles or external building finish siding and more specifically to such cover materials incorporating therein a plurality of integrally formed nail tabs.

## BACKGROUND OF THE INVENTION

A shingle roof installation generally comprises at least two distinctive layers. The first layer is an underlayment, usually a saturated asphalt material that attaches directly to the plywood sheets or board material that supports the shingles. The second layer is made up of the shingles themselves. Normally, the underlayment assists in making the roof resistant to water intrusion. The starting material for the underlayment is a base material usually referred to as "dry felt". Examples of types of dry felt starting material are rag, paper and fiberglass, which is not exhaustive of possible starting base materials. The starting base material that has actually been subject to experimentation is a fibrous paper made from treating recyclable cardboard; however, this invention is not limited thereto. The term "dry felt" used herein is used generically for all suitable starting base material. Dry felt material when saturated with an asphalt material produces an underlayment roofing material known in the trade as "tar paper" or "saturated felt", which is produced in various grades depending on thickness and weight.

Regardless of the type of underlayment roofing material that has been employed, common practice in the installation industry has been to unroll a length of the underlayment material and affix each length to the support sheets or boards at a plurality of locations so that it stays in place prior to the installation of the covering shingles. The affixing or fastening devices for this material are generally staples and nails. Staples and regular nails are readily applied by power devices; however, both are notoriously susceptible to either pulling out of the sheets or boards when there is an uplift on the underlayment or, when the staples or nails stay in place, tearing of the roofing material at the fastening locations. Even when shingling is to follow immediately, the underlayment can still be exposed alone to windy and other adverse conditions, such as when the installers walk or crawl on the underlayment.

Moreover, it is desirable that the underlayment be securely attached independently of the shingles not only in the pre-shingling stage of installation, but also in the final installation. This is because shingles do get blown or ripped off under adverse weather conditions and a securely independently installed underlayment will provide some interim protection from the weather elements prior to roof repair. When the underlayment is not securely fastened, then the underlayment may be blown away or ripped concurrently with shingle damage.

To securely install the underlayment and avoid the tearing described above, it has long been a common practice to either use roofing nails with large heads or to use an auxiliary large washer or tab that lies underneath the nail head. Such large washer or tab successfully resists being torn through as with a smaller nail head of regular size. The use of such washer or tab has not been totally satisfactory, however, since such use is time consuming, somewhat expensive, and can be somewhat dangerous when the installation is on a fairly steeply pitched roof and/or the conditions are inclement. This is because it requires two hands to either slip the washer over the nail or to hold a tab down while driving the nail through. If the installer is having to reach while only supporting himself or herself on a toeboard, it may be uncomfortable and/or unstable to be unable to use either hand for additional support when necessary. Moreover, nails with large, unconventional heads are not recommended both because they are expensive and because they cannot be used in ordinary power equipment. ordinarily, power equipment for driving nails can be loaded only with standard nail cartridges.

U.S. Pat. No. 5,365,709, commonly owned herewith, describes an improved underlayment roofing material that includes a plurality of suitable nail tabs attached to a felt base. The concept therein described was to produce a roll of underlayment that had the tabs in place so that the installer would not have to separately handle a washer or a separated tab and nail. With the tabs in place, the installer would merely target the tabs one by one with a conventional power driven nail gun. Such installation would be many times faster than installations previously described and would be less cumbersome to the installer since the nailing process would not require both hands when a nail gun is used. However, the underlayment therein described has not been used commercially. To make a dry felt material with glued-on tabs, as described in the '709 patent, into saturated felt material requires the adhesive and the tab material to not materially degrade during the asphalt saturation process. The high temperature of this process and the rollers used tend to either melt the adhesive glue, melt the tab material itself, scrape off the tabs, or a combination of all three, any of which renders the resulting saturated felt material unreliable, if not unsuited, for commercial use.

It has been discovered, as hereinafter described, that tabs can be permanently and reliably affixed or bonded to saturated felt material avoiding many of the problems attendant to affixing tabs to the dry felt base material as described in the '709 patent. Moreover, it has been discovered that the process of producing suitable tabs onto saturated felt material can be automated using liquid thermoplastic tab material that quickly solidifies and adheres or bonds to the surface of the saturated felt material.

Also, importantly, it has been discovered that the production of tabs onto the saturated felt material can be done immediately following the step of dipping or spraying the dry felt material with a suitable hot asphalt mix to make saturated felt material. Thus, the conversion of dry felt to saturated felt can be combined in an automated process with the subsequent production of the tabs.

In addition to saturated felt material used in a roofing application, suitable tabs can also be similarly installed using liquid thermoplastic tab material to other base sheeting materials, such as siding materials used for wrapping the side of a framed house or other structure prior to securing the finish siding.

Therefore, it is a feature of the present invention to provide an improved sheeting material having nail tabs produced directly onto at least one of its surfaces.

It is another feature of the present invention to provide an improved underlayment roofing material incorporating nail

tabs therein that are tough and compliant that are produced directly on saturated felt material.

It is yet another feature of the present invention to provide such an underlayment roofing material incorporating nail tabs therein that are of a material that is reliable when used in the extremes of ambient temperature conditions encountered in typical installations.

It is still another feature of the present invention to provide an improved underlayment roofing material utilizing an automated process for applying a liquid thermoplastic material at appropriate tab positions using nozzles that are readily programmably controlled.

It is yet another feature of the present invention to provide an improved underlayment material, wherein the overall process is continuous and automated to include the saturation of dry felt material to make saturated felt material followed by the production of suitable nail tabs from pressurized liquid thermoplastic-based or other material that subsequently hardens and securely bonds to the surface of the saturated felt material.

## SUMMARY OF THE INVENTION

A composite roofing material is made starting with a roll of dry felt material. In the preferred method of producing the underlayment roofing material in accordance with this invention, the dry felt material is introduced to the beginning of a continuous and automated process having a system of driven rollers for transporting the roofing material through the process. First, the dry felt material undergoes treatment in conventional fashion to produce asphalt saturated felt material from the dry felt material. Then, a suitable liquid thermoplastic-based or other material is deposited on the rapidly moving saturated felt using appropriately positioned nozzles or nozzle sets. The on/off operation of the nozzles or nozzle sets and the movement of the saturated felt material are respectively controlled and coordinated by one or more suitable programmable microprocessors. The thermoplastic-based material may include an appropriate adhesive to ensure that it bonds to the surface of the saturated felt material as it rapidly cools and hardens to form the desired nail pads or tabs. The thermoplastic-based material may be reinforced with fibers, flakes or other similar particles, and such material may also include a color contrasting dye to that of the underlying saturated felt material, which is normally black. Even without an added dye, however, the tabs do contrast in color and are readily visible.

By the time the saturated felt material with tabs reaches a "free looper" stage, the tabs are sufficiently cooled and hardened to operational conditions. That is, they are tough, but flexible. The free looper is followed by a final stage, where the underlayment material with tabs is wound to make up standard sized rolls. The free looper allows this action to occur without impacting on the prior continuous movement of the conveyed saturated felt during the foregoing tab producing stage of the operation.

As mentioned, the final resulting composite roofing material just described is manufactured using a machine that includes one or more depositing nozzles at each row location. The liquid thermoplastic-based or equivalent material is normally supplied to the depositing nozzles under pressure. The nozzles are turned on and then off to deposit the material in the correct quantity and at the correct spacing, which preferably staggers the tabs across the width of the base felt material. The line speed of conveyance determines, through the operation of a microprocessor, the durations of both the "on" time and the "off" time.

Each "nozzle" used for making the deposits is preferably either a plurality of closely spaced orifices in a common manifold housing or an elongated slit opening so as to cover a wide enough area for making tabs of the preferred width dimension without forming a tab that is too thick. When a plurality of orifices are employed, the liquid material flowing from the individual orifices blends together, cools and hardens to form the individual tabs.

## BRIEF DESCRIPTION OF THE DRAWINGS

So that the manner in which the above recited features, advantages and objects of the invention, as well as others which will become apparent, are attained and can be understood in detail, more particular description of the invention briefly summarized above may be had by reference to the embodiment thereof which is illustrated in the appended drawings, which drawings form a part of this specification. It is to be noted, however, that the drawings illustrate only a preferred embodiment of the invention and is therefore not to be considered limiting of its scope as the invention may admit to other equally effective embodiments.

In the drawings:

FIG. **1** is a schematic side view of an automated process of manufacturing a composite roofing material of the invention in accordance with a preferred procedure.

FIG. **2** is a schematic top view of the nail tab production area of the automated process shown in FIG. **1**.

FIG. **3** is a schematic representation of a nozzle with a manifold housing having a plurality of orifices used in the process of manufacturing the composite roofing material as shown in FIG. **2**.

FIG. **4** is a schematic representation of a nozzle having an elongated slit used in the process of manufacturing the composite roofing material as shown in FIG. **2**.

## DESCRIPTION OF THE PREFERRED EMBODIMENTS

The making of the composite roofing material preferably employs a machine manufactured by Nordson Corp. of Westlake, Ohio that uses one or more nozzle sets for dispensing multiple beads of viscous liquid, as set forth in U.S. Pat. No. 5,335,825, which is incorporated herein for all purposes. This machine has been utilized in the past, for example, in laying down small beads of glue onto stock cardboard, which when subsequently cut and folded produces boxes. Other suitable equipment can be used, if desired.

The process illustrated in FIG. **1** is generally a roller driven system that moves from left to right in the drawing. The end of a roll **10** of appropriate dry felt material to be saturated is conveyed using a drive roller **12** to a treatment area **14** for asphalt saturating the dry felt in conventional fashion. This saturating treatment stage is illustrated as a series of turns of the unrolled felt material since that fairly represents how the material is fed through the hot asphalt bath or pit to saturate the dry felt material. The temperature of the asphalt that is applied is typically in excess of 400° F. As the saturated felt material exits the saturating treatment stage, it may be cooled by use of a water cooled chill roll **16**. Other means of cooling the saturated felt may be used, if desired. For example, conveying the material through a long distance in a cool ambient environment would produce the same cooling result.

It has been discovered, however, the subsequent production of the nail tabs can be produced without detriment onto

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.